



**Exam** CISSP

**Title** Certified Information Systems Security Professional

**Updated** Version: 15.1

**Product Type** 1373 Q & A with Explanation



**QUESTION 1**

A potential problem related to the physical installation of the Iris Scanner in regards to the usage of the iris pattern within a biometric system is:

- A. Concern that the laser beam may cause eye damage.
- B. The iris pattern changes as a person grows older.
- C. There is a relatively high rate of false accepts.
- D. The optical unit must be positioned so that the sun does not shine into the aperture.

Answer: D

Explanation: Because the optical unit utilizes a camera and infrared light to create the images, sun light can impact the aperture so it must not be positioned in direct light of any type. Because the subject does not need to have direct contact with the optical reader, direct light can impact the reader.

An Iris recognition is a form of biometrics that is based on the uniqueness of a subject's iris. A camera like device records the patterns of the iris creating what is known as Iriscode.

It is the unique patterns of the iris that allow it to be one of the most accurate forms of biometric identification of an individual. Unlike other types of biometrics, the iris rarely changes over time. Fingerprints can change over time due to scaring and manual labor, voice patterns can change due to a variety of causes, hand geometry can also change as well. But barring surgery or an accident it is not usual for an iris to change. The subject has a high-resolution image taken of their iris and this is then converted to Iriscode. The current standard for the Iriscode was developed by John Daugman. When the subject attempts to be authenticated an infrared light is used to capture the iris image and this image is then compared to the Iriscode. If there is a match the subject's identity is confirmed. The subject does not need to have direct contact with the optical reader so it is a less invasive means of authentication than retinal scanning would be.

Reference(s) used for this question:

AIO, 3rd edition, Access Control, p 134

AIO, 4th edition, Access Control, p 182

Wikipedia - [http://en.wikipedia.org/wiki/Iris\\_recognition](http://en.wikipedia.org/wiki/Iris_recognition)

The following answers are incorrect:

Concern that the laser beam may cause eye damage. The optical readers do not use laser so, concern that the laser beam may cause eye damage is not an issue.

The iris pattern changes as a person grows older. The question asked about the physical installation of the scanner, so this was not the best answer. If the question would have been about long term problems then it could have been the best choice. Recent research has shown that Irises actually do change over time: <http://www.nature.com/news/ageing-eyes-hinder-biometric-scans-110722>

There is a relatively high rate of false accepts. Since the advent of the Iriscode there is a very low rate of false accepts, in fact the algorithm used has never had a false match. This all depends on the quality of the equipment used but because of the uniqueness of the iris even when comparing identical twins, iris patterns are unique.

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**QUESTION 2**

In Mandatory Access Control, sensitivity labels attached to object contain what information?

- A. The item's classification
- B. The item's classification and category set
- C. The item's category
- D. The item's need to know

Answer: B

Explanation: The following is the correct answer: the item's classification and category set.

A Sensitivity label must contain at least one classification and one category set.

Category set and Compartment set are synonyms, they mean the same thing. The sensitivity label must contain at least one Classification and at least one Category. It is common in some environments for a single item to belong to multiple categories. The list of all the categories to which an item belongs is called a compartment set or category set.

The following answers are incorrect:

The item's classification. Is incorrect because you need a category set as well.

The item's category. Is incorrect because category set and classification would be both be required.

The item's need to know. Is incorrect because there is no such thing. The need to know is indicated by the categories the object belongs to. This is NOT the best answer.

Reference(s) used for this question:

OIG CBK, Access Control (pages 186 - 188)

AIO, 3rd Edition, Access Control (pages 162 - 163)

AIO, 4th Edition, Access Control, pp 212-214

Wikipedia - [http://en.wikipedia.org/wiki/Mandatory\\_Access\\_Control](http://en.wikipedia.org/wiki/Mandatory_Access_Control)

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**QUESTION 3**

Which of the following is true about Kerberos?

- A. It utilizes public key cryptography.
- B. It encrypts data after a ticket is granted, but passwords are exchanged in plain text.
- C. It depends upon symmetric ciphers.
- D. It is a second party authentication system.

Answer: C

Explanation: Kerberos depends on secret keys (symmetric ciphers). Kerberos is a third party authentication protocol. It was designed and developed in the mid 1980's by MIT. It is considered open source but is copyrighted and owned by MIT. It relies on the user's secret keys. The password is used to encrypt and decrypt the keys.

The following answers are incorrect:

It utilizes public key cryptography. Is incorrect because Kerberos depends on secret keys (symmetric ciphers).

It encrypts data after a ticket is granted, but passwords are exchanged in plain text. Is incorrect

because the passwords are not exchanged but used for encryption and decryption of the keys. It is a second party authentication system. Is incorrect because Kerberos is a third party authentication system, you authenticate to the third party (Kerberos) and not the system you are accessing.

References:

MIT <http://web.mit.edu/kerberos/>

Wikipedia [http://en.wikipedia.org/wiki/Kerberos\\_%28protocol%29](http://en.wikipedia.org/wiki/Kerberos_%28protocol%29)

OIG CBK Access Control (pages 181 - 184)

AIOv3 Access Control (pages 151 - 155)

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#### QUESTION 4

Which of the following is needed for System Accountability?

- A. Audit mechanisms.
- B. Documented design as laid out in the Common Criteria.
- C. Authorization.
- D. Formal verification of system design.

Answer: A

Explanation: Is a means of being able to track user actions. Through the use of audit logs and other tools the user actions are recorded and can be used at a later date to verify what actions were performed.

Accountability is the ability to identify users and to be able to track user actions.

The following answers are incorrect:

Documented design as laid out in the Common Criteria. Is incorrect because the Common Criteria is an international standard to evaluate trust and would not be a factor in System Accountability.

Authorization. Is incorrect because Authorization is granting access to subjects, just because you have authorization does not hold the subject accountable for their actions.

Formal verification of system design. Is incorrect because all you have done is to verify the system design and have not taken any steps toward system accountability.

References:

OIG CBK Glossary (page 778)

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#### QUESTION 5

What is Kerberos?

- A. A three-headed dog from the egyptian mythology.
- B. A trusted third-party authentication protocol.
- C. A security model.
- D. A remote authentication dial in user server.

Answer: B

Explanation: Is correct because that is exactly what Kerberos is.

The following answers are incorrect:

A three-headed dog from Egyptian mythology. Is incorrect because we are dealing with Information Security and not the Egyptian mythology but the Greek Mythology.

A security model. Is incorrect because Kerberos is an authentication protocol and not just a security model.

A remote authentication dial in user server. Is incorrect because Kerberos is not a remote authentication dial in user server that would be called RADIUS.

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### QUESTION 6

Kerberos depends upon what encryption method?

- A. Public Key cryptography.
- B. Secret Key cryptography.
- C. El Gamal cryptography.
- D. Blowfish cryptography.

Answer: B

Explanation: Kerberos depends on Secret Keys or Symmetric Key cryptography.

Kerberos a third party authentication protocol. It was designed and developed in the mid 1980's by MIT. It is considered open source but is copyrighted and owned by MIT. It relies on the user's secret keys. The password is used to encrypt and decrypt the keys.

This question asked specifically about encryption methods. Encryption methods can be SYMMETRIC (or secret key) in which encryption and decryption keys are the same, or ASYMMETRIC (aka 'Public Key') in which encryption and decryption keys differ.

'Public Key' methods must be asymmetric, to the extent that the decryption key CANNOT be easily derived from the encryption key. Symmetric keys, however, usually encrypt more efficiently, so they lend themselves to encrypting large amounts of data. Asymmetric encryption is often limited to ONLY encrypting a symmetric key and other information that is needed in order to decrypt a data stream, and the remainder of the encrypted data uses the symmetric key method for performance reasons. This does not in any way diminish the security nor the ability to use a public key to encrypt the data, since the symmetric key method is likely to be even MORE secure than the asymmetric method.

For symmetric key ciphers, there are basically two types: BLOCK CIPHERS, in which a fixed length block is encrypted, and STREAM CIPHERS, in which the data is encrypted one 'data unit' (typically 1 byte) at a time, in the same order it was received in.

The following answers are incorrect:

Public Key cryptography. Is incorrect because Kerberos depends on Secret Keys or Symmetric Key cryptography and not Public Key or Asymmetric Key cryptography.

El Gamal cryptography. Is incorrect because El Gamal is an Asymmetric Key encryption algorithm.

Blowfish cryptography. Is incorrect because Blowfish is a Symmetric Key encryption algorithm.

References:

OIG CBK Access Control (pages 181 - 184)

AIOv3 Access Control (pages 151 - 155)

Wikipedia [http://en.wikipedia.org/wiki/Blowfish\\_%28cipher%29](http://en.wikipedia.org/wiki/Blowfish_%28cipher%29) ;

[http://en.wikipedia.org/wiki/El\\_Gamal](http://en.wikipedia.org/wiki/El_Gamal)

<http://www.mrp3com/encrypt.html>

**QUESTION 7**

A confidential number used as an authentication factor to verify a user's identity is called a:

- A. PIN
- B. User ID
- C. Password
- D. Challenge

Answer: A

Explanation: PIN Stands for Personal Identification Number, as the name states it is a combination of numbers.

The following answers are incorrect:

User ID This is incorrect because a Userid is not required to be a number and a Userid is only used to establish identity not verify it.

Password. This is incorrect because a password is not required to be a number, it could be any combination of characters.

Challenge. This is incorrect because a challenge is not defined as a number, it could be anything.

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**QUESTION 8**

Individual accountability does not include which of the following?

- A. unique identifiers
- B. policies & procedures
- C. access rules
- D. audit trails

Answer: B

Explanation: Accountability would not include policies & procedures because while important on an effective security program they cannot be used in determining accountability.

The following answers are incorrect:

Unique identifiers. Is incorrect because Accountability would include unique identifiers so that you can identify the individual.

Access rules. Is incorrect because Accountability would include access rules to define access violations.

Audit trails. Is incorrect because Accountability would include audit trails to be able to trace violations or attempted violations.

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**QUESTION 9**

Which of the following exemplifies proper separation of duties?

- A. Operators are not permitted modify the system time.
- B. Programmers are permitted to use the system console.
- C. Console operators are permitted to mount tapes and disks.

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- D. Tape operators are permitted to use the system console.

Answer: A

Explanation: This is an example of Separation of Duties because operators are prevented from modifying the system time which could lead to fraud. Tasks of this nature should be performed by system administrators.

AIO defines Separation of Duties as a security principle that splits up a critical task among two or more individuals to ensure that one person cannot complete a risky task by himself.

The following answers are incorrect:

Programmers are permitted to use the system console. Is incorrect because programmers should not be permitted to use the system console, this task should be performed by operators. Allowing programmers access to the system console could allow fraud to occur so this is not an example of Separation of Duties..

Console operators are permitted to mount tapes and disks. Is incorrect because operators should be able to mount tapes and disks so this is not an example of Separation of Duties.

Tape operators are permitted to use the system console. Is incorrect because operators should be able to use the system console so this is not an example of Separation of Duties.

References:

OIG CBK Access Control (page 98 - 101)

AIOv3 Access Control (page 182)

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### QUESTION 10

An access control policy for a bank teller is an example of the implementation of which of the following?

- A. Rule-based policy
- B. Identity-based policy
- C. User-based policy
- D. Role-based policy

Answer: D

Explanation: The position of a bank teller is a specific role within the bank, so you would implement a role-based policy.

The following answers are incorrect:

Rule-based policy. Is incorrect because this is based on rules and not the role of a bank teller so this would not be applicable for a specific role within an organization.

Identity-based policy. Is incorrect because this is based on the identity of an individual and not the role of a bank teller so this would not be applicable for a specific role within an organization.

User-based policy. Is incorrect because this would be based on the user and not the role of a bank teller so this would not be applicable for a specific role within an organization.

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### QUESTION 11

Which one of the following authentication mechanisms creates a problem for mobile users?

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- A. Mechanisms based on IP addresses
  - B. Mechanism with reusable passwords
  - C. One-time password mechanism.
  - D. Challenge response mechanism.

Answer: A

Explanation: Anything based on a fixed IP address would be a problem for mobile users because their location and its associated IP address can change from one time to the next. Many providers will assign a new IP every time the device would be restarted. For example an insurance adjuster using a laptop to file claims online. He goes to a different client each time and the address changes every time he connects to the ISP.

**NOTE FROM CLEMENT:**

The term MOBILE in this case is synonymous with Road Warriors where a user is constantly traveling and changing location. With smartphone today that may not be an issue but it would be an issue for laptops or WIFI tablets. Within a carrier network the IP will tend to be the same and would change rarely. So this question is more applicable to devices that are not cellular devices but in some cases this issue could affect cellular devices as well.

The following answers are incorrect:

Mechanism with reusable password. This is incorrect because reusable password mechanism would not present a problem for mobile users. They are the least secure and change only at specific interval one-time password mechanism. This is incorrect because a one-time password mechanism would not present a problem for mobile users. Many are based on a clock and not on the IP address of the user Challenge response mechanism. This is incorrect because challenge response mechanism would not present a problem for mobile users.

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## QUESTION 12

Organizations should consider which of the following first before allowing external access to their LANs via the Internet?

- A. Plan for implementing workstation locking mechanisms.
- B. Plan for protecting the modem pool.
- C. Plan for providing the user with his account usage information.
- D. Plan for considering proper authentication options.

Answer: D

Explanation: Before a LAN is connected to the Internet, you need to determine what the access controls mechanisms are to be used, this would include how you are going to authenticate individuals that may access your network externally through access control.

The following answers are incorrect:

Plan for implementing workstation locking mechanisms. This is incorrect because locking the workstations have no impact on the LAN or Internet access.

Plan for protecting the modem pool. This is incorrect because protecting the modem pool has no impact on the LAN or Internet access, it just protects the modem.

Plan for providing the user with his account usage information. This is incorrect because the

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question asks what should be done first. While important your primary concern should be focused on security.

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**QUESTION 13**

Kerberos can prevent which one of the following attacks?

- A. Tunneling attack.
- B. Playback (replay) attack.
- C. Destructive attack.
- D. Process attack.

Answer: B

Explanation: Each ticket in Kerberos has a timestamp and are subject to time expiration to help prevent these types of attacks.

The following answers are incorrect:

Tunneling attack. This is incorrect because a tunneling attack is an attempt to bypass security and access low-level systems. Kerberos cannot totally prevent these types of attacks.

Destructive attack. This is incorrect because depending on the type of destructive attack, Kerberos cannot prevent someone from physically destroying a server.

Process attack. This is incorrect because with Kerberos cannot prevent an authorized individuals from running processes

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**QUESTION 14**

In discretionary access environments, which of the following entities is authorized to grant information access to other people?

- A. Manager
- B. Group Leader
- C. Security Manager
- D. Data Owner

Answer: D

Explanation: In Discretionary Access Control (DAC) environments, the user who creates a file is also considered the owner and has full control over the file including the ability to set permissions for that file.

The following answers are incorrect:

Manager is incorrect because in Discretionary Access Control (DAC) environments it is the owner/user that is authorized to grant information access to other people group leader. Is incorrect because in Discretionary Access Control (DAC) environments it is the owner/user that is authorized to grant information access to other people security manager. Is incorrect because in Discretionary Access Control (DAC) environments it is the owner/user that is authorized to grant information access to other people.

**IMPORTANT NOTE:**

The term Data Owner is also used within Classifications as well. Under the subject of classification

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the Data Owner is a person from management who has been entrusted with a data set that belongs to the company. For example it could be the Chief Financial Officer (CFO) who is entrusted with all of the financial data for a company. As such the CFO would determine the classification of the financial data and who can access as well. The Data Owner would then tell the Data Custodian (a technical person) what the classification and need to know is on the specific set of data.

The term Data Owner under DAC simply means whoever created the file and as the creator of the file the owner has full access and can grant access to other subjects based on their identity.

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### QUESTION 15

What is the main concern with single sign-on?

- A. Maximum unauthorized access would be possible if a password is disclosed.
- B. The security administrator's workload would increase.
- C. The users' password would be too hard to remember.
- D. User access rights would be increased.

Answer: A

Explanation: A major concern with Single Sign-On (SSO) is that if a user's ID and password are compromised, the intruder would have access to all the systems that the user was authorized for. The following answers are incorrect:

The security administrator's workload would increase. Is incorrect because the security administrator's workload would decrease and not increase. The admin would not be responsible for maintaining multiple user accounts just the one.

The users' password would be too hard to remember. Is incorrect because the users would have less passwords to remember.

User access rights would be increased. Is incorrect because the user access rights would not be any different than if they had to log into systems manually.

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### QUESTION 16

Who developed one of the first mathematical models of a multilevel-security computer system?

- A. Diffie and Hellman.
- B. Clark and Wilson.
- C. Bell and LaPadula.
- D. Gasser and Lipner.

Answer: C

Explanation: In 1973 Bell and LaPadula created the first mathematical model of a multi-level security system.

The following answers are incorrect:

Diffie and Hellman. This is incorrect because Diffie and Hellman was involved with cryptography.  
Clark and Wilson. This is incorrect because Bell and LaPadula was the first model. The Clark-

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Wilson model came later, 1987

Gasser and Lipner. This is incorrect, it is a distractor. Bell and LaPadula was the first model

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### QUESTION 17

Which of the following attacks could capture network user passwords?

- A. Data diddling
- B. Sniffing
- C. IP Spoofing
- D. Smurfing

Answer: B

Explanation: A network sniffer captures a copy every packet that traverses the network segment the sniffer is connected to.

Sniffers are typically devices that can collect information from a communication medium, such as a network. These devices can range from specialized equipment to basic workstations with customized software.

A sniffer can collect information about most, if not all, attributes of the communication. The most common method of sniffing is to plug a sniffer into an existing network device like a hub or switch. A hub (which is designed to relay all traffic passing through it to all of its ports) will automatically begin sending all the traffic on that network segment to the sniffing device. On the other hand, a switch (which is designed to limit what traffic gets sent to which port) will have to be specially configured to send all traffic to the port where the sniffer is plugged in.

Another method for sniffing is to use a network tap—a device that literally splits a network transmission into two identical streams; one going to the original network destination and the other going to the sniffing device. Each of these methods has its advantages and disadvantages, including cost, feasibility, and the desire to maintain the secrecy of the sniffing activity.

The packets captured by a sniffer are decoded and then displayed by the sniffer. Therefore, if the username/password are contained in a packet or packets traversing the segment the sniffer is connected to, it will capture and display that information (and any other information on that segment it can see).

Of course, if the information is encrypted via a VPN, SSL, TLS, or similar technology, the information is still captured and displayed, but it is in an unreadable format.

The following answers are incorrect:

Data diddling involves changing data before, as it is entered into a computer, or after it is extracted.

Spoofing is forging an address and inserting it into a packet to disguise the origin of the communication - or causing a system to respond to the wrong address.

Smurfing would refer to the smurf attack, where an attacker sends spoofed packets to the broadcast address on a gateway in order to cause a denial of service.

The following reference(s) were/was used to create this question:

CISA Review manual 2014 Page number 321

Official ISC2 Guide to the CISSP 3rd edition Page Number 153

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**QUESTION 18**

Which of the following would constitute the best example of a password to use for access to a system by a network administrator?

- A. holiday
- B. Christmas12
- C. Jenny
- D. GyN19Za!

Answer: D

Explanation: GyN19Za! would be the best answer because it contains a mixture of upper and lower case characters, alphabetic and numeric characters, and a special character making it less vulnerable to password attacks.

All of the other answers are incorrect because they are vulnerable to brute force or dictionary attacks. Passwords should not be common words or names. The addition of a number to the end of a common word only marginally strengthens it because a common password attack would also check combinations of words:

Christmas23

Christmas123 etc...

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**QUESTION 19**

What physical characteristic does a retinal scan biometric device measure?

- A. The amount of light reaching the retina
- B. The amount of light reflected by the retina
- C. The pattern of light receptors at the back of the eye
- D. The pattern of blood vessels at the back of the eye

Answer: D

Explanation: The retina, a thin nerve (1/50th of an inch) on the back of the eye, is the part of the eye which senses light and transmits impulses through the optic nerve to the brain - the equivalent of film in a camera. Blood vessels used for biometric identification are located along the neural retina, the outermost of retina's four cell layers.

The following answers are incorrect:

The amount of light reaching the retina

The amount of light reaching the retina is not used in the biometric scan of the retina.

The amount of light reflected by the retina

The amount of light reflected by the retina is not used in the biometric scan of the retina.

The pattern of light receptors at the back of the eye

This is a distractor

The following reference(s) were/was used to create this question:

Reference: Retina Scan Technology.

ISC2 Official Guide to the CBK, 2007 (Page 161)

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**QUESTION 20**

The Computer Security Policy Model the Orange Book is based on is which of the following?

- A. Bell-LaPadula
- B. Data Encryption Standard
- C. Kerberos
- D. Tempest

Answer: A

Explanation: The Computer Security Policy Model Orange Book is based is the Bell-LaPadula Model. Orange Book Glossary.

The Data Encryption Standard (DES) is a cryptographic algorithm. National Information Security Glossary.

TEMPEST is related to limiting the electromagnetic emanations from electronic equipment.

Reference: U.S. Department of Defense, Trusted Computer System Evaluation Criteria (Orange Book), DOD 5200.28-STD. December 1985 (also available here).

**QUESTION 21**

The end result of implementing the principle of least privilege means which of the following?

- A. Users would get access to only the info for which they have a need to know
- B. Users can access all systems.
- C. Users get new privileges added when they change positions.
- D. Authorization creep.

Answer: A

Explanation: The principle of least privilege refers to allowing users to have only the access they need and not anything more. Thus, certain users may have no need to access any of the files on specific systems.

The following answers are incorrect:

Users can access all systems. Although the principle of least privilege limits what access and systems users have authorization to, not all users would have a need to know to access all of the systems. The best answer is still Users would get access to only the info for which they have a need to know as some of the users may not have a need to access a system.

Users get new privileges when they change positions. Although true that a user may indeed require new privileges, this is not a given fact and in actuality a user may require less privileges for a new position. The principle of least privilege would require that the rights required for the position be closely evaluated and where possible rights revoked.

Authorization creep. Authorization creep occurs when users are given additional rights with new positions and responsibilities. The principle of least privilege should actually prevent authorization creep.

The following reference(s) were/was used to create this question:

ISC2 OIG 2007 p.101,123

Shon Harris AIO v3 p148, 902-903

**QUESTION 22**

Which of the following is the most reliable authentication method for remote access?

- A. Variable callback system
- B. Synchronous token
- C. Fixed callback system
- D. Combination of callback and caller ID

Answer: B

Explanation: A Synchronous token generates a one-time password that is only valid for a short period of time. Once the password is used it is no longer valid, and it expires if not entered in the acceptable time frame.

The following answers are incorrect:

Variable callback system. Although variable callback systems are more flexible than fixed callback systems, the system assumes the identity of the individual unless two-factor authentication is also implemented. By itself, this method might allow an attacker access as a trusted user.

Fixed callback system. Authentication provides assurance that someone or something is who or what he/it is supposed to be. Callback systems authenticate a person, but anyone can pretend to be that person. They are tied to a specific place and phone number, which can be spoofed by implementing call-forwarding.

Combination of callback and Caller ID. The caller ID and callback functionality provides greater confidence and auditability of the caller's identity. By disconnecting and calling back only authorized phone numbers, the system has a greater confidence in the location of the call.

However, unless combined with strong authentication, any individual at the location could obtain access.

The following reference(s) were/was used to create this question:

Shon Harris AIO v3 p. 140, 548

ISC2 OIG 2007 p. 152-153, 126-127

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**QUESTION 23**

Which of the following is true of two-factor authentication?

- A. It uses the RSA public-key signature based on integers with large prime factors.
- B. It requires two measurements of hand geometry.
- C. It does not use single sign-on technology.
- D. It relies on two independent proofs of identity.

Answer: D

Explanation: It relies on two independent proofs of identity. Two-factor authentication refers to using two independent proofs of identity, such as something the user has (e.g. a token card) and something the user knows (a password). Two-factor authentication may be used with single signon. The following answers are incorrect: It requires two measurements of hand geometry. Measuring hand geometry twice does not yield two independent proofs.

It uses the RSA public-key signature based on integers with large prime factors. RSA encryption uses integers with exactly two prime factors, but the term "two-factor authentication" is not used in that context.

It does not use single sign-on technology. This is a detractor.

The following reference(s) were/was used to create this question:

Shon Harris AIO v.3 p.129

ISC2 OIG, 2007 p. 126

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### QUESTION 24

The primary service provided by Kerberos is which of the following?

- A. non-repudiation
- B. confidentiality
- C. authentication
- D. authorization

Answer: C

Explanation: non-repudiation. Since Kerberos deals primarily with symmetric cryptography, it does not help with non-repudiation.

confidentiality. Once the client is authenticated by Kerberos and obtains its session key and ticket, it may use them to assure confidentiality of its communication with a server; however, that is not a Kerberos service as such.

authorization. Although Kerberos tickets may include some authorization information, the meaning of the authorization fields is not standardized in the Kerberos specifications, and authorization is not a primary Kerberos service.

The following reference(s) were/was used to create this question:

ISC2 OIG, 2007 p. 179-184

Shon Harris AIO v.3 152-155

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### QUESTION 25

There are parallels between the trust models in Kerberos and Public Key Infrastructure (PKI).

When we compare them side by side, Kerberos tickets correspond most closely to which of the following?

- A. public keys
- B. private keys
- C. public-key certificates
- D. private-key certificates

Answer: C

Explanation: A Kerberos ticket is issued by a trusted third party. It is an encrypted data structure that includes the service encryption key. In that sense it is similar to a public-key certificate.

However, the ticket is not the key.

The following answers are incorrect:

public keys. Kerberos tickets are not shared out publicly, so they are not like a PKI public key. Private keys. Although a Kerberos ticket is not shared publicly, it is not a private key. Private keys are associated with Asymmetric crypto system which is not used by Kerberos. Kerberos uses only the Symmetric crypto system.

private key certificates. This is a detractor. There is no such thing as a private key certificate.

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**QUESTION 26**

In which of the following security models is the subject's clearance compared to the object's classification such that specific rules can be applied to control how the subject-to-object interactions take place?

- A. Bell-LaPadula model
- B. Biba model
- C. Access Matrix model
- D. Take-Grant model

Answer: A

Explanation: Details:

The

Answer: Bell-LaPadula model

The Bell-LAPadula model is also called a multilevel security system because users with different clearances use the system and the system processes data with different classifications.

Developed by the US Military in the 1970s.

A security model maps the abstract goals of the policy to information system terms by specifying explicit data structures and techniques necessary to enforce the security policy. A security model is usually represented in mathematics and analytical ideas, which are mapped to system specifications and then developed by programmers through programming code. So we have a policy that encompasses security goals, such as "each subject must be authenticated and authorized before accessing an object." The security model takes this requirement and provides the necessary mathematical formulas, relationships, and logic structure to be followed to accomplish this goal.

A system that employs the Bell-LaPadula model is called a multilevel security system because users with different clearances use the system, and the system processes data at different classification levels. The level at which information is classified determines the handling procedures that should be used. The Bell-LaPadula model is a state machine model that enforces the confidentiality aspects of access control. A matrix and security levels are used to determine if subjects can access different objects. The subject's clearance is compared to the object's classification and then specific rules are applied to control how subject-to-object subject-to-object interactions can take place.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 369). McGraw-Hill. Kindle Edition.

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**QUESTION 27**

Which of the following was developed to address some of the weaknesses in Kerberos and uses

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public key cryptography for the distribution of secret keys and provides additional access control support?

- A. SESAME
- B. RADIUS
- C. KryptoKnight
- D. TACACS+

Answer: A

Explanation: Secure European System for Applications in a Multi-vendor Environment (SESAME) was developed to address some of the weaknesses in Kerberos and uses public key cryptography for the distribution of secret keys and provides additional access control support.

Reference:

TIPTON, Harold, Official (ISC)2 Guide to the CISSP CBK (2007), page 184  
ISC OIG Second Edition, Access Controls, Page 111

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### QUESTION 28

Single Sign-on (SSO) is characterized by which of the following advantages?

- A. Convenience
- B. Convenience and centralized administration
- C. Convenience and centralized data administration
- D. Convenience and centralized network administration

Answer: B

Explanation: Convenience -Using single sign-on users have to type their passwords only once when they first log in to access all the network resources; and Centralized Administration as some single sign-on systems are built around a unified server administration system. This allows a single administrator to add and delete accounts across the entire network from one user interface.

The following answers are incorrect:

Convenience - alone this is not the correct answer.

Centralized Data or Network Administration - these are thrown in to mislead the student. Neither are a benefit to SSO, as these specifically should not be allowed with just an SSO.

References: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 1, page 35

TIPTON, Harold F. & HENRY, Kevin, Official (ISC)2 Guide to the CISSP CBK, 2007, page 180

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### QUESTION 29

What is the primary role of smartcards in a PKI?

- A. Transparent renewal of user keys
- B. Easy distribution of the certificates between the users
- C. Fast hardware encryption of the raw data
- D. Tamper resistant, mobile storage and application of private keys of the users

Answer: D

Reference: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 2001, McGraw-Hill/Osborne, page 139;

SNYDER, J., What is a SMART CARD?.

Wikipedia has a nice definition at: [http://en.wikipedia.org/wiki/Tamper\\_resistance](http://en.wikipedia.org/wiki/Tamper_resistance)  
Security

Tamper-resistant microprocessors are used to store and process private or sensitive information, such as private keys or electronic money credit. To prevent an attacker from retrieving or modifying the information, the chips are designed so that the information is not accessible through external means and can be accessed only by the embedded software, which should contain the appropriate security measures.

Examples of tamper-resistant chips include all secure cryptoprocessors, such as the IBM 4758 and chips used in smartcards, as well as the Clipper chip.

It has been argued that it is very difficult to make simple electronic devices secure against tampering, because numerous attacks are possible, including:

- physical attack of various forms (microprobing, drills, files, solvents, etc.)
  - freezing the device
  - applying out-of-spec voltages or power surges
  - applying unusual clock signals
  - inducing software errors using radiation
  - measuring the precise time and power requirements of certain operations (see power analysis)
- Tamper-resistant chips may be designed to zeroise their sensitive data (especially cryptographic keys) if they detect penetration of their security encapsulation or out-of-specification environmental parameters. A chip may even be rated for "cold zeroisation", the ability to zeroise itself even after its power supply has been crippled.

Nevertheless, the fact that an attacker may have the device in his possession for as long as he likes, and perhaps obtain numerous other samples for testing and practice, means that it is practically impossible to totally eliminate tampering by a sufficiently motivated opponent. Because of this, one of the most important elements in protecting a system is overall system design. In particular, tamper-resistant systems should "fail gracefully" by ensuring that compromise of one device does not compromise the entire system. In this manner, the attacker can be practically restricted to attacks that cost less than the expected return from compromising a single device (plus, perhaps, a little more for kudos). Since the most sophisticated attacks have been estimated to cost several hundred thousand dollars to carry out, carefully designed systems may be invulnerable in practice.

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### QUESTION 30

What kind of certificate is used to validate a user identity?

- A. Public key certificate
- B. Attribute certificate
- C. Root certificate
- D. Code signing certificate

Answer: A

Explanation: In cryptography, a public key certificate (or identity certificate) is an electronic document which incorporates a digital signature to bind together a public key with an identity — information such as the name of a person or an organization, their address, and so forth. The certificate can be used to verify that a public key belongs to an individual.

In a typical public key infrastructure (PKI) scheme, the signature will be of a certificate authority (CA). In a web of trust scheme, the signature is of either the user (a self-signed certificate) or other users ("endorsements"). In either case, the signatures on a certificate are attestations by the certificate signer that the identity information and the public key belong together.

In computer security, an authorization certificate (also known as an attribute certificate) is a digital document that describes a written permission from the issuer to use a service or a resource that the issuer controls or has access to use. The permission can be delegated.

Some people constantly confuse PKCs and ACs. An analogy may make the distinction clear. A PKC can be considered to be like a passport: it identifies the holder, tends to last for a long time, and should not be trivial to obtain. An AC is more like an entry visa: it is typically issued by a different authority and does not last for as long a time. As acquiring an entry visa typically requires presenting a passport, getting a visa can be a simpler process.

A real life example of this can be found in the mobile software deployments by large service providers and are typically applied to platforms such as Microsoft Smartphone (and related), Symbian OS, J2ME, and others.

In each of these systems a mobile communications service provider may customize the mobile terminal client distribution (ie. the mobile phone operating system or application environment) to include one or more root certificates each associated with a set of capabilities or permissions such as "update firmware", "access address book", "use radio interface", and the most basic one, "install and execute". When a developer wishes to enable distribution and execution in one of these controlled environments they must acquire a certificate from an appropriate CA, typically a large commercial CA, and in the process they usually have their identity verified using out-of-band mechanisms such as a combination of phone call, validation of their legal entity through government and commercial databases, etc., similar to the high assurance SSL certificate vetting process, though often there are additional specific requirements imposed on would-be developers/publishers.

Once the identity has been validated they are issued an identity certificate they can use to sign their software; generally the software signed by the developer or publisher's identity certificate is not distributed but rather it is submitted to processor to possibly test or profile the content before generating an authorization certificate which is unique to the particular software release. That certificate is then used with an ephemeral asymmetric key-pair to sign the software as the last step of preparation for distribution. There are many advantages to separating the identity and authorization certificates especially relating to risk mitigation of new content being accepted into the system and key management as well as recovery from errant software which can be used as attack vectors.

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 2001, McGraw-Hill/Osborne, page 540

[http://en.wikipedia.org/wiki/Attribute\\_certificate](http://en.wikipedia.org/wiki/Attribute_certificate)

[http://en.wikipedia.org/wiki/Public\\_key\\_certificate](http://en.wikipedia.org/wiki/Public_key_certificate)

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**QUESTION 31**

The following is NOT a security characteristic we need to consider while choosing a biometric identification systems:

- A. data acquisition process
- B. cost
- C. enrollment process
- D. speed and user interface

Answer: B

Explanation: Cost is a factor when considering Biometrics but it is not a security characteristic. All the other answers are incorrect because they are security characteristics related to Biometrics. Data acquisition process can cause a security concern because if the process is not fast and efficient it can discourage individuals from using the process.

Enrollment process can cause a security concern because the enrollment process has to be quick and efficient. This process captures data for authentication.

Speed and user interface can cause a security concern because this also impacts the users acceptance rate of biometrics. If they are not comfortable with the interface and speed they might sabotage the devices or otherwise attempt to circumvent them.

References:

OIG Access Control (Biometrics) (pgs 165-167)

From: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 1, Pages 5-6

\*\* in process of correction \*\*

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**QUESTION 32**

In biometric identification systems, at the beginning, it was soon apparent that truly positive identification could only be based on physical attributes of a person. This raised the necessity of answering 2 questions :

- A. what was the sex of a person and his age
- B. what part of body to be used and how to accomplish identification that is viable
- C. what was the age of a person and his income level
- D. what was the tone of the voice of a person and his habits

Answer: B

Explanation: Today implementation of fast, accurate reliable and user-acceptable biometric identification systems is already taking place. Unique physical attributes or behavior of a person are used for that purpose.

From: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 1, Page 7

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**QUESTION 33**

In biometric identification systems, the parts of the body conveniently available for identification

are:

- A. neck and mouth
- B. hands, face, and eyes
- C. feet and hair
- D. voice and neck

Answer: B

Explanation: Today implementation of fast, accurate, reliable, and user-acceptable biometric identification systems are already under way. Because most identity authentication takes place when a people are fully clothed (neck to feet and wrists), the parts of the body conveniently available for this purpose are hands, face, and eyes.

From: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 1, Page 7

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#### **QUESTION 34**

Controlling access to information systems and associated networks is necessary for the preservation of their:

- A. Authenticity, confidentiality and availability
- B. Confidentiality, integrity, and availability.
- C. integrity and availability.
- D. authenticity,confidentiality, integrity and availability.

Answer: B

Explanation: Controlling access to information systems and associated networks is necessary for the preservation of their confidentiality, integrity and availability.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 31

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#### **QUESTION 35**

To control access by a subject (an active entity such as individual or process) to an object (a passive entity such as a file) involves setting up:

- A. Access Rules
- B. Access Matrix
- C. Identification controls
- D. Access terminal

Answer: A

Explanation: Controlling access by a subject (an active entity such as individual or process) to an object (a passive entity such as a file) involves setting up access rules.

These rules can be classified into three access control models: Mandatory, Discretionary, and

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Non-Discretionary.

An access matrix is one of the means used to implement access control.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 33

Answer:

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**QUESTION 36**

Rule-Based Access Control (RuBAC) access is determined by rules. Such rules would fit within what category of access control?

- A. Discretionary Access Control (DAC)
- B. Mandatory Access control (MAC)
- C. Non-Discretionary Access Control (NDAC)
- D. Lattice-based Access control

Answer: C

Explanation: Rule-based access control is a type of non-discretionary access control because this access is determined by rules and the subject does not decide what those rules will be, the rules are uniformly applied to ALL of the users or subjects.

In general, all access control policies other than DAC are grouped in the category of nondiscretionary access control (NDAC). As the name implies, policies in this category have rules that are not established at the discretion of the user. Non-discretionary policies establish controls that cannot be changed by users, but only through administrative action.

Both Role Based Access Control (RBAC) and Rule Based Access Control (RuBAC) fall within Non Discretionary Access Control (NDAC). If it is not DAC or MAC then it is most likely NDAC.

**IT IS NOT ALWAYS BLACK OR WHITE**

The different access control models are not totally exclusive of each others. MAC is making use of Rules to be implemented. However with MAC you have requirements above and beyond having simple access rules. The subject would get formal approval from management, the subject must have the proper security clearance, objects must have labels/sensitivity levels attached to them, subjects must have the proper security clearance. If all of this is in place then you have MAC.

**BELOW YOU HAVE A DESCRIPTION OF THE DIFFERENT CATEGORIES:**

**MAC = Mandatory Access Control**

Under a mandatory access control environment, the system or security administrator will define what permissions subjects have on objects. The administrator does not dictate user's access but simply configure the proper level of access as dictated by the Data Owner.

The MAC system will look at the Security Clearance of the subject and compare it with the object sensitivity level or classification level. This is what is called the dominance relationship.

The subject must DOMINATE the object sensitivity level. Which means that the subject must have a security clearance equal or higher than the object he is attempting to access.

MAC also introduce the concept of labels. Every objects will have a label attached to them indicating the classification of the object as well as categories that are used to impose the need to know (NTK) principle. Even thou a user has a security clearance of Secret it does not mean he would be able to access any Secret documents within the system. He would be allowed to access

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only Secret document for which he has a Need To Know, formal approval, and object where the user belong to one of the categories attached to the object.

If there is no clearance and no labels then IT IS NOT Mandatory Access Control.

Many of the other models can mimic MAC but none of them have labels and a dominance relationship so they are NOT in the MAC category.

NISTR-7316 Says:

Usually a labeling mechanism and a set of interfaces are used to determine access based on the MAC policy; for example, a user who is running a process at the Secret classification should not be allowed to read a file with a label of Top Secret. This is known as the “simple security rule,” or “no read up.” Conversely, a user who is running a process with a label of Secret should not be allowed to write to a file with a label of Confidential. This rule is called the “\*-property” (pronounced “star property”) or “no write down.” The \*-property is required to maintain system security in an automated environment. A variation on this rule called the “strict \*-property” requires that information can be written at, but not above, the subject’s clearance level. Multilevel security models such as the Bell-La Padula Confidentiality and Biba Integrity models are used to formally specify this kind of MAC policy.

DAC = Discretionary Access Control

DAC is also known as: Identity Based access control system.

The owner of an object is define as the person who created the object. As such the owner has the discretion to grant access to other users on the network. Access will be granted based solely on the identity of those users.

Such system is good for low level of security. One of the major problem is the fact that a user who has access to someone's else file can further share the file with other users without the knowledge or permission of the owner of the file. Very quickly this could become the wild west as there is no control on the dissemination of the information.

RBAC = Role Based Access Control

RBAC is a form of Non-Discretionary access control.

Role Based access control usually maps directly with the different types of jobs performed by employees within a company.

For example there might be 5 security administrator within your company. Instead of creating each of their profile one by one, you would simply create a role and assign the administrators to the role. Once an administrator has been assigned to a role, he will IMPLICITLY inherit the permissions of that role.

RBAC is great tool for environment where there is a large rotation of employees on a daily basis such as a very large help desk for example.

RBAC or RuBAC = Rule Based Access Control

RuBAC is a form of Non-Discretionary access control.

A good example of a Rule Based access control device would be a Firewall. A single set of rules is imposed to all users attempting to connect through the firewall.

NOTE FROM CLEMENT:

Lot of people tend to confuse MAC and Rule Based Access Control.

Mandatory Access Control must make use of LABELS. If there is only rules and no label, it cannot be Mandatory Access Control. This is why they call it Non Discretionary Access control (NDAC). There are even books out there that are WRONG on this subject. Books are sometimes opiniated and not strictly based on facts.

In MAC subjects must have clearance to access sensitive objects. Objects have labels that

contain the classification to indicate the sensitivity of the object and the label also has categories to enforce the need to know.

Today the best example of rule based access control would be a firewall. All rules are imposed globally to any user attempting to connect through the device. This is NOT the case with MAC. I strongly recommend you read carefully the following document:

NISTIR-7316 at <http://csrc.nist.gov/publications/nistir/7316/NISTIR-7316.pdf>

It is one of the best Access Control Study document to prepare for the exam. Usually I tell people not to worry about the hundreds of NIST documents and other reference. This document is an exception. Take some time to read it.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 33

And

NISTIR-7316 at <http://csrc.nist.gov/publications/nistir/7316/NISTIR-7316.pdf>

And

Conrad, Eric; Misnar, Seth; Feldman, Joshua (2012-09-01). CISSP Study Guide (Kindle Locations 651-652). Elsevier Science (reference). Kindle Edition.

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### QUESTION 37

The type of discretionary access control (DAC) that is based on an individual's identity is also called:

- A. Identity-based Access control
- B. Rule-based Access control
- C. Non-Discretionary Access Control
- D. Lattice-based Access control

Answer: A

Explanation: An identity-based access control is a type of Discretionary Access Control (DAC) that is based on an individual's identity.

DAC is good for low level security environment. The owner of the file decides who has access to the file.

If a user creates a file, he is the owner of that file. An identifier for this user is placed in the file header and/or in an access control matrix within the operating system.

Ownership might also be granted to a specific individual. For example, a manager for a certain department might be made the owner of the files and resources within her department. A system that uses discretionary access control (DAC) enables the owner of the resource to specify which subjects can access specific resources.

This model is called discretionary because the control of access is based on the discretion of the owner. Many times department managers, or business unit managers , are the owners of the data within their specific department. Being the owner, they can specify who should have access and who should not.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 220). McGraw-Hill . Kindle Edition.

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**QUESTION 38**

Which access control type has a central authority that determine to what objects the subjects have access to and it is based on role or on the organizational security policy?

- A. Mandatory Access Control
- B. Discretionary Access Control
- C. Non-Discretionary Access Control
- D. Rule-based Access control

Answer: C

Explanation: Non Discretionary Access Control include Role Based Access Control (RBAC) and Rule Based Access Control (RBAC or RuBAC). RABC being a subset of NDAC, it was easy to eliminate RBAC as it was covered under NDAC already.

Some people think that RBAC is synonymous with NDAC but RuBAC would also fall into this category.

Discretionary Access control is for environment with very low level of security. There is no control on the dissemination of the information. A user who has access to a file can copy the file or further share it with other users.

Rule Based Access Control is when you have ONE set of rules applied uniformly to all users. A good example would be a firewall at the edge of your network. A single rule based is applied against any packets received from the internet.

Mandatory Access Control is a very rigid type of access control. The subject must dominate the object and the subject must have a Need To Know to access the information. Objects have labels that indicate the sensitivity (classification) and there is also categories to enforce the Need To Know (NTK).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 33

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**QUESTION 39**

Which of the following control pairings include: organizational policies and procedures, preemployment background checks, strict hiring practices, employment agreements, employee termination procedures, vacation scheduling, labeling of sensitive materials, increased supervision, security awareness training, behavior awareness, and sign-up procedures to obtain access to information systems and networks?

- A. Preventive/Administrative Pairing
- B. Preventive/Technical Pairing
- C. Preventive/Physical Pairing
- D. Detective/Administrative Pairing

Answer: A

Explanation: organizational policies and procedures, pre-employment background checks, strict hiring practices, employment agreements, friendly and unfriendly employee termination

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procedures, vacation scheduling, labeling of sensitive materials, increased supervision, security awareness training, behavior awareness, and sign-up procedures to obtain access to information systems and networks.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 34

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#### QUESTION 40

Technical controls such as encryption and access control can be built into the operating system, be software applications, or can be supplemental hardware/software units. Such controls, also known as logical controls, represent which pairing?

- A. Preventive/Administrative Pairing
- B. Preventive/Technical Pairing
- C. Preventive/Physical Pairing
- D. Detective/Technical Pairing

Answer: B

Explanation: Preventive/Technical controls are also known as logical controls and can be built into the operating system, be software applications, or can be supplemental hardware/software units.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 34

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#### QUESTION 41

What is called the use of technologies such as fingerprint, retina, and iris scans to authenticate the individuals requesting access to resources?

- A. Micrometrics
- B. Macrometrics
- C. Biometrics
- D. MicroBiometrics

Answer: C

Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 35

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#### QUESTION 42

What is called the access protection system that limits connections by calling back the number of a previously authorized location?

- A. Sendback systems
- B. Callback forward systems
- C. Callback systems
- D. Sendback forward systems

Answer: C

Explanation: The

Answer: Call back Systems; Callback systems provide access protection by calling back the number of a previously authorized location, but this control can be compromised by call forwarding.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 35

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### QUESTION 43

What are called user interfaces that limit the functions that can be selected by a user?

- A. Constrained user interfaces
- B. Limited user interfaces
- C. Mini user interfaces
- D. Unlimited user interfaces

Answer: A

Explanation: Another method for controlling access is by restricting users to specific functions based on their role in the system. This is typically implemented by limiting available menus, data views, encryption, or by physically constraining the user interfaces.

This is common on devices such as an automated teller machine (ATM). The advantage of a constrained user interface is that it limits potential avenues of attack and system failure by restricting the processing options that are available to the user.

On an ATM machine, if a user does not have a checking account with the bank he or she will not be shown the “Withdraw money from checking” option. Likewise, an information system might have an “Add/Remove Users” menu option for administrators, but if a normal, non-administrative user logs in he or she will not even see that menu option. By not even identifying potential options for non-qualifying users, the system limits the potentially harmful execution of unauthorized system or application commands.

Many database management systems have the concept of “views.” A database view is an extract of the data stored in the database that is filtered based on predefined user or system criteria. This permits multiple users to access the same database while only having the ability to access data they need (or are allowed to have) and not data for another user. The use of database views is another example of a constrained user interface.

The following were incorrect answers:

All of the other choices presented were bogus answers.

The following reference(s) were used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 1989-2002). Auerbach Publications. Kindle Edition.

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### QUESTION 44

Controls such as job rotation, the sharing of responsibilities, and reviews of audit records are associated with:

- A. Preventive/physical
- B. Detective/technical
- C. Detective/physical
- D. Detective/administrative

Answer: D

Explanation: Additional detective/administrative controls are job rotation, the sharing of responsibilities, and reviews of audit records.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 35

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#### **QUESTION 45**

The control measures that are intended to reveal the violations of security policy using software and hardware are associated with:

- A. Preventive/physical
- B. Detective/technical
- C. Detective/physical
- D. Detective/administrative

Answer: B

Explanation: The detective/technical control measures are intended to reveal the violations of security policy using technical means.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 35

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#### **QUESTION 46**

The controls that usually require a human to evaluate the input from sensors or cameras to determine if a real threat exists are associated with:

- A. Preventive/physical
- B. Detective/technical
- C. Detective/physical
- D. Detective/administrative

Answer: C

Explanation: Detective/physical controls usually require a human to evaluate the input from sensors or cameras to determine if a real threat exists.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 36

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**QUESTION 47**

External consistency ensures that the data stored in the database is:

- A. in-consistent with the real world.
- B. remains consistant when sent from one system to another.
- C. consistent with the logical world.
- D. consistent with the real world.

Answer: D

Explanation: External consistency ensures that the data stored in the database is consistent with the real world.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, page 33

**QUESTION 48**

A central authority determines what subjects can have access to certain objects based on the organizational security policy is called:

- A. Mandatory Access Control
- B. Discretionary Access Control
- C. Non-Discretionary Access Control
- D. Rule-based Access control

Answer: C

Explanation: A central authority determines what subjects can have access to certain objects based on the organizational security policy.

The key focal point of this question is the 'central authority' that determines access rights.

Cecilia one of the quiz user has sent me feedback informing me that NIST defines MAC as: "MAC Policy means that Access Control Policy Decisions are made by a CENTRAL AUTHORITY. Which seems to indicate there could be two good answers to this question.

However if you read the NISTR document mentioned in the references below, it is also mentioned that: MAC is the most mentioned NDAC policy. So MAC is a form of NDAC policy.

Within the same document it is also mentioned: "In general, all access control policies other than DAC are grouped in the category of non- discretionary access control (NDAC). As the name implies, policies in this category have rules that are not established at the discretion of the user. Non-discretionary policies establish controls that cannot be changed by users, but only through administrative action."

Under NDAC you have two choices:

Rule Based Access control and Role Base Access Control

MAC is implemented using RULES which makes it fall under RBAC which is a form of NDAC. It is a subset of NDAC.

This question is representative of what you can expect on the real exam where you have more than once choice that seems to be right. However, you have to look closely if one of the choices would be higher level or if one of the choice falls under one of the other choice. In this case NDAC

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is a better choice because MAC is falling under NDAC through the use of Rule Based Access Control.

The following are incorrect answers:

#### MANDATORY ACCESS CONTROL

In Mandatory Access Control the labels of the object and the clearance of the subject determines access rights, not a central authority. Although a central authority (Better known as the Data Owner) assigns the label to the object, the system does the determination of access rights automatically by comparing the Object label with the Subject clearance. The subject clearance MUST dominate (be equal or higher) than the object being accessed.

The need for a MAC mechanism arises when the security policy of a system dictates that:

1 Protection decisions must not be decided by the object owner.

2 The system must enforce the protection decisions (i.e., the system enforces the security policy over the wishes or intentions of the object owner).

Usually a labeling mechanism and a set of interfaces are used to determine access based on the MAC policy; for example, a user who is running a process at the Secret classification should not be allowed to read a file with a label of Top Secret. This is known as the “simple security rule,” or “no read up.”

Conversely, a user who is running a process with a label of Secret should not be allowed to write to a file with a label of Confidential. This rule is called the “\*-property” (pronounced “star property”) or “no write down.” The \*-property is required to maintain system security in an automated environment.

#### DISCRETIONARY ACCESS CONTROL

In Discretionary Access Control the rights are determined by many different entities, each of the persons who have created files and they are the owner of that file, not one central authority.

DAC leaves a certain amount of access control to the discretion of the object's owner or anyone else who is authorized to control the object's access. For example, it is generally used to limit a user's access to a file; it is the owner of the file who controls other users' accesses to the file. Only those users specified by the owner may have some combination of read, write, execute, and other permissions to the file.

DAC policy tends to be very flexible and is widely used in the commercial and government sectors. However, DAC is known to be inherently weak for two reasons:

First, granting read access is transitive; for example, when Ann grants Bob read access to a file, nothing stops Bob from copying the contents of Ann's file to an object that Bob controls. Bob may now grant any other user access to the copy of Ann's file without Ann's knowledge.

Second, DAC policy is vulnerable to Trojan horse attacks. Because programs inherit the identity of the invoking user, Bob may, for example, write a program for Ann that, on the surface, performs some useful function, while at the same time destroys the contents of Ann's files. When investigating the problem, the audit files would indicate that Ann destroyed her own files. Thus, formally, the drawbacks of DAC are as follows:

- Discretionary Access Control (DAC) Information can be copied from one object to another; therefore, there is no real assurance on the flow of information in a system.
- No restrictions apply to the usage of information when the user has received it.
- The privileges for accessing objects are decided by the owner of the object, rather than through a system-wide policy that reflects the organization's security requirements.

ACLs and owner/group/other access control mechanisms are by far the most common mechanism for implementing DAC policies. Other mechanisms, even though not designed with DAC in mind,

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may have the capabilities to implement a DAC policy.

#### RULE BASED ACCESS CONTROL

In Rule-based Access Control a central authority could in fact determine what subjects can have access when assigning the rules for access. However, the rules actually determine the access and so this is not the most correct answer.

RuBAC (as opposed to RBAC, role-based access control) allow users to access systems and information based on pre determined and configured rules. It is important to note that there is no commonly understood definition or formally defined standard for rule-based access control as there is for DAC, MAC, and RBAC. “Rule-based access” is a generic term applied to systems that allow some form of organization-defined rules, and therefore rule-based access control encompasses a broad range of systems. RuBAC may in fact be combined with other models, particularly RBAC or DAC. A RuBAC system intercepts every access request and compares the rules with the rights of the user to make an access decision. Most of the rule-based access control relies on a security label system, which dynamically composes a set of rules defined by a security policy. Security labels are attached to all objects, including files, directories, and devices.

Sometime roles to subjects (based on their attributes) are assigned as well. RuBAC meets the business needs as well as the technical needs of controlling service access. It allows business rules to be applied to access control—for example, customers who have overdue balances may be denied service access. As a mechanism for MAC, rules of RuBAC cannot be changed by users. The rules can be established by any attributes of a system related to the users such as domain, host, protocol, network, or IP addresses. For example, suppose that a user wants to access an object in another network on the other side of a router. The router employs RuBAC with the rule composed by the network addresses, domain, and protocol to decide whether or not the user can be granted access. If employees change their roles within the organization, their existing authentication credentials remain in effect and do not need to be CK configured. Using rules in conjunction with roles adds greater flexibility because rules can be applied to people as well as to devices. Rule-based access control can be combined with role-based access control, such that the role of a user is one of the attributes in rule setting. Some provisions of access control systems have rule- based policy engines in addition to a role-based policy engine and certain implemented dynamic policies [Des03]. For example, suppose that two of the primary types of software users are product engineers and quality engineers. Both groups usually have access to the same data, but they have different roles to perform in relation to the data and the application's function. In addition, individuals within each group have different job responsibilities that may be identified using several types of attributes such as developing programs and testing areas. Thus, the access decisions can be made in real time by a scripted policy that regulates the access between the groups of product engineers and quality engineers, and each individual within these groups. Rules can either replace or complement role-based access control. However, the creation of rules and security policies is also a complex process, so each organization will need to strike the appropriate balance.

References used for this question:

<http://csrc.nist.gov/publications/nistir/7316/NISTIR-7316.pdf>

And

AIO v3 p162-167 and OIG (2007) p.186-191

Also

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 33

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**QUESTION 49**

What is called the act of a user professing an identity to a system, usually in the form of a log-on ID?

- A. Authentication
- B. Identification
- C. Authorization
- D. Confidentiality

Answer: B

Explanation: Identification is the act of a user professing an identity to a system, usually in the form of a log-on ID to the system.

Identification is nothing more than claiming you are somebody. You identify yourself when you speak to someone on the phone that you don't know, and they ask you who they're speaking to. When you say, "I'm Jason.", you've just identified yourself.

In the information security world, this is analogous to entering a username. It's not analogous to entering a password. Entering a password is a method for verifying that you are who you identified yourself as.

NOTE: The word "professing" used above means: "to say that you are, do, or feel something when other people doubt what you say". This is exactly what happens when you provide your identifier (identification), you claim to be someone but the system cannot take your word for it, you must further Authenticate to the system to prove who you claim to be.

The following are incorrect answers:

Authentication: is how one proves that they are who they say they are. When you claim to be Jane Smith by logging into a computer system as "jsmith", it's most likely going to ask you for a password. You've claimed to be that person by entering the name into the username field (that's the identification part), but now you have to prove that you are really that person.

Many systems use a password for this, which is based on "something you know", i.e. a secret between you and the system.

Another form of authentication is presenting something you have, such as a driver's license, an RSA token, or a smart card.

You can also authenticate via something you are. This is the foundation for biometrics. When you do this, you first identify yourself and then submit a thumb print, a retina scan, or another form of bio-based authentication.

Once you've successfully authenticated, you have now done two things: you've claimed to be someone, and you've proven that you are that person. The only thing that's left is for the system to determine what you're allowed to do.

Authorization: is what takes place after a person has been both identified and authenticated; it's the step determines what a person can then do on the system.

An example in people terms would be someone knocking on your door at night. You say, "Who is it?", and wait for a response. They say, "It's John." in order to identify themselves. You ask them to back up into the light so you can see them through the peephole. They do so, and you authenticate them based on what they look like (biometric). At that point you decide they can come inside the house.

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If they had said they were someone you didn't want in your house (identification), and you then verified that it was that person (authentication), the authorization phase would not include access to the inside of the house.

**Confidentiality:** Is one part of the CIA triad. It prevents sensitive information from reaching the wrong people, while making sure that the right people can in fact get it. A good example is a credit card number while shopping online, the merchant needs it to clear the transaction but you do not want your information exposed over the network, you would use a secure link such as SSL, TLS, or some tunneling tool to protect the information from prying eyes between point A and point B. Data encryption is a common method of ensuring confidentiality.

The other parts of the CIA triad are listed below:

**Integrity** involves maintaining the consistency, accuracy, and trustworthiness of data over its entire life cycle. Data must not be changed in transit, and steps must be taken to ensure that data cannot be altered by unauthorized people (for example, in a breach of confidentiality). In addition, some means must be in place to detect any changes in data that might occur as a result of non-human caused events such as an electromagnetic pulse (EMP) or server crash. If an unexpected change occurs, a backup copy must be available to restore the affected data to its correct state.

**Availability** is best ensured by rigorously maintaining all hardware, performing hardware repairs immediately when needed, providing a certain measure of redundancy and failover, providing adequate communications bandwidth and preventing the occurrence of bottlenecks, implementing emergency backup power systems, keeping current with all necessary system upgrades, and guarding against malicious actions such as denial-of-service (DoS) attacks.

Reference used for this question:

<http://whatis.techtarget.com/definition/Confidentiality-integrity-and-availability-CIA>

<http://www.danielmiessler.com/blog/security-identification-authentication-and-authorization>

<http://www.merriam-webster.com/dictionary/profess>

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 36

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## QUESTION 50

Which one of the following factors is NOT one on which Authentication is based?

- A. Type 1 Something you know, such as a PIN or password
- B. Type 2 Something you have, such as an ATM card or smart card
- C. Type 3 Something you are (based upon one or more intrinsic physical or behavioral traits), such as a fingerprint or retina scan
- D. Type 4 Something you are, such as a system administrator or security administrator

Answer: D

Explanation: Authentication is based on the following three factor types:

Type 1 Something you know, such as a PIN or password

Type 2 Something you have, such as an ATM card or smart card

Type 3 Something you are (Unique physical characteristic), such as a fingerprint or retina scan

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 36

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Also: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 4: Access Control (pages 132-133).

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### QUESTION 51

A central authority determines what subjects can have access to certain objects based on the organizational security policy is called:

- A. Mandatory Access Control
- B. Discretionary Access Control
- C. Non-Discretionary Access Control
- D. Rule-based Access control

Answer: C

Explanation: A central authority determines what subjects can have access to certain objects based on the organizational security policy.

The key focal point of this question is the 'central authority' that determines access rights.

Cecilia one of the quiz user has sent me feedback informing me that NIST defines MAC as: "MAC Policy means that Access Control Policy Decisions are made by a CENTRAL AUTHORITY. Which seems to indicate there could be two good answers to this question.

However if you read the NISTR document mentioned in the references below, it is also mentioned that: MAC is the most mentioned NDAC policy. So MAC is a form of NDAC policy.

Within the same document it is also mentioned: "In general, all access control policies other than DAC are grouped in the category of non-discretionary access control (NDAC). As the name implies, policies in this category have rules that are not established at the discretion of the user. Non-discretionary policies establish controls that cannot be changed by users, but only through administrative action."

Under NDAC you have two choices:

Rule Based Access control and Role Base Access Control

MAC is implemented using RULES which makes it fall under RBAC which is a form of NDAC. It is a subset of NDAC.

This question is representative of what you can expect on the real exam where you have more than once choice that seems to be right. However, you have to look closely if one of the choices would be higher level or if one of the choice falls under one of the other choice. In this case NDAC is a better choice because MAC is falling under NDAC through the use of Rule Based Access Control.

The following are incorrect answers:

#### MANDATORY ACCESS CONTROL

In Mandatory Access Control the labels of the object and the clearance of the subject determines access rights, not a central authority. Although a central authority (Better known as the Data Owner) assigns the label to the object, the system does the determination of access rights automatically by comparing the Object label with the Subject clearance. The subject clearance MUST dominate (be equal or higher) than the object being accessed.

The need for a MAC mechanism arises when the security policy of a system dictates that:

- 1 Protection decisions must not be decided by the object owner.
- 2 The system must enforce the protection decisions (i.e., the system enforces the security policy)

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over the wishes or intentions of the object owner).

Usually a labeling mechanism and a set of interfaces are used to determine access based on the MAC policy; for example, a user who is running a process at the Secret classification should not be allowed to read a file with a label of Top Secret. This is known as the “simple security rule,” or “no read up.”

Conversely, a user who is running a process with a label of Secret should not be allowed to write to a file with a label of Confidential. This rule is called the “\*-property” (pronounced “star property”) or “no write down.” The \*-property is required to maintain system security in an automated environment.

#### DISCRETIONARY ACCESS CONTROL

In Discretionary Access Control the rights are determined by many different entities, each of the persons who have created files and they are the owner of that file, not one central authority.

DAC leaves a certain amount of access control to the discretion of the object's owner or anyone else who is authorized to control the object's access. For example, it is generally used to limit a user's access to a file; it is the owner of the file who controls other users' accesses to the file. Only those users specified by the owner may have some combination of read, write, execute, and other permissions to the file.

DAC policy tends to be very flexible and is widely used in the commercial and government sectors. However, DAC is known to be inherently weak for two reasons:

First, granting read access is transitive; for example, when Ann grants Bob read access to a file, nothing stops Bob from copying the contents of Ann's file to an object that Bob controls. Bob may now grant any other user access to the copy of Ann's file without Ann's knowledge.

Second, DAC policy is vulnerable to Trojan horse attacks. Because programs inherit the identity of the invoking user, Bob may, for example, write a program for Ann that, on the surface, performs some useful function, while at the same time destroys the contents of Ann's files. When investigating the problem, the audit files would indicate that Ann destroyed her own files. Thus, formally, the drawbacks of DAC are as follows:

- Discretionary Access Control (DAC) Information can be copied from one object to another; therefore, there is no real assurance on the flow of information in a system.
- No restrictions apply to the usage of information when the user has received it.
- The privileges for accessing objects are decided by the owner of the object, rather than through a system-wide policy that reflects the organization's security requirements.

ACLs and owner/group/other access control mechanisms are by far the most common mechanism for implementing DAC policies. Other mechanisms, even though not designed with DAC in mind, may have the capabilities to implement a DAC policy.

#### RULE BASED ACCESS CONTROL

In Rule-based Access Control a central authority could in fact determine what subjects can have access when assigning the rules for access. However, the rules actually determine the access and so this is not the most correct answer.

RuBAC (as opposed to RBAC, role-based access control) allow users to access systems and information based on pre determined and configured rules. It is important to note that there is no commonly understood definition or formally defined standard for rule-based access control as there is for DAC, MAC, and RBAC. “Rule-based access” is a generic term applied to systems that allow some form of organization-defined rules, and therefore rule-based access control encompasses a broad range of systems. RuBAC may in fact be combined with other models, particularly RBAC or DAC. A RuBAC system intercepts every access request and compares the

rules with the rights of the user to make an access decision. Most of the rule-based access control relies on a security label system, which dynamically composes a set of rules defined by a security policy. Security labels are attached to all objects, including files, directories, and devices. Sometime roles to subjects (based on their attributes) are assigned as well. RuBAC meets the business needs as well as the technical needs of controlling service access. It allows business rules to be applied to access control—for example, customers who have overdue balances may be denied service access. As a mechanism for MAC, rules of RuBAC cannot be changed by users. The rules can be established by any attributes of a system related to the users such as domain, host, protocol, network, or IP addresses. For example, suppose that a user wants to access an object in another network on the other side of a router. The router employs RuBAC with the rule composed by the network addresses, domain, and protocol to decide whether or not the user can be granted access. If employees change their roles within the organization, their existing authentication credentials remain in effect and do not need to be CK configured. Using rules in conjunction with roles adds greater flexibility because rules can be applied to people as well as to devices. Rule-based access control can be combined with role-based access control, such that the role of a user is one of the attributes in rule setting. Some provisions of access control systems have rule-based policy engines in addition to a role-based policy engine and certain implemented dynamic policies [Des03]. For example, suppose that two of the primary types of software users are product engineers and quality engineers. Both groups usually have access to the same data, but they have different roles to perform in relation to the data and the application's function. In addition, individuals within each group have different job responsibilities that may be identified using several types of attributes such as developing programs and testing areas. Thus, the access decisions can be made in real time by a scripted policy that regulates the access between the groups of product engineers and quality engineers, and each individual within these groups. Rules can either replace or complement role-based access control. However, the creation of rules and security policies is also a complex process, so each organization will need to strike the appropriate balance.

References used for this question:

<http://csrc.nist.gov/publications/nistir/7316/NISTIR-7316.pdf>

And

AIO v3 p162-167 and OIG (2007) p.186-191

Also

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 33

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## QUESTION 52

What is called the act of a user professing an identity to a system, usually in the form of a log-on ID?

- A. Authentication
- B. Identification
- C. Authorization
- D. Confidentiality

Answer: B

Explanation: Identification is the act of a user professing an identity to a system, usually in the form of a log-on ID to the system.

Identification is nothing more than claiming you are somebody. You identify yourself when you speak to someone on the phone that you don't know, and they ask you who they're speaking to. When you say, "I'm Jason.", you've just identified yourself.

In the information security world, this is analogous to entering a username. It's not analogous to entering a password. Entering a password is a method for verifying that you are who you identified yourself as.

NOTE: The word "professing" used above means: "to say that you are, do, or feel something when other people doubt what you say". This is exactly what happens when you provide your identifier (identification), you claim to be someone but the system cannot take your word for it, you must further Authenticate to the system to prove who you claim to be.

The following are incorrect answers:

Authentication: is how one proves that they are who they say they are. When you claim to be Jane Smith by logging into a computer system as "jsmith", it's most likely going to ask you for a password. You've claimed to be that person by entering the name into the username field (that's the identification part), but now you have to prove that you are really that person.

Many systems use a password for this, which is based on "something you know", i.e. a secret between you and the system.

Another form of authentication is presenting something you have, such as a driver's license, an RSA token, or a smart card.

You can also authenticate via something you are. This is the foundation for biometrics. When you do this, you first identify yourself and then submit a thumb print, a retina scan, or another form of bio-based authentication.

Once you've successfully authenticated, you have now done two things: you've claimed to be someone, and you've proven that you are that person. The only thing that's left is for the system to determine what you're allowed to do.

Authorization: is what takes place after a person has been both identified and authenticated; it's the step determines what a person can then do on the system.

An example in people terms would be someone knocking on your door at night. You say, "Who is it?", and wait for a response. They say, "It's John." in order to identify themselves. You ask them to back up into the light so you can see them through the peephole. They do so, and you authenticate them based on what they look like (biometric). At that point you decide they can come inside the house.

If they had said they were someone you didn't want in your house (identification), and you then verified that it was that person (authentication), the authorization phase would not include access to the inside of the house.

Confidentiality: Is one part of the CIA triad. It prevents sensitive information from reaching the wrong people, while making sure that the right people can in fact get it. A good example is a credit card number while shopping online, the merchant needs it to clear the transaction but you do not want your information exposed over the network, you would use a secure link such as SSL, TLS, or some tunneling tool to protect the information from prying eyes between point A and point B. Data encryption is a common method of ensuring confidentiality.

The other parts of the CIA triad are listed below:

Integrity involves maintaining the consistency, accuracy, and trustworthiness of data over its entire life cycle. Data must not be changed in transit, and steps must be taken to ensure that data cannot

be altered by unauthorized people (for example, in a breach of confidentiality). In addition, some means must be in place to detect any changes in data that might occur as a result of non-human-caused events such as an electromagnetic pulse (EMP) or server crash. If an unexpected change occurs, a backup copy must be available to restore the affected data to its correct state.

Availability is best ensured by rigorously maintaining all hardware, performing hardware repairs immediately when needed, providing a certain measure of redundancy and failover, providing adequate communications bandwidth and preventing the occurrence of bottlenecks, implementing emergency backup power systems, keeping current with all necessary system upgrades, and guarding against malicious actions such as denial-of-service (DoS) attacks.

Reference used for this question:

<http://whatis.techtarget.com/definition/Confidentiality-integrity-and-availability-CIA>

<http://www.danielmiessler.com/blog/security-identification-authentication-and-authorization>

<http://www.merriam-webster.com/dictionary/profess>

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 36

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### QUESTION 53

What is called the verification that the user's claimed identity is valid and is usually implemented through a user password at log-on time?

- A. Authentication
- B. Identification
- C. Integrity
- D. Confidentiality

Answer: A

Explanation: Authentication is verification that the user's claimed identity is valid and is usually implemented through a user password at log-on time.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 36

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### QUESTION 54

Which one of the following factors is NOT one on which Authentication is based?

- A. Type 1 Something you know, such as a PIN or password
- B. Type 2 Something you have, such as an ATM card or smart card
- C. Type 3 Something you are (based upon one or more intrinsic physical or behavioral traits), such as a fingerprint or retina scan
- D. Type 4 Something you are, such as a system administrator or security administrator

Answer: D

Explanation: Authentication is based on the following three factor types:

Type 1. Something you know, such as a PIN or password

Type 2. Something you have, such as an ATM card or smart card

Type 3. Something you are (Unique physical characteristic), such as a fingerprint or retina scan

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 36.

Also: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 4: Access Control (pages 132-133).

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### QUESTION 55

The act of requiring two of the three factors to be used in the authentication process refers to:

- A. Two-Factor Authentication
- B. One-Factor Authentication
- C. Bi-Factor Authentication
- D. Double Authentication

Answer: A

Explanation: Two-Factor Authentication refers to the act of requiring two of the three factors to be used in the authentication process.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 36

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### QUESTION 56

Which type of password provides maximum security because a new password is required for each new log-on?

- A. One-time or dynamic password
- B. Congnitive password
- C. Static password
- D. Passphrase

Answer: A

Explanation: "One-time password" provides maximum security because a new password is required for each new log-on.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 36

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### QUESTION 57

What is called a password that is the same for each log-on session?

- A. "one-time password"
- B. "two-time password"
- C. static password
- D. dynamic password

Answer: C

Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 36

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**QUESTION 58**

What is called a sequence of characters that is usually longer than the allotted number for a password?

- A. passphrase
- B. cognitive phrase
- C. anticipated phrase
- D. Real phrase

Answer: A

Explanation: A passphrase is a sequence of characters that is usually longer than the allotted number for a password.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, page 37

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**QUESTION 59**

Which best describes a tool (i.e. keyfob, calculator, memory card or smart card) used to supply dynamic passwords?

- A. Tickets
- B. Tokens
- C. Token passing networks
- D. Coupons

Answer: B

Explanation: Tokens; Tokens in the form of credit card-size memory cards or smart cards, or those resembling small calculators, are used to supply static and dynamic passwords.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 37

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**QUESTION 60**

Which of the following would be true about Static password tokens?

- A. The owner identity is authenticated by the token
- B. The owner will never be authenticated by the token.
- C. The owner will authenticate himself to the system.
- D. The token does not authenticates the token owner but the system.

Answer: A

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Explanation: Tokens are electronic devices or cards that supply a user's password for them. A token system can be used to supply either a static or a dynamic password. There is a big difference between the static and dynamic systems, a static system will normally log a user in but a dynamic system the user will often have to log themselves in.

Static Password Tokens:

The owner identity is authenticated by the token. This is done by the person who issues the token to the owner (normally the employer). The owner of the token is now authenticated by "something you have". The token authenticates the identity of the owner to the information system. An example of this occurring is when an employee swipes his or her smart card over an electronic lock to gain access to a store room.

Synchronous Dynamic Password Tokens:

This system is a lot more complex than the static token password. The synchronous dynamic password tokens generate new passwords at certain time intervals that are synched with the main system. The password is generated on a small device similar to a pager or a calculator that can often be attached to the user's key ring. Each password is only valid for a certain time period, typing in the wrong password in the wrong time period will invalidate the authentication. The time factor can also be the system's downfall. If a clock on the system or the password token device becomes out of sync, a user can have trouble authenticating themselves to the system.

Asynchronous Dynamic Password Tokens:

The clock synching problem is eliminated with asynchronous dynamic password tokens. This system works on the same principle as the synchronous one but it does not have a time frame. A lot of big companies use this system especially for employees who may work from home on the company's VPN (Virtual private Network).

Challenge Response Tokens:

This is an interesting system. A user will be sent special "challenge" strings at either random or timed intervals. The user inputs this challenge string into their token device and the device will respond by generating a challenge response. The user then types this response into the system and if it is correct they are authenticated.

Reference(s) used for this question:

<http://www.informit.com/guides/content.aspx?g=security&seqNum=146>

and

KRUTZ, Ronald L. & VINES, Russel D

The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 37

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## QUESTION 61

In Synchronous dynamic password tokens:

- A. The token generates a new password value at fixed time intervals (this password could be based on the time of day encrypted with a secret key).
- B. The token generates a new non-unique password value at fixed time intervals (this password could be based on the time of day encrypted with a secret key).
- C. The unique password is not entered into a system or workstation along with an owner's PIN.
- D. The authentication entity in a system or workstation knows an owner's secret key and PIN, and the entity verifies that the entered password is invalid and that it was entered during the invalid time window.

Answer: B

Explanation: Synchronous dynamic password tokens:

The token generates a new password value at fixed time intervals (this password could be the time of day encrypted with a secret key).

The unique password is entered into a system or workstation along with an owner's PIN.

The authentication entity in a system or workstation knows an owner's secret key and PIN, and the entity verifies that the entered password is valid and that it was entered during the valid time window.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 37

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### QUESTION 62

In biometrics, "one-to-many" search against database of stored biometric images is done in:

- A. Authentication
- B. Identification
- C. Identities
- D. Identity-based access control

Answer: B

Explanation: In biometrics, identification is a "one-to-many" search of an individual's characteristics from a database of stored images.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 38

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### QUESTION 63

Which of the following is true of biometrics?

- A. It is used for identification in physical controls and it is not used in logical controls.
- B. It is used for authentication in physical controls and for identification in logical controls.
- C. It is used for identification in physical controls and for authentication in logical controls.
- D. Biometrics has no role in logical controls.

Answer: C

Explanation: When used in physical control biometric Identification is performed by doing a one to many match. When you submit your biometric template a search is done through a database of templates until the matching one is found. At that point your identity is revealed and if you are a valid employee access is granted.

When used in logical controls the biometric template is used to either confirm or deny someone identity. For example if I access a system and I pretend to be user Nathalie then I would provide my biometric template to confirm that I really am who I pretend to be. Biometric is one of the three authentication factor (something you are) that can be used. The other two are something you know

and something you have.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 38

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### QUESTION 64

What is called the percentage of valid subjects that are falsely rejected by a Biometric Authentication system?

- A. False Rejection Rate (FRR) or Type I Error
- B. False Acceptance Rate (FAR) or Type II Error
- C. Crossover Error Rate (CER)
- D. True Rejection Rate (TRR) or Type III Error

Answer: A

Explanation: The percentage of valid subjects that are falsely rejected is called the False Rejection Rate (FRR) or Type I Error.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 38

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### QUESTION 65

What is called the percentage of invalid subjects that are falsely accepted by a Biometric authentication system?

- A. False Rejection Rate (FRR) or Type I Error
- B. False Acceptance Rate (FAR) or Type II Error
- C. Crossover Error Rate (CER)
- D. True Acceptance Rate (TAR) or Type III Error

Answer: B

Explanation: The percentage of invalid subjects that are falsely accepted is called the False Acceptance Rate (FAR) or Type II Error.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 38

And: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 4: Access Control (pages 127-128).

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### QUESTION 66

What is called the percentage at which the False Rejection Rate equals the False Acceptance Rate?

- A. False Rejection Rate (FRR) or Type I Error
- B. False Acceptance Rate (FAR) or Type II Error
- C. Crossover Error Rate (CER)
- D. Failure to enroll rate (FTE or FER)

Answer: C

Explanation: The percentage at which the False Rejection Rate equals the False Acceptance Rate is called the Crossover Error Rate (CER). Another name for the CER is the Equal Error Rate (EER), any of the two terms could be used.

Equal error rate or crossover error rate (EER or CER)

It is the rate at which both accept and reject errors are equal. The EER is a quick way to compare the accuracy of devices with different ROC curves. In general, the device with the lowest EER is most accurate.

The other choices were all wrong answers:

The following are used as performance metrics for biometric systems:

False accept rate or false match rate (FAR or FMR): the probability that the system incorrectly matches the input pattern to a non-matching template in the database. It measures the percent of invalid inputs which are incorrectly accepted. This is when an impostor would be accepted by the system  
false reject rate or false non-match rate (FRR or FNMR): the probability that the system fails to detect a match between the input pattern and a matching template in the database. It measures the percent of valid inputs which are incorrectly rejected. This is when a valid company employee would be rejected by the system  
Failure to enroll rate (FTE or FER): the rate at which attempts to create a template from an input is unsuccessful. This is most commonly caused by low quality inputs.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 38

And

<https://en.wikipedia.org/wiki/Biometrics>

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### QUESTION 67

Considerations of privacy, invasiveness, and psychological and physical comfort when using the system are important elements for which of the following?

- A. Accountability of biometrics systems
- B. Acceptability of biometrics systems
- C. Availability of biometrics systems
- D. Adaptability of biometrics systems

Answer: B

Explanation: Acceptability refers to considerations of privacy, invasiveness, and psychological and physical comfort when using the system.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 39

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### QUESTION 68

Which of the following offers advantages such as the ability to use stronger passwords, easier password administration, one set of credential, and faster resource access?

- A. Smart cards
- B. Single Sign-On (SSO)
- C. Symmetric Ciphers
- D. Public Key Infrastructure (PKI)

Answer: B

Explanation: The advantages of SSO include having the ability to use stronger passwords, easier administration as far as changing or deleting the passwords, minimize the risks of orphan accounts, and requiring less time to access resources.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 39

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### QUESTION 69

Which of the following describes the major disadvantage of many Single Sign-On (SSO) implementations?

- A. Once an individual obtains access to the system through the initial log-on, they have access to all resources within the environment that the account has access to.
- B. The initial logon process is cumbersome to discourage potential intruders.
- C. Once a user obtains access to the system through the initial log-on, they only need to logon to some applications.
- D. Once a user obtains access to the system through the initial log-on, he has to logout from all other systems

Answer: A

Explanation: Single Sign-On is a distributed Access Control methodology where an individual only has to authenticate once and would have access to all primary and secondary network domains. The individual would not be required to re-authenticate when they needed additional resources. The security issue that this creates is if a fraudster is able to compromise those credentials they too would have access to all the resources that account has access to.  
All the other answers are incorrect as they are distractors.

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### QUESTION 70

Which of the following is implemented through scripts or smart agents that replays the users multiple log-ins against authentication servers to verify a user's identity which permit access to system services?

- A. Single Sign-On
- B. Dynamic Sign-On
- C. Smart cards
- D. Kerberos

Answer: A

Explanation: SSO can be implemented by using scripts that replay the users multiple log-ins against authentication servers to verify a user's identity and to permit access to system services. Single Sign on was the best answer in this case because it would include Kerberos. When you have two good answers within the 4 choices presented you must select the BEST one. The high level choice is always the best. When one choice would include the other one that would be the best as well.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 40

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### QUESTION 71

Which of the following is NOT true of the Kerberos protocol?

- A. Only a single login is required per session.
- B. The initial authentication steps are done using public key algorithm.
- C. The KDC is aware of all systems in the network and is trusted by all of them
- D. It performs mutual authentication

Answer: B

Explanation: Kerberos is a network authentication protocol. It is designed to provide strong authentication for client/server applications by using secret-key cryptography. It has the following characteristics:

- It is secure: it never sends a password unless it is encrypted.
- Only a single login is required per session. Credentials defined at login are then passed between resources without the need for additional logins.
- The concept depends on a trusted third party – a Key Distribution Center (KDC). The KDC is aware of all systems in the network and is trusted by all of them.
- It performs mutual authentication, where a client proves its identity to a server and a server proves its identity to the client.

Kerberos introduces the concept of a Ticket-Granting Server/Service (TGS). A client that wishes to use a service has to receive a ticket from the TGS – a ticket is a time-limited cryptographic message – giving it access to the server. Kerberos also requires an Authentication Server (AS) to verify clients. The two servers combined make up a KDC.

Within the Windows environment, Active Directory performs the functions of the KDC. The following figure shows the sequence of events required for a client to gain access to a service using Kerberos authentication. Each step is shown with the Kerberos message associated with it, as defined in RFC 4120 “The Kerberos Network Authorization Service (V5)”.

#### Kerberos Authentication Step by Step

- Step 1: The user logs on to the workstation and requests service on the host. The workstation sends a message to the Authorization Server requesting a ticket granting ticket (TGT).
- Step 2: The Authorization Server verifies the user's access rights in the user database and creates a TGT and session key. The Authorization Server encrypts the results using a key derived from the user's password and sends a message back to the user workstation.

The workstation prompts the user for a password and uses the password to decrypt the incoming

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message. When decryption succeeds, the user will be able to use the TGT to request a service ticket.

- Step 3: When the user wants access to a service, the workstation client application sends a request to the Ticket Granting Service containing the client name, realm name and a timestamp. The user proves his identity by sending an authenticator encrypted with the session key received in Step 2
- Step 4: The TGS decrypts the ticket and authenticator, verifies the request, and creates a ticket for the requested server. The ticket contains the client name and optionally the client IP address. It also contains the realm name and ticket lifespan. The TGS returns the ticket to the user workstation. The returned message contains two copies of a server session key – one encrypted with the client password, and one encrypted by the service password.
- Step 5: The client application now sends a service request to the server containing the ticket received in Step 4 and an authenticator. The service authenticates the request by decrypting the session key. The server verifies that the ticket and authenticator match, and then grants access to the service. This step as described does not include the authorization performed by the Intel AMT device, as described later.
- Step 6: If mutual authentication is required, then the server will reply with a server authentication message.

The Kerberos server knows "secrets" (encrypted passwords) for all clients and servers under its control, or it is in contact with other secure servers that have this information. These "secrets" are used to encrypt all of the messages shown in the figure above.

To prevent "replay attacks," Kerberos uses timestamps as part of its protocol definition. For timestamps to work properly, the clocks of the client and the server need to be in synch as much as possible. In other words, both computers need to be set to the same time and date. Since the clocks of two computers are often out of synch, administrators can establish a policy to establish the maximum acceptable difference to Kerberos between a client's clock and server's clock. If the difference between a client's clock and the server's clock is less than the maximum time difference specified in this policy, any timestamp used in a session between the two computers will be considered authentic. The maximum difference is usually set to five minutes.

Note that if a client application wishes to use a service that is "Kerberized" (the service is configured to perform Kerberos authentication), the client must also be Kerberized so that it expects to support the necessary message responses.

For more information about Kerberos, see <http://web.mit.edu/kerberos/www/>.

#### References:

Introduction to Kerberos Authentication from Intel

and

<http://www.zeroshell.net/eng/kerberos/Kerberos-definitions/#1353>

and

<http://www.ietf.org/rfc/rfc4120txt>

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#### QUESTION 72

The authenticator within Kerberos provides a requested service to the client after validating which of the following?

- A. timestamp
- B. client public key

- C. client private key
- D. server public key

Answer: A

#### Explanation:

The server also checks the authenticator and, if that timestamp is valid, it provides the requested service to the client.

Even if the user principal is present in a ticket and only the application server can extract and possibly manage such information (since the ticket is encrypted with the secret key of the service), this is not enough to guarantee the authenticity of the client.

An impostor could capture (remember the hypothesis of an open and insecure network) the ticket when it is sent by a legitimate client to the application server, and at an opportune time, send it to illegitimately obtain the service.

On the other hand, including the IP addresses of the machine from where it is possible to use it is not very useful: it is known that in an open and insecure network addresses are easily falsified. To solve the problem, one has to exploit the fact that the client and server, at least during a session have the session key in common that only they know (also the KDC knows it since it generated it, but it is trusted by definition!!!).

Thus the following strategy is applied: along with the request containing the ticket, the client adds another packet (the authenticator) where the user principal and time stamp (its at that time) are included and encrypts it with the session key; the server which must offer the service, upon receiving this request, unpacks the first ticket, extracts the session key and, if the user is actually who he/she says, the server is able to unencrypt the authenticator extracting the timestamp.

If the latter differs from the server time by less than 2 minutes (but the tolerance can be configured) then the authentication is successful. This underlines the criticality of synchronization between machines belonging to the same realm.

#### The Replay Attack

A replay attack occurs when an intruder steals the packet and presents it to the service as if the intruder were the user. The user's credentials are there -- everything needed to access a resource.

This is mitigated by the features of the "Authenticator," which is illustrated in the picture below.

The Authenticator is created for the AS\_REQ or the TGS\_REQ and sends additional data, such as an encrypted IP list, the client's timestamp and the ticket lifetime. If a packet is replayed, the timestamp is checked. If the timestamp is earlier or the same as a previous authenticator, the packet is rejected because it's a replay. In addition, the time stamp in the Authenticator is compared to the server time. It must be within five minutes (by default in Windows).

#### Kerberos Authenticator to prevent replay attacks

The Authenticator mitigates the Possibility of a replay attack.

If the time skew is greater than five minutes the packet is rejected. This limits the number of possible replay attacks. While it is technically possible to steal the packet and present it to the server before the valid packet gets there, it is very difficult to do.

It's fairly well known that all computers in a Windows domain must have system times within five minutes of each other. This is due to the Kerberos requirement.

Reference(s) used for this question:

Redmond Magazine  
and

<http://kerberos.org/software/tutorial.html>

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 42

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### QUESTION 73

Which of the following is addressed by Kerberos?

- A. Confidentiality and Integrity
- B. Authentication and Availability
- C. Validation and Integrity
- D. Auditability and Integrity

Answer: A

Explanation: Kerberos addresses the confidentiality and integrity of information.

It also addresses primarily authentication but does not directly address availability.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 42

and

<https://www.ietf.org/rfc/rfc4120txt>

and

<http://learn-networking.com/network-security/how-kerberos-authentication-works>

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### QUESTION 74

Kerberos is vulnerable to replay in which of the following circumstances?

- A. When a private key is compromised within an allotted time window.
- B. When a public key is compromised within an allotted time window.
- C. When a ticket is compromised within an allotted time window.
- D. When the KSD is compromised within an allotted time window.

Answer: C

Explanation: Replay can be accomplished on Kerberos if the compromised tickets are used within an allotted time window.

The security depends on careful implementation: enforcing limited lifetimes for authentication credentials minimizes the threat of replayed credentials, the KDC must be physically secured, and it should be hardened, not permitting any non-kerberos activities.

Reference:

Official ISC2 Guide to the CISSP, 2007 Edition, page 184

also see:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 42

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**QUESTION 75**

Like the Kerberos protocol, SESAME is also subject to which of the following?

- A. timeslot replay
- B. password guessing
- C. symmetric key guessing
- D. asymmetric key guessing

Answer: B

Explanation:

Sesame is an authentication and access control protocol, that also supports communication confidentiality and integrity. It provides public key based authentication along with the Kerberos style authentication, that uses symmetric key cryptography. Sesame supports the Kerberos protocol and adds some security extensions like public key based authentication and an ECMAstyle Privilege Attribute Service.

The users under SESAME can authenticate using either symmetric encryption as in Kerberos or Public Key authentication. When using Symmetric Key authentication as in Kerberos, SESAME is also vulnerable to password guessing just like Kerberos would be. The Symmetric key being used is based on the password used by the user when he logged on the system. If the user has a simple password it could be guessed or compromise. Even thou Kerberos or SESAME may be use, there is still a need to have strong password discipline.

The Basic Mechanism in Sesame for strong authentication is as follow:

The user sends a request for authentication to the Authentication Server as in Kerberos, except that SESAME is making use of public key cryptography for authentication where the client will present his digital certificate and the request will be signed using a digital signature. The signature is communicated to the authentication server through the preauthentication fields. Upon receipt of this request, the authentication server will verifies the certificate, then validate the signature, and if all is fine the AS will issue a ticket granting ticket (TGT) as in Kerberos. This TGT will be use to communicate with the privilage attribute server (PAS) when access to a resource is needed.

Users may authenticate using either a public key pair or a conventional (symmetric) key. If public key cryptography is used, public key data is transported in preauthentication data fields to help establish identity.

Kerberos uses tickets for authenticating subjects to objects and SESAME uses Privileged Attribute Certificates (PAC), which contain the subject's identity, access capabilities for the object, access time period, and lifetime of the PAC. The PAC is digitally signed so that the object can validate that it came from the trusted authentication server, which is referred to as the privilege attribute server (PAS). The PAS holds a similar role as the KDC within Kerberos. After a user successfully authenticates to the authentication service (AS), he is presented with a token to give to the PAS.

The PAS then creates a PAC for the user to present to the resource he is trying to access.

Reference(s) used for this question:

<http://srg.cs.uiuc.edu/Security/nephilim/Internal/SESAME.txt>

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 43

**QUESTION 76**

RADIUS incorporates which of the following services?

- A. Authentication server and PIN codes.
- B. Authentication of clients and static passwords generation.
- C. Authentication of clients and dynamic passwords generation.
- D. Authentication server as well as support for Static and Dynamic passwords.

Answer: D

Explanation: According to RFC 2865:

A Network Access Server (NAS) operates as a client of RADIUS. The client is responsible for passing user information to designated RADIUS servers, and then acting on the response which is returned.

RADIUS servers are responsible for receiving user connection requests, authenticating the user, and then returning all

configuration information necessary for the client to deliver service to the user.

RADIUS authentication is based on provisions of simple username/password credentials. These credentials are encrypted

by the client using a shared secret between the client and the RADIUS server. OIG 2007, Page 513

RADIUS incorporates an authentication server and can make uses of both dynamic and static passwords.

Since it uses the PAP and CHAP protocols, it also includes static passwords.

RADIUS is an Internet protocol. RADIUS carries authentication, authorization, and configuration information between a Network Access Server and a shared Authentication Server. RADIUS features and functions are described primarily in the IETF (International Engineering Task Force) document RFC2138

The term " RADIUS" is an acronym which stands for Remote Authentication Dial In User Service. The main advantage to using a RADIUS approach to authentication is that it can provide a stronger form of authentication. RADIUS is capable of using a strong, two-factor form of authentication, in which users need to possess both a user ID and a hardware or software token to gain access.

Token-based schemes use dynamic passwords. Every minute or so, the token generates a unique 4-, 6- or 8-digit access number that is synchronized with the security server. To gain entry into the system, the user must generate both this one-time number and provide his or her user ID and password.

Although protocols such as RADIUS cannot protect against theft of an authenticated session via some realtime attacks, such as wiretapping, using unique, unpredictable authentication requests can protect against a wide range of active attacks.

**RADIUS: Key Features and Benefits**

**Features Benefits**

RADIUS supports dynamic passwords and challenge/response passwords.

Improved system security due to the fact that passwords are not static.

It is much more difficult for a bogus host to spoof users into giving up their passwords or password-generation algorithms.

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RADIUS allows the user to have a single user ID and password for all computers in a network. Improved usability due to the fact that the user has to remember only one login combination.

RADIUS is able to:

Prevent RADIUS users from logging in via login (or ftp).

Require them to log in via login (or ftp)

Require them to login to a specific network access server (NAS);

Control access by time of day.

Provides very granular control over the types of logins allowed, on a per-user basis.

The time-out interval for failing over from an unresponsive primary RADIUS server to a backup RADIUS server is site-configurable.

RADIUS gives System Administrator more flexibility in managing which users can login from which hosts or devices.

Stratus Technology Product Brief

<http://www.stratus.com/products/vos/openvosc/radius.htm>

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Pages 43, 44

Also check: MILLER, Lawrence & GREGORY, Peter, CISSP for Dummies, 2002, Wiley Publishing, Inc., pages 45-46

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### QUESTION 77

Which of the following protects a password from eavesdroppers and supports the encryption of communication?

- A. Challenge Handshake Authentication Protocol (CHAP)
- B. Challenge Handshake Identification Protocol (CHIP)
- C. Challenge Handshake Encryption Protocol (CHEP)
- D. Challenge Handshake Substitution Protocol (CHSP)

Answer: A

Explanation:

CHAP: A protocol that uses a three way handshake. The server sends the client a challenge which includes a random value(a nonce) to thwart replay attacks. The client responds with the MD5 hash of the nonce and the password.

The authentication is successful if the client's response is the one that the server expected.

Reference: Page 450, OIG 2007

CHAP protects the password from eavesdroppers and supports the encryption of communication.

Reference: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 44

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### QUESTION 78

Which of the following represents the columns of the table in a relational database?

- A. attributes
- B. relation
- C. record retention

D. records or tuples

Answer: A

Explanation: The rows of the table represent records or tuples and the columns of the table represent the attributes.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 45

### QUESTION 79

A database view is the results of which of the following operations?

- A. Join and Select.
- B. Join, Insert, and Project.
- C. Join, Project, and Create.
- D. Join, Project, and Select.

Answer: D

Explanation: 1 The formal description of how a relational database operates.

2 The mathematics which underpin SQL operations.

A number of operations can be performed in relational algebra to build relations and operate on the data.

Five operations are primitives (Select, Project, Union, Difference and Product) and the other operations can be defined in terms of those five. A View is defined from the operations of Join, Project, and Select.

For the purpose of the exam you must remember the following terms from relational algebra and their SQL equivalent:

Tuple = Row, Entry

Attribute = Column

Relation or Based relation = Table

See the extract below from the ISC2 book:

Each table, or relation, in the relational model consists of a set of attributes and a set of tuples (rows) or entries in the table. Attributes correspond to a column in a table. Attributes are unordered left to right, and thus are referenced by name and not by position. All data values in the relational model are atomic. Atomic values mean that at every row/column position in every table there is always exactly one data value and never a set of values. There are no links or pointers connecting tables; thus, the representation of relationships is contained as data in another table.

A tuple of a table corresponds to a row in the table. Tuples are unordered top to bottom because a relation is a mathematical set and not a list. Also, because tuples are based on tables that are mathematical sets, there are no duplicate tuples in a table (sets in mathematics by definition do not include duplicate elements).

The primary key is an attribute or set of attributes that uniquely identifies a specific instance of an entity. Each table in a database must have a primary key that is unique to that table. It is a subset of the candidate key.

Reference used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 12262-12269). Auerbach Publications. Kindle Edition.  
and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 46

and

<http://db.grussell.org/slides/rel%20algebra%201ppt>

NOTE:

SQL offers three classes of operators: select, project, and join.

The select operator serves to shrink the table vertically by eliminating unwanted rows (tuples).

The project operator serves to shrink the table horizontally by removing unwanted columns (attributes).

And the join operator allows the dynamic linking of two tables that share a common column value.

The join operation is achieved by stating the selection criteria for two tables and equating them with their common columns.

Most commercial implementations of SQL do not support a project operation, instead projections are achieved by specifying the columns desired in the output. This is why the Project operator is not well known as it is fading away from most databases.

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## QUESTION 80

Which of the following is used to create and modify the structure of your tables and other objects in the database?

- A. SQL Data Definition Language (DDL)
- B. SQL Data Manipulation Language (DML)
- C. SQL Data Relational Language (DRL)
- D. SQL Data Identification Language (DIL)

Answer: A

Explanation:

The SQL Data Definition Language (DDL) is used to create, modify, and delete views and relations (tables).

Data Definition Language

The Data Definition Language (DDL) is used to create and destroy databases and database objects. These commands will primarily be used by database administrators during the setup and removal phases of a database project. Let's take a look at the structure and usage of four basic DDL commands:

CREATE

Installing a database management system (DBMS) on a computer allows you to create and manage many independent databases. For example, you may want to maintain a database of customer contacts for your sales department and a personnel database for your HR department. The CREATE command can be used to establish each of these databases on your platform. For example, the command:

`CREATE DATABASE employees`

creates an empty database named "employees" on your DBMS. After creating the database, your

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next step is to create tables that will contain data. (If this doesn't make sense, you might want to read the article Microsoft Access Fundamentals for an overview of tables and databases.) Another variant of the CREATE command can be used for this purpose. The command:

`CREATE TABLE personal_info (first_name char(20) not null, last_name char(20) not null, employee_id int not null)`

establishes a table titled "personal\_info" in the current database. In our example, the table contains three attributes: first\_name, last\_name and employee\_id. Don't worry about the other information included in the command -- we'll cover that in a future article.

#### USE

The USE command allows you to specify the database you wish to work with within your DBMS. For example, if we're currently working in the sales database and want to issue some commands that will affect the employees database, we would preface them with the following SQL command:  
`USE employees`

It's important to always be conscious of the database you are working in before issuing SQL commands that manipulate data.

#### ALTER

Once you've created a table within a database, you may wish to modify the definition of it. The ALTER command allows you to make changes to the structure of a table without deleting and recreating it. Take a look at the following command:

`ALTER TABLE personal_info`

`ADD salary money null`

This example adds a new attribute to the personal\_info table -- an employee's salary. The "money" argument specifies that an employee's salary will be stored using a dollars and cents format. Finally, the "null" keyword tells the database that it's OK for this field to contain no value for any given employee.

#### DROP

The final command of the Data Definition Language, DROP, allows us to remove entire database objects from our DBMS. For example, if we want to permanently remove the personal\_info table that we created, we'd use the following command:

`DROP TABLE personal_info`

Similarly, the command below would be used to remove the entire employees database:

`DROP DATABASE employees`

Use this command with care! Remember that the DROP command removes entire data structures from your database. If you want to remove individual records, use the DELETE command of the Data Manipulation Language.

That's the Data Definition Language in a nutshell.

#### Data Manipulation Language

The Data Manipulation Language (DML) is used to retrieve, insert and modify database information. These commands will be used by all database users during the routine operation of the database. Let's take a brief look at the basic DML commands:

The Data Manipulation Language (DML) is used to retrieve, insert and modify database information. These commands will be used by all database users during the routine operation of the database. Let's take a brief look at the basic DML commands:

#### INSERT

The INSERT command in SQL is used to add records to an existing table. Returning to the personal\_info example from the previous section, let's imagine that our HR department needs to

---

add a new employee to their database. They could use a command similar to the one shown below:

```
INSERT INTO personal_info  
values('bart','simpson',12345,$45000)
```

Note that there are four values specified for the record. These correspond to the table attributes in the order they were defined: first\_name, last\_name, employee\_id, and salary.

**SELECT**

The SELECT command is the most commonly used command in SQL. It allows database users to retrieve the specific information they desire from an operational database. Let's take a look at a few examples, again using the personal\_info table from our employees database.

The command shown below retrieves all of the information contained within the personal\_info table. Note that the asterisk is used as a wildcard in SQL. This literally means "Select everything from the personal\_info table."

```
SELECT *  
FROM personal_info
```

Alternatively, users may want to limit the attributes that are retrieved from the database. For example, the Human Resources department may require a list of the last names of all employees in the company. The following SQL command would retrieve only that information:

```
SELECT last_name  
FROM personal_info
```

Finally, the WHERE clause can be used to limit the records that are retrieved to those that meet specified criteria. The CEO might be interested in reviewing the personnel records of all highly paid employees. The following command retrieves all of the data contained within personal\_info for records that have a salary value greater than \$50,000:

```
SELECT *  
FROM personal_info  
WHERE salary > $50000
```

**UPDATE**

The UPDATE command can be used to modify information contained within a table, either in bulk or individually. Each year, our company gives all employees a 3% cost-of-living increase in their salary. The following SQL command could be used to quickly apply this to all of the employees stored in the database:

```
UPDATE personal_info  
SET salary = salary * 103
```

On the other hand, our new employee Bart Simpson has demonstrated performance above and beyond the call of duty. Management wishes to recognize his stellar accomplishments with a \$5,000 raise. The WHERE clause could be used to single out Bart for this raise:

```
UPDATE personal_info  
SET salary = salary + $5000  
WHERE employee_id = 12345
```

**DELETE**

Finally, let's take a look at the DELETE command. You'll find that the syntax of this command is similar to that of the other DML commands. Unfortunately, our latest corporate earnings report didn't quite meet expectations and poor Bart has been laid off. The DELETE command with a WHERE clause can be used to remove his record from the personal\_info table:

```
DELETE FROM personal_info
```

WHERE employee\_id = 12345

#### JOIN Statements

Now that you've learned the basics of SQL, it's time to move on to one of the most powerful concepts the language has to offer – the JOIN statement. Quite simply, these statements allow you to combine data in multiple tables to quickly and efficiently process large quantities of data. These statements are where the true power of a database resides.

We'll first explore the use of a basic JOIN operation to combine data from two tables. In future installments, we'll explore the use of outer and inner joins to achieve added power.

We'll continue with our example using the PERSONAL\_INFO table, but first we'll need to add an additional table to the mix. Let's assume we have a table called DISCIPLINARY\_ACTION that was created with the following statement:

```
CREATE TABLE disciplinary_action (action_id int not null, employee_id int not null, comments char(500))
```

This table contains the results of disciplinary actions on company employees. You'll notice that it doesn't contain any information about the employee other than the employee number. It's then easy to imagine many scenarios where we might want to combine information from the DISCIPLINARY\_ACTION and PERSONAL\_INFO tables.

Assume we've been tasked with creating a report that lists the disciplinary actions taken against all employees with a salary greater than \$40,000. The use of a JOIN operation in this case is quite straightforward. We can retrieve this information using the following command:

```
SELECT personal_info.first_name, personal_info.last_name, disciplinary_action.comments  
FROM personal_info, disciplinary_action  
WHERE personal_info.employee_id = disciplinary_action.employee_id  
AND personal_info.salary > 40000
```

As you can see, we simply specified the two tables that we wished to join in the FROM clause and then included a statement in the WHERE clause to limit the results to records that had matching employee IDs and met our criteria of a salary greater than \$40,000.

Another term you must be familiar with as a security mechanism in Databases is: VIEW

#### What is a view?

In database theory, a view is a virtual or logical table composed of the result set of a query. Unlike ordinary tables (base tables) in a relational database, a view is not part of the physical schema: it is a dynamic, virtual table computed or collated from data in the database. Changing the data in a table alters the data shown in the view.

The result of a view is stored in a permanent table whereas the result of a query is displayed in a temporary table.

Views can provide advantages over tables;

They can subset the data contained in a table

They can join and simplify multiple tables into a single virtual table

Views can act as aggregated tables, where aggregated data (sum, average etc.) are calculated and presented as part of the data

Views can hide the complexity of data, for example a view could appear as Sales2000 or Sales2001, transparently partitioning the actual underlying table

Views take very little space to store; only the definition is stored, not a copy of all the data they present

Depending on the SQL engine used, views can provide extra security.

Limit the exposure to which a table or tables are exposed to outer world

Just like functions (in programming) provide abstraction, views can be used to create abstraction. Also, just like functions, views can be nested, thus one view can aggregate data from other views. Without the use of views it would be much harder to normalise databases above second normal form. Views can make it easier to create lossless join decomposition.

Rows available through a view are not sorted. A view is a relational table, and the relational model states that a table is a set of rows. Since sets are not sorted - per definition - the rows in a view are not ordered either. Therefore, an ORDER BY clause in the view definition is meaningless and the SQL standard (SQL:2003) does not allow this for the subselect in a CREATE VIEW statement.

The following reference(s) were used for this question:

The text above is from About.Com at: <http://databases.about.com/>

The definition of views above is from: [http://en.wikipedia.org/wiki/View\\_%28database%29](http://en.wikipedia.org/wiki/View_%28database%29)

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 47

<http://www.tomjewett.com/dbdesign/dbdesign.php?page=ddldml.php>

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### QUESTION 81

Which of the following is used to monitor network traffic or to monitor host audit logs in real time to determine violations of system security policy that have taken place?

- A. Intrusion Detection System
- B. Compliance Validation System
- C. Intrusion Management System (IMS)
- D. Compliance Monitoring System

Answer: A

Explanation:

An Intrusion Detection System (IDS) is a system that is used to monitor network traffic or to monitor host audit logs in order to determine if any violations of an organization's system security policy have taken place.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 48

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### QUESTION 82

Which of the following monitors network traffic in real time?

- A. network-based IDS
- B. host-based IDS
- C. application-based IDS
- D. firewall-based IDS

Answer: A

Explanation: This type of IDS is called a network-based IDS because monitors network traffic in real time.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 48

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**QUESTION 83**

A host-based IDS is resident on which of the following?

- A. On each of the critical hosts
- B. decentralized hosts
- C. central hosts
- D. bastion hosts

Answer: A

Explanation: A host-based IDS is resident on a host and reviews the system and event logs in order to detect an attack on the host and to determine if the attack was successful. All critical servers should have a Host Based Intrusion Detection System (HIDS) installed. As you are well aware, network based IDS cannot make sense or detect pattern of attacks within encrypted traffic. A HIDS might be able to detect such attack after the traffic has been decrypted on the host. This is why critical servers should have both NIDS and HIDS.

FROM WIKIPEDIA:

A HIDS will monitor all or part of the dynamic behavior and of the state of a computer system. Much as a NIDS will dynamically inspect network packets, a HIDS might detect which program accesses what resources and assure that (say) a word-processor hasn't suddenly and inexplicably started modifying the system password-database. Similarly a HIDS might look at the state of a system, its stored information, whether in RAM, in the file-system, or elsewhere; and check that the contents of these appear as expected.

One can think of a HIDS as an agent that monitors whether anything/anyone - internal or external - has circumvented the security policy that the operating system tries to enforce.

[http://en.wikipedia.org/wiki/Host-based\\_intrusion\\_detection\\_system](http://en.wikipedia.org/wiki/Host-based_intrusion_detection_system)

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**QUESTION 84**

Which of the following usually provides reliable, real-time information without consuming network or host resources?

- A. network-based IDS
- B. host-based IDS
- C. application-based IDS
- D. firewall-based IDS

Answer: A

Explanation: A network-based IDS usually provides reliable, real-time information without consuming network or host resources.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 48

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**QUESTION 85**

The fact that a network-based IDS reviews packets payload and headers enable which of the following?

- A. Detection of denial of service
- B. Detection of all viruses
- C. Detection of data corruption
- D. Detection of all password guessing attacks

Answer: A

Explanation: Because a network-based IDS reviews packets and headers, denial of service attacks can also be detected.

This question is an easy question if you go through the process of elimination. When you see an answer containing the keyword: ALL It is something a give away that it is not the proper answer. On the real exam you may encounter a few question where the use of the work ALL renders the choice invalid. Pay close attention to such keyword.

The following are incorrect answers:

Even though most IDSs can detect some viruses and some password guessing attacks, they cannot detect ALL viruses or ALL password guessing attacks. Therefore these two answers are only detractors.

Unless the IDS knows the valid values for a certain dataset, it can NOT detect data corruption.

Reference used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 48

**QUESTION 86**

Which of the following reviews system and event logs to detect attacks on the host and determine if the attack was successful?

- A. host-based IDS
- B. firewall-based IDS
- C. bastion-based IDS
- D. server-based IDS

Answer: A

Explanation: A host-based IDS can review the system and event logs in order to detect an attack on the host and to determine if the attack was successful.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 48

**QUESTION 87**

What would be considered the biggest drawback of Host-based Intrusion Detection systems (HIDS)?

- A. It can be very invasive to the host operating system
- B. Monitors all processes and activities on the host system only
- C. Virtually eliminates limits associated with encryption
- D. They have an increased level of visibility and control compared to NIDS

Answer: A

Explanation: The biggest drawback of HIDS, and the reason many organizations resist its use, is that it can be very invasive to the host operating system. HIDS must have the capability to monitor all processes and activities on the host system and this can sometimes interfere with normal system processing.

#### HIDS versus NIDS

A host-based IDS (HIDS) can be installed on individual workstations and/ or servers to watch for inappropriate or anomalous activity. HIDSs are usually used to make sure users do not delete system files, reconfigure important settings, or put the system at risk in any other way.

So, whereas the NIDS understands and monitors the network traffic, a HIDS's universe is limited to the computer itself. A HIDS does not understand or review network traffic, and a NIDS does not "look in" and monitor a system's activity. Each has its own job and stays out of the other's way.

The ISC2 official study book defines an IDS as:

An intrusion detection system (IDS) is a technology that alerts organizations to adverse or unwanted activity. An IDS can be implemented as part of a network device, such as a router, switch, or firewall, or it can be a dedicated IDS device monitoring traffic as it traverses the network. When used in this way, it is referred to as a network IDS, or NIDS. IDS can also be used on individual host systems to monitor and report on file, disk, and process activity on that host. When used in this way it is referred to as a host-based IDS, or HIDS.

An IDS is informative by nature and provides real-time information when suspicious activities are identified. It is primarily a detective device and, acting in this traditional role, is not used to directly prevent the suspected attack.

#### What about IPS?

In contrast, an intrusion prevention system (IPS), is a technology that monitors activity like an IDS but will automatically take proactive preventative action if it detects unacceptable activity. An IPS permits a predetermined set of functions and actions to occur on a network or system; anything that is not permitted is considered unwanted activity and blocked. IPS is engineered specifically to respond in real time to an event at the system or network layer. By proactively enforcing policy, IPS can thwart not only attackers, but also authorized users attempting to perform an action that is not within policy. Fundamentally, IPS is considered an access control and policy enforcement technology, whereas IDS is considered network monitoring and audit technology.

The following answers were incorrect:

All of the other answer were advantages and not drawback of using HIDS

#### TIP FOR THE EXAM:

Be familiar with the differences that exists between an HIDS, NIDS, and IPS. Know that IDS's are mostly detective but IPS are preventive. IPS's are considered an access control and policy enforcement technology, whereas IDS's are considered network monitoring and audit technology.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 5817-5822). McGraw-Hill. Kindle Edition.

and

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Access Control ((ISC)2 Press), Domain1, Page 180-188 or on the kindle version look for Kindle Locations 3199-3203 Auerbach Publications.

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### QUESTION 88

Attributes that characterize an attack are stored for reference using which of the following Intrusion Detection System (IDS)?

- A. signature-based IDS
- B. statistical anomaly-based IDS
- C. event-based IDS
- D. inferent-based IDS

Answer: A

Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 49

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### QUESTION 89

Which of the following is an issue with signature-based intrusion detection systems?

- A. Only previously identified attack signatures are detected.
- B. Signature databases must be augmented with inferential elements.
- C. It runs only on the windows operating system
- D. Hackers can circumvent signature evaluations.

Answer: A

Explanation: An issue with signature-based ID is that only attack signatures that are stored in their database are detected.

New attacks without a signature would not be reported. They do require constant updates in order to maintain their effectiveness.

Reference used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 49

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### QUESTION 90

Which of the following is an IDS that acquires data and defines a "normal" usage profile for the network or host?

- A. Statistical Anomaly-Based ID
- B. Signature-Based ID
- C. dynamical anomaly-based ID
- D. inferential anomaly-based ID

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Answer: A

Explanation: Statistical Anomaly-Based ID - With this method, an IDS acquires data and defines a "normal" usage profile for the network or host that is being monitored.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 49

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### QUESTION 91

Which of the following is most relevant to determining the maximum effective cost of access control?

- A. the value of information that is protected.
- B. management's perceptions regarding data importance.
- C. budget planning related to base versus incremental spending.
- D. the cost to replace lost data.

Answer: A

Explanation: The cost of access control must be commensurate with the value of the information that is being protected.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 49

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### QUESTION 92

Which of the following is NOT a factor related to Access Control?

- A. integrity
- B. authenticity
- C. confidentiality
- D. availability

Answer: B

Explanation: These factors cover the integrity, confidentiality, and availability components of information system security.

Integrity is important in access control as it relates to ensuring only authorized subjects can make changes to objects.

Authenticity is different from authentication. Authenticity pertains to something being authentic, not necessarily having a direct correlation to access control.

Confidentiality is pertinent to access control in that the access to sensitive information is controlled to protect confidentiality.

Availability is protected by access controls in that if an attacker attempts to disrupt availability they would first need access.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 49

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**QUESTION 93**

Which of the following is most appropriate to notify an external user that session monitoring is being conducted?

- A. Logon Banners
- B. Wall poster
- C. Employee Handbook
- D. Written agreement

Answer: A

Explanation: Banners at the log-on time should be used to notify external users of any monitoring that is being conducted. A good banner will give you a better legal stand and also makes it obvious the user was warned about who should access the system and if it is an unauthorized user then he is fully aware of trespassing.

This is a tricky question, the keyword in the question is External user.

There are two possible answers based on how the question is presented, this question could either apply to internal users or ANY anonymous user.

Internal users should always have a written agreement first, then logon banners serve as a constant reminder.

Anonymous users, such as those logging into a web site, ftp server or even a mail server; their only notification system is the use of a logon banner.

References used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 50  
and

Shon Harris, CISSP All-in-one, 5th edition, pg 873

**QUESTION 94**

Which of the following pairings uses technology to enforce access control policies?

- A. Preventive/Administrative
- B. Preventive/Technical
- C. Preventive/Physical
- D. Detective/Administrative

Answer: B

Explanation: The preventive/technical pairing uses technology to enforce access control policies.

**TECHNICAL CONTROLS**

Technical security involves the use of safeguards incorporated in computer hardware, operations or applications software, communications hardware and software, and related devices. Technical controls are sometimes referred to as logical controls.

Preventive Technical Controls

Preventive technical controls are used to prevent unauthorized personnel or programs from gaining remote access to computing resources. Examples of these controls include:

- Access control software.
- Antivirus software.
- Library control systems.
- Passwords.
- Smart cards.
- Encryption.
- Dial-up access control and callback systems.

#### Preventive Physical Controls

Preventive physical controls are employed to prevent unauthorized personnel from entering computing facilities (i.e., locations housing computing resources, supporting utilities, computer hard copy, and input data media) and to help protect against natural disasters. Examples of these controls include:

- Backup files and documentation.
- Fences.
- Security guards.
- Badge systems.
- Double door systems.
- Locks and keys.
- Backup power.
- Biometric access controls.
- Site selection.
- Fire extinguishers.

#### Preventive Administrative Controls

Preventive administrative controls are personnel-oriented techniques for controlling people's behavior to ensure the confidentiality, integrity, and availability of computing data and programs.

Examples of preventive administrative controls include:

- Security awareness and technical training.
- Separation of duties.
- Procedures for recruiting and terminating employees.
- Security policies and procedures.
- Supervision.
- Disaster recovery, contingency, and emergency plans.
- User registration for computer access.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 34

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#### QUESTION 95

In the course of responding to and handling an incident, you work on determining the root cause of the incident. In which step are you in?

- A. Recovery
- B. Containment
- C. Triage
- D. Analysis and tracking

Answer: D

Explanation: In this step, your main objective is to examine and analyze what has occurred and focus on determining the root cause of the incident.

Recovery is incorrect as recovery is about resuming operations or bringing affected systems back into production

Containment is incorrect as containment is about reducing the potential impact of an incident.

Triage is incorrect as triage is about determining the seriousness of the incident and filtering out false positives

Reference:

Official Guide to the CISSP CBK, pages 700-704

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### QUESTION 96

Access control is the collection of mechanisms that permits managers of a system to exercise a directing or restraining influence over the behavior, use, and content of a system. It does not permit management to:

- A. specify what users can do
- B. specify which resources they can access
- C. specify how to restrain hackers
- D. specify what operations they can perform on a system.

Answer: C

Explanation: Access control is the collection of mechanisms that permits managers of a system to exercise a directing or restraining influence over the behavior, use, and content of a system. It permits management to specify what users can do, which resources they can access, and what operations they can perform on a system. Specifying HOW to restrain hackers is not directly linked to access control.

Source: DUPUIS, Clement, Access Control Systems and Methodology, Version 1, May 2002,  
CISSP Open Study Group Study Guide for Domain 1, Page 12

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### QUESTION 97

Access Control techniques do not include which of the following choices?

- A. Relevant Access Controls
- B. Discretionary Access Control
- C. Mandatory Access Control
- D. Lattice Based Access Control

Answer: A

Explanation: Access Control Techniques

Discretionary Access Control

Mandatory Access Control

Lattice Based Access Control

Rule-Based Access Control

## Role-Based Access Control

Source: DUPUIS, Clement, Access Control Systems and Methodology, Version 1, May 2002,  
CISSP Open Study Group Study Guide for Domain 1, Page 13

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### QUESTION 98

Which of the following statements relating to the Bell-LaPadula security model is FALSE  
(assuming the Strong Star property is not being used)?

- A. A subject is not allowed to read up.
- B. The \*- property restriction can be escaped by temporarily downgrading a high level subject.
- C. A subject is not allowed to read down.
- D. It is restricted to confidentiality.

Answer: C

Explanation: It is not a property of Bell LaPadula model.

The other answers are incorrect because:

A subject is not allowed to read up is a property of the 'simple security rule' of Bell LaPadula model.

The \*- property restriction can be escaped by temporarily downgrading a high level subject can be escaped by temporarily downgrading a high level subject or by identifying a set of trusted objects which are permitted to violate the \*-property as long as it is not in the middle of an operation.

It is restricted to confidentiality as it is a state machine model that enforces the confidentiality aspects of access control.

Reference: Shon Harris AIO v3 , Chapter-5 : Security Models and Architecture , Page:279-282

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### QUESTION 99

When a biometric system is used, which error type deals with the possibility of GRANTING access to impostors who should be REJECTED?

- A. Type I error
- B. Type II error
- C. Type III error
- D. Crossover error

Answer: B

Explanation: When the biometric system accepts impostors who should have been rejected , it is called a Type II error or False Acceptance Rate or False Accept Rate.

Biometrics verifies an individual's identity by analyzing a unique personal attribute or behavior, which is one of the most effective and accurate methods of verifying identification.

Biometrics is a very sophisticated technology; thus, it is much more expensive and complex than the other types of identity verification processes. A biometric system can make authentication decisions based on an individual's behavior, as in signature dynamics, but these can change over time and possibly be forged.

Biometric systems that base authentication decisions on physical attributes (iris, retina, fingerprint)

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provide more accuracy, because physical attributes typically don't change much, absent some disfiguring injury, and are harder to impersonate.

When a biometric system rejects an authorized individual, it is called a Type I error (False Rejection Rate (FRR) or False Reject Rate (FRR)).

When the system accepts impostors who should be rejected, it is called a Type II error (False Acceptance Rate (FAR) or False Accept Rate (FAR)). Type II errors are the most dangerous and thus the most important to avoid.

The goal is to obtain low numbers for each type of error, but When comparing different biometric systems, many different variables are used, but one of the most important metrics is the crossover error rate (CER).

The accuracy of any biometric method is measured in terms of Failed Acceptance Rate (FAR) and Failed Rejection Rate (FRR). Both are expressed as percentages. The FAR is the rate at which attempts by unauthorized users are incorrectly accepted as valid. The FRR is just the opposite. It measures the rate at which authorized users are denied access.

The relationship between FRR (Type I) and FAR (Type II) is depicted in the graphic below . As one rate increases, the other decreases. The Cross-over Error Rate (CER) is sometimes considered a good indicator of the overall accuracy of a biometric system. This is the point at which the FRR and the FAR have the same value. Solutions with a lower CER are typically more accurate.

See graphic below from Biometria showing this relationship. The Cross-over Error Rate (CER) is also called the Equal Error Rate (EER), the two are synonymous.

#### Cross Over Error Rate

The other answers are incorrect:

Type I error is also called as False Rejection Rate where a valid user is rejected by the system.

Type III error : there is no such error type in biometric system.

Crossover error rate stated in percentage , represents the point at which false rejection equals the false acceptance rate.

Reference(s) used for this question:

<http://www.biometria.sk/en/principles-of-biometrics.html> and Shon Harris, CISSP All In One (AIO), 6th Edition , Chapter 3, Access Control, Page 188-189 and Tech Republic, Reduce Multi\_Factor Authentication Cost

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## QUESTION 100

Which of the following is the FIRST step in protecting data's confidentiality?

- A. Install a firewall
- B. Implement encryption
- C. Identify which information is sensitive
- D. Review all user access rights

Answer: C

Explanation: In order to protect the confidentiality of the data.

The following answers are incorrect because :

Install a firewall is incorrect as this would come after the information has been identified for sensitivity levels.

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Implement encryption is also incorrect as this is one of the mechanisms to protect the data once it has been identified.

Review all user access rights is also incorrect as this is also a protection mechanism for the identified information.

Reference : Shon Harris AIO v3 , Chapter-4 : Access Control , Page : 126

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### QUESTION 101

Which of the following best ensures accountability of users for the actions taken within a system or domain?

- A. Identification
- B. Authentication
- C. Authorization
- D. Credentials

Answer: B

Explanation: The only way to ensure accountability is if the subject is uniquely identified and authenticated. Identification alone does not provide proof the user is who they claim to be. After showing proper credentials, a user is authorized access to resources.

References:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 4: Access Control (page 126).

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### QUESTION 102

Which of the following statements pertaining to biometrics is FALSE?

- A. User can be authenticated based on behavior.
- B. User can be authenticated based on unique physical attributes.
- C. User can be authenticated by what he knows.
- D. A biometric system's accuracy is determined by its crossover error rate (CER).

Answer: C

Explanation: As this is not a characteristic of Biometrics this is the right choice for this question. This is one of the three basic ways authentication can be performed and it is not related to Biometrics. Example of something you know would be a password or PIN for example.

Please make a note of the negative 'FALSE' within the question. This question may seem tricky to some of you but you would be amazed at how many people cannot deal with negative questions. There will be a few negative questions within the real exam, just like this one the keyword NOT or FALSE will be in Uppercase to clearly indicate that it is negative.

Biometrics verifies an individual's identity by analyzing a unique personal attribute or behavior, which is one of the most effective and accurate methods of performing authentication (one to one matching) or identification (a one to many matching).

A biometric system scans an attribute or behavior of a person and compares it to a template stored within an authentication server database, such template would be created in an earlier enrollment

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process. Because this system inspects the grooves of a person's fingerprint, the pattern of someone's retina, or the pitches of someone's voice, it has to be extremely sensitive.

The system must perform accurate and repeatable measurements of anatomical or physiological characteristics. This type of sensitivity can easily cause false positives or false negatives. The system must be calibrated so that these false positives and false negatives occur infrequently and the results are as accurate as possible.

There are two types of failures in biometric identification:

False Rejection also called False Rejection Rate (FRR) — The system fail to recognize a legitimate user. While it could be argued that this has the effect of keeping the protected area extra secure, it is an intolerable frustration to legitimate users who are refused access because the scanner does not recognize them.

False Acceptance or False Acceptance Rate (FAR) — This is an erroneous recognition, either by confusing one user with another or by accepting an imposter as a legitimate user.

Physiological Examples:

Unique Physical Attributes:

Fingerprint (Most commonly accepted)

Hand Geometry

Retina Scan (Most accurate but most intrusive)

Iris Scan

Vascular Scan

Behavioral Examples:

Repeated Actions

Keystroke Dynamics

(Dwell time (the time a key is pressed) and Flight time (the time between "key up" and the next "key down").

Signature Dynamics

(Stroke and pressure points)

EXAM TIP:

Retina scan devices are the most accurate but also the most invasive biometrics system available today. The continuity of the retinal pattern throughout life and the difficulty in fooling such a device also make it a great long-term, high-security option. Unfortunately, the cost of the proprietary hardware as well the stigma of users thinking it is potentially harmful to the eye makes retinal scanning a bad fit for most situations.

Remember for the exam that fingerprints are the most commonly accepted type of biometrics system.

The other answers are incorrect:

'Users can be authenticated based on behavior.' is incorrect as this choice is TRUE as it pertains to BIOMETRICS.

Biometrics systems makes use of unique physical characteristics or behavior of users.

'User can be authenticated based on unique physical attributes.' is also incorrect as this choice is also TRUE as it pertains to BIOMETRICS. Biometrics systems makes use of unique physical characteristics or behavior of users.

'A biometric system's accuracy is determined by its crossover error rate (CER)' is also incorrect as this is TRUE as it also pertains to BIOMETRICS. The CER is the point at which the false rejection rates and the false acceptance rates are equal. The smaller the value of the CER, the more accurate the system.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 25353-25356). Auerbach Publications. Kindle Edition.  
and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 25297-25303). Auerbach Publications. Kindle Edition.

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### QUESTION 103

Which of the following biometric devices offers the LOWEST CER?

- A. Keystroke dynamics
- B. Voice verification
- C. Iris scan
- D. Fingerprint

Answer: C

Explanation: From most effective (lowest CER) to least effective (highest CER) are:

Iris scan, fingerprint, voice verification, keystroke dynamics.

Reference : Shon Harris AIO v3 , Chapter-4 : Access Control , Page : 131

Also see: [http://www.sans.org/reading\\_room/whitepapers/authentication/biometric-selection-bodyparts-online\\_139](http://www.sans.org/reading_room/whitepapers/authentication/biometric-selection-bodyparts-online_139)

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### QUESTION 104

Which of the following is the WEAKEST authentication mechanism?

- A. Passphrases
- B. Passwords
- C. One-time passwords
- D. Token devices

Answer: B

Explanation: Most of the time users usually choose passwords which can be guessed , hence passwords is the BEST answer out of the choices listed above.

The following answers are incorrect because :

Passphrases is incorrect as it is more secure than a password because it is longer.

One-time passwords is incorrect as the name states , it is good for only once and cannot be reused.

Token devices is incorrect as this is also a password generator and is an one time password mechanism.

Reference : Shon Harris AIO v3 , Chapter-4 : Access Control , Page : 139 , 142

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### QUESTION 105

Which of the following statements pertaining to access control is false?

- 
- A. Users should only access data on a need-to-know basis.
  - B. If access is not explicitly denied, it should be implicitly allowed.
  - C. Access rights should be granted based on the level of trust a company has on a subject.
  - D. Roles can be an efficient way to assign rights to a type of user who performs certain tasks.

Answer: B

Explanation: Access control mechanisms should default to no access to provide the necessary level of security and ensure that no security holes go unnoticed. If access is not explicitly allowed, it should be implicitly denied.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 4: Access Control (page 143).

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### QUESTION 106

Which of the following is NOT part of the Kerberos authentication protocol?

- A. Symmetric key cryptography
- B. Authentication service (AS)
- C. Principals
- D. Public Key

Answer: D

Explanation: There is no such component within kerberos environment. Kerberos uses only symmetric encryption and does not make use of any public key component.

The other answers are incorrect because :

Symmetric key cryptography is a part of Kerberos as the KDC holds all the users' and services' secret keys.

Authentication service (AS) : KDC (Key Distribution Center) provides an authentication service  
Principals : Key Distribution Center provides services to principals , which can be users , applications or network services.

References : Shon Harris , AIO v3 , Chapter - 4: Access Control , Pages : 152-155

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### QUESTION 107

Which access control model enables the OWNER of the resource to specify what subjects can access specific resources based on their identity?

- A. Discretionary Access Control
- B. Mandatory Access Control
- C. Sensitive Access Control
- D. Role-based Access Control

Answer: A

Explanation: Data owners decide who has access to resources based only on the identity of the person accessing the resource.

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The following answers are incorrect :

Mandatory Access Control : users and data owners do not have as much freedom to determine who can access files. The operating system makes the final decision and can override the users' wishes and access decisions are based on security labels.

Sensitive Access Control : There is no such access control in the context of the above question.

Role-based Access Control : uses a centrally administered set of controls to determine how subjects and objects interact , also called as non discretionary access control.

In a mandatory access control (MAC) model, users and data owners do not have as much freedom to determine who can access files. The operating system makes the final decision and can override the users' wishes. This model is much more structured and strict and is based on a security label system. Users are given a security clearance (secret, top secret, confidential, and so on), and data is classified in the same way. The clearance and classification data is stored in the security labels, which are bound to the specific subjects and objects. When the system makes a decision about fulfilling a request to access an object, it is based on the clearance of the subject, the classification of the object, and the security policy of the system. The rules for how subjects access objects are made by the security officer, configured by the administrator, enforced by the operating system, and supported by security technologies

Reference : Shon Harris , AIO v3 , Chapter-4 : Access Control , Page : 163-165

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### QUESTION 108

Which of the following access control models is based on sensitivity labels?

- A. Discretionary access control
- B. Mandatory access control
- C. Rule-based access control
- D. Role-based access control

Answer: B

Explanation: Access decisions are made based on the clearance of the subject and the sensitivity label of the object.

Example: Eve has a "Secret" security clearance and is able to access the "Mugwump Missile Design Profile" because its sensitivity label is "Secret." She is denied access to the "Presidential Toilet Tissue Formula" because its sensitivity label is "Top Secret."

The other answers are not correct because:

Discretionary Access Control is incorrect because in DAC access to data is determined by the data owner. For example, Joe owns the "Secret Chili Recipe" and grants read access to Charles. Role Based Access Control is incorrect because in RBAC access decisions are made based on the role held by the user. For example, Jane has the role "Auditor" and that role includes read permission on the "System Audit Log."

Rule Based Access Control is incorrect because it is a form of MAC. A good example would be a Firewall where rules are defined and apply to anyone connecting through the firewall.

References:

All in One third edition, page 164

Official ISC2 Guide page 187

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**QUESTION 109**

Which access control model is also called Non Discretionary Access Control (NDAC)?

- A. Lattice based access control
- B. Mandatory access control
- C. Role-based access control
- D. Label-based access control

Answer: C

Explanation: RBAC is sometimes also called non-discretionary access control (NDAC) (as Ferraiolo says "to distinguish it from the policy-based specifics of MAC"). Another model that fits within the NDAC category is Rule-Based Access Control (RuBAC or RBAC). Most of the CISSP books use the same acronym for both models but NIST tend to use a lowercase "u" in between R and B to differentiate the two models.

You can certainly mimic MAC using RBAC but true MAC makes use of Labels which contains the sensitivity of the objects and the categories they belong to. No labels means MAC is not being used.

One of the most fundamental data access control decisions an organization must make is the amount of control it will give system and data owners to specify the level of access users of that data will have. In every organization there is a balancing point between the access controls enforced by organization and system policy and the ability for information owners to determine who can have access based on specific business requirements. The process of translating that balance into a workable access control model can be defined by three general access frameworks:

Discretionary access control

Mandatory access control

Nondiscretionary access control

A role-based access control (RBAC) model bases the access control authorizations on the roles (or functions) that the user is assigned within an organization. The determination of what roles have access to a resource can be governed by the owner of the data, as with DACs, or applied based on policy, as with MACs.

Access control decisions are based on job function, previously defined and governed by policy, and each role (job function) will have its own access capabilities. Objects associated with a role will inherit privileges assigned to that role. This is also true for groups of users, allowing administrators to simplify access control strategies by assigning users to groups and groups to roles.

There are several approaches to RBAC. As with many system controls, there are variations on how they can be applied within a computer system.

There are four basic RBAC architectures:

1 Non-RBAC: Non-RBAC is simply a user-granted access to data or an application by traditional mapping, such as with ACLs. There are no formal "roles" associated with the mappings, other than any identified by the particular user.

2 Limited RBAC: Limited RBAC is achieved when users are mapped to roles within a single application rather than through an organization-wide role structure. Users in a limited RBAC system are also able to access non-RBAC-based applications or data. For example, a user may

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be assigned to multiple roles within several applications and, in addition, have direct access to another application or system independent of his or her assigned role. The key attribute of limited RBAC is that the role for that user is defined within an application and not necessarily based on the user's organizational job function.

3 Hybrid RBAC: Hybrid RBAC introduces the use of a role that is applied to multiple applications or systems based on a user's specific role within the organization. That role is then applied to applications or systems that subscribe to the organization's role-based model. However, as the term "hybrid" suggests, there are instances where the subject may also be assigned to roles defined solely within specific applications, complimenting (or, perhaps, contradicting) the larger, more encompassing organizational role used by other systems.

4 Full RBAC: Full RBAC systems are controlled by roles defined by the organization's policy and access control infrastructure and then applied to applications and systems across the enterprise. The applications, systems, and associated data apply permissions based on that enterprise definition, and not one defined by a specific application or system.

Be careful not to try to make MAC and DAC opposites of each other -- they are two different access control strategies with RBAC being a third strategy that was defined later to address some of the limitations of MAC and DAC.

The other answers are not correct because:

Mandatory access control is incorrect because though it is by definition not discretionary, it is not called "non-discretionary access control." MAC makes use of label to indicate the sensitivity of the object and it also makes use of categories to implement the need to know.

Label-based access control is incorrect because this is not a name for a type of access control but simply a bogus detractor.

Lattice based access control is not adequate either. A lattice is a series of levels and a subject will be granted an upper and lower bound within the series of levels. These levels could be sensitivity levels or they could be confidentiality levels or they could be integrity levels.

Reference(s) used for this question:

All in One, third edition, page 165

Ferraiolo, D., Kuhn, D. & Chandramouli, R. (2003). Role-Based Access Control, p. 18

Ferraiolo, D., Kuhn, D. (1992). Role-Based Access Controls.

[http://csrc.nist.gov/rbac/Role\\_Based\\_Access\\_Control-1992html](http://csrc.nist.gov/rbac/Role_Based_Access_Control-1992html)

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Access Control ((ISC)2 Press) (Kindle Locations 1557-1584). Auerbach Publications. Kindle Edition.

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Access Control ((ISC)2 Press) (Kindle Locations 1474-1477). Auerbach Publications. Kindle Edition.

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## QUESTION 110

Which access model is most appropriate for companies with a high employee turnover?

- A. Role-based access control
- B. Mandatory access control
- C. Lattice-based access control
- D. Discretionary access control

Answer: A

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Explanation: The underlying problem for a company with a lot of turnover is assuring that new employees are assigned the correct access permissions and that those permissions are removed when they leave the company.

Selecting the best answer requires one to think about the access control options in the context of a company with a lot of flux in the employee population. RBAC simplifies the task of assigning permissions because the permissions are assigned to roles which do not change based on who belongs to them. As employees join the company, it is simply a matter of assigning them to the appropriate roles and their permissions derive from their assigned role. They will implicitly inherit the permissions of the role or roles they have been assigned to. When they leave the company or change jobs, their role assignment is revoked/changed appropriately.

Mandatory access control is incorrect. While controlling access based on the clearance level of employees and the sensitivity of objects is a better choice than some of the other incorrect answers, it is not the best choice when RBAC is an option and you are looking for the best solution for a high number of employees constantly leaving or joining the company.

Lattice-based access control is incorrect. The lattice is really a mathematical concept that is used in formally modeling information flow (Bell-Lapadula, Biba, etc). In the context of the question, an abstract model of information flow is not an appropriate choice. CBK, pp. 324-325

Discretionary access control is incorrect. When an employee joins or leaves the company, the object owner must grant or revoke access for that employee on all the objects they own. Problems would also arise when the owner of an object leaves the company. The complexity of assuring that the permissions are added and removed correctly makes this the least desirable solution in this situation.

References:

All in One, third edition page 165

RBAC is discussed on pp. 189 through 191 of the ISC(2) guide.

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## QUESTION 111

In a security context what are database views used for?

- A. To ensure referential integrity
- B. To allow easier access to data in a database
- C. To restrict user access to data in a database
- D. To provide audit trails

Answer: C

Explanation: The use of a database view allows sensitive information to be hidden from unauthorized users. For example, the employee table might contain employee name, address, office extension and sensitive information such as social security number, etc. A view of the table could be constructed and assigned to the switchboard operator that only included the name and office extension.

To ensure referential integrity is incorrect. Referential integrity states that for each foreign key value in a database table, there must be another table that contains a record with that value as its primary key (CBK, p. 607). For example, consider a record in the line-items table of an order management database -- this table contains a foreign key of part-number from the parts-master table. Referential integrity states that for each part-number value in the line-items table, there must

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be a matching record with that same value in the parts-master table. Referential integrity helps avoids consistency problems that could occur when, for example, a part-number was deleted from parts-master that still appeared on records in the line-items table.

To allow easier access to the database is incorrect. While views can be used for this purpose by, for example, combining information from several tables in a single view, this is not the best answer for the use of views in a security context.

To provide audit trails is incorrect. Since a view only affects what columns of a table are shown, this has nothing to do with providing an audit trail.

References:

CBK, p. 632

AIOv3, p.168

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### QUESTION 112

What can be defined as a list of subjects along with their access rights that are authorized to access a specific object?

- A. A capability table
- B. An access control list
- C. An access control matrix
- D. A role-based matrix

Answer: B

Explanation: "It [ACL] specifies a list of users [subjects] who are allowed access to each object"  
CBK, p. 188

A capability table is incorrect. "Capability tables are used to track, manage and apply controls based on the object and rights, or capabilities of a subject. For example, a table identifies the object, specifies access rights allowed for a subject, and permits access based on the user's posession of a capability (or ticket) for the object." CBK, pp. 191-192 The distinction that makes this an incorrect choice is that access is based on posession of a capability by the subject.

To put it another way, as noted in AIO3 on p. 169, "A capabilty table is different from an ACL because the subject is bound to the capability table, whereas the object is bound to the ACL."

An access control matrix is incorrect. The access control matrix is a way of describing the rules for an access control strategy. The matrix lists the users, groups and roles down the left side and the resources and functions across the top. The cells of the matrix can either indicate that access is allowed or indicate the type of access. CBK pp 317 - 318

AIO3, p. 169 describes it as a table if subjects and objects specifying the access rights a certain subject possesses pertaining to specific objects.

In either case, the matrix is a way of analyzing the access control needed by a population of subjects to a population of objects. This access control can be applied using rules, ACL's, capability tables, etc.

A role-based matrix is incorrect. Again, a matrix of roles vs objects could be used as a tool for thinking about the access control to be applied to a set of objects. The results of the analysis could then be implemented using RBAC.

References:

CBK, Domain 2: Access Control.  
AIO3, Chapter 4: Access Control

### QUESTION 113

What is the difference between Access Control Lists (ACLs) and Capability Tables?

- A. Access control lists are related/attached to a subject whereas capability tables are related/attached to an object.
- B. Access control lists are related/attached to an object whereas capability tables are related/attached to a subject.
- C. Capability tables are used for objects whereas access control lists are used for users.
- D. They are basically the same.

Answer: B

Explanation: Capability tables are used to track, manage and apply controls based on the object and rights, or capabilities of a subject. For example, a table identifies the object, specifies access rights allowed for a subject, and permits access based on the user's possession of a capability (or ticket) for the object. It is a row within the matrix.

To put it another way, A capability table is different from an ACL because the subject is bound to the capability table, whereas the object is bound to the ACL.

CLEMENT NOTE:

If we wish to express this very simply:

Capabilities are attached to a subject and it describes what access the subject has to each of the objects on the row that matches with the subject within the matrix. It is a row within the matrix. ACL's are attached to objects, it describes who has access to the object and what type of access they have. It is a column within the matrix.

The following are incorrect answers:

"Access control lists are subject-based whereas capability tables are object-based" is incorrect.  
"Capability tables are used for objects whereas access control lists are used for users" is incorrect.  
"They are basically the same" is incorrect.

References used for this question:

CBK, pp. 191 - 192

AIO3 p. 169

### QUESTION 114

What can be defined as a table of subjects and objects indicating what actions individual subjects can take upon individual objects?

- A. A capacity table
- B. An access control list
- C. An access control matrix
- D. A capability table

Answer: C

Explanation: The matrix lists the users, groups and roles down the left side and the resources and functions across the top. The cells of the matrix can either indicate that access is allowed or indicate the type of access. CBK pp 317 - 318

AIO3, p. 169 describes it as a table of subjects and objects specifying the access rights a certain subject possesses pertaining to specific objects.

In either case, the matrix is a way of analyzing the access control needed by a population of subjects to a population of objects. This access control can be applied using rules, ACL's, capability tables, etc.

"A capacity table" is incorrect.

This answer is a trap for the unwary -- it sounds a little like "capability table" but is just there to distract you.

"An access control list" is incorrect.

"It [ACL] specifies a list of users [subjects] who are allowed access to each object" CBK, p. 188 Access control lists (ACL) could be used to implement the rules identified by an access control matrix but is different from the matrix itself.

"A capability table" is incorrect.

"Capability tables are used to track, manage and apply controls based on the object and rights, or capabilities of a subject. For example, a table identifies the object, specifies access rights allowed for a subject, and permits access based on the user's possession of a capability (or ticket) for the object." CBK, pp. 191-192 To put it another way, as noted in AIO3 on p. 169, "A capability table is different from an ACL because the subject is bound to the capability table, whereas the object is bound to the ACL."

Again, a capability table could be used to implement the rules identified by an access control matrix but is different from the matrix itself.

References:

CBK pp. 191-192, 317-318

AIO3, p. 169

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## QUESTION 115

Which access control model is best suited in an environment where a high security level is required and where it is desired that only the administrator grants access control?

- A. DAC
- B. MAC
- C. Access control matrix
- D. TACACS

Answer: B

Explanation: MAC provides high security by regulating access based on the clearance of individual users and sensitivity labels for each object. Clearance levels and sensitivity levels cannot be modified by individual users -- for example, user Joe (SECRET clearance) cannot reclassify the "Presidential Doughnut Recipe" from "SECRET" to "CONFIDENTIAL" so that his friend Jane (CONFIDENTIAL clearance) can read it. The administrator is ultimately responsible for configuring this protection in accordance with security policy and directives from the Data Owner. DAC is incorrect. In DAC, the data owner is responsible for controlling access to the object.

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Access control matrix is incorrect. The access control matrix is a way of thinking about the access control needed by a population of subjects to a population of objects. This access control can be applied using rules, ACL's, capability tables, etc.

TACACS is incorrect. TACACS is a tool for performing user authentication.

References:

CBK, p. 187, Domain 2: Access Control.

AIO3, Chapter 4, Access Control.

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### QUESTION 116

What is the primary goal of setting up a honey pot?

- A. To lure hackers into attacking unused systems
- B. To entrap and track down possible hackers
- C. To set up a sacrificial lamb on the network
- D. To know when certain types of attacks are in progress and to learn about attack techniques so the network can be fortified.

Answer: D

Explanation: The primary purpose of a honeypot is to study the attack methods of an attacker for the purposes of understanding their methods and improving defenses.

"To lure hackers into attacking unused systems" is incorrect. Honeypots can serve as decoys but their primary purpose is to study the behaviors of attackers.

"To entrap and track down possible hackers" is incorrect. There are a host of legal issues around enticement vs entrapment but a good general rule is that entrapment is generally prohibited and evidence gathered in a scenario that could be considered as "entrapping" an attacker would not be admissible in a court of law.

"To set up a sacrificial lamb on the network" is incorrect. While a honeypot is a sort of sacrificial lamb and may attract attacks that might have been directed against production systems, its real purpose is to study the methods of attackers with the goals of better understanding and improving network defenses.

References:

AIO3, p. 213

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### QUESTION 117

Which of the following countermeasures would be the most appropriate to prevent possible intrusion or damage from wardialing attacks?

- A. Monitoring and auditing for such activity
- B. Require user authentication
- C. Making sure only necessary phone numbers are made public
- D. Using completely different numbers for voice and data accesses

Answer: B

Explanation: Knowledge of modem numbers is a poor access control method as an attacker can

discover modem numbers by dialing all numbers in a range. Requiring user authentication before remote access is granted will help in avoiding unauthorized access over a modem line.

"Monitoring and auditing for such activity" is incorrect. While monitoring and auditing can assist in detecting a wardialing attack, they do not defend against a successful wardialing attack.

"Making sure that only necessary phone numbers are made public" is incorrect. Since a wardialing attack blindly calls all numbers in a range, whether certain numbers in the range are public or not is irrelevant.

"Using completely different numbers for voice and data accesses" is incorrect. Using different number ranges for voice and data access might help prevent an attacker from stumbling across the data lines while wardialing the public voice number range but this is not an adequate countermeasure.

References:

CBK, p. 214

AIO3, p. 534-535

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### QUESTION 118

Which access control model provides upper and lower bounds of access capabilities for a subject?

- A. Role-based access control
- B. Lattice-based access control
- C. Biba access control
- D. Content-dependent access control

Answer: B

Explanation: In the lattice model, users are assigned security clearances and the data is classified. Access decisions are made based on the clearance of the user and the classification of the object. Lattice-based access control is an essential ingredient of formal security models such as Bell-LaPadula, Biba, Chinese Wall, etc.

The bounds concept comes from the formal definition of a lattice as a "partially ordered set for which every pair of elements has a greatest lower bound and a least upper bound." To see the application, consider a file classified as "SECRET" and a user Joe with a security clearance of "TOP SECRET." Under Bell-LaPadula, Joe's "least upper bound" access to the file is "READ" and his least lower bound is "NO WRITE" (star property).

Role-based access control is incorrect. Under RBAC, the access is controlled by the permissions assigned to a role and the specific role assigned to the user.

Biba access control is incorrect. The Biba integrity model is based on a lattice structure but the context of the question disqualifies it as the best answer.

Content-dependent access control is incorrect. In content dependent access control, the actual content of the information determines access as enforced by the arbiter.

References:

CBK, pp. 324-325

AIO3, pp. 291-293 See particularly Figure 5-19 on p. 293 for an illustration of bounds in action.

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### QUESTION 119

How are memory cards and smart cards different?

- A. Memory cards normally hold more memory than smart cards
- B. Smart cards provide a two-factor authentication whereas memory cards don't
- C. Memory cards have no processing power
- D. Only smart cards can be used for ATM cards

Answer: C

Explanation: The main difference between memory cards and smart cards is their capacity to process information. A memory card holds information but cannot process information. A smart card holds information and has the necessary hardware and software to actually process that information.

A memory card holds a user's authentication information, so that this user needs only type in a user ID or PIN and presents the memory card to the system. If the entered information and the stored information match and are approved by an authentication service, the user is successfully authenticated.

A common example of a memory card is a swipe card used to provide entry to a building. The user enters a PIN and swipes the memory card through a card reader. If this is the correct combination, the reader flashes green and the individual can open the door and enter the building.

Memory cards can also be used with computers, but they require a reader to process the information. The reader adds cost to the process, especially when one is needed for every computer. Additionally, the overhead of PIN and card generation adds additional overhead and complexity to the whole authentication process. However, a memory card provides a more secure authentication method than using only a password because the attacker would need to obtain the card and know the correct PIN.

Administrators and management need to weigh the costs and benefits of a memory card implementation as well as the security needs of the organization to determine if it is the right authentication mechanism for their environment.

One of the most prevalent weaknesses of memory cards is that data stored on the card are not protected. Unencrypted data on the card (or stored on the magnetic strip) can be extracted or copied. Unlike a smart card, where security controls and logic are embedded in the integrated circuit, memory cards do not employ an inherent mechanism to protect the data from exposure. Very little trust can be associated with confidentiality and integrity of information on the memory cards.

The following answers are incorrect:

"Smart cards provide two-factor authentication whereas memory cards don't" is incorrect. This is not necessarily true. A memory card can be combined with a pin or password to offer two factors authentication where something you have and something you know are used for factors.

"Memory cards normally hold more memory than smart cards" is incorrect. While a memory card may or may not have more memory than a smart card, this is certainly not the best answer to the question.

"Only smart cards can be used for ATM cards" is incorrect. This depends on the decisions made by the particular institution and is not the best answer to the question.

Reference(s) used for this question:

Shon Harris, CISSP All In One, 6th edition , Access Control, Page 199 and also for people using the Kindle edition of the book you can look at Locations 4647-4650

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Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Access Control ((ISC)2 Press) (Kindle Locations 2124-2139). Auerbach Publications. Kindle Edition.

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**QUESTION 120**

Which of the following issues is not addressed by Kerberos?

- A. Availability
- B. Confidentiality
- C. Integrity
- D. Authentication

Answer: A

Explanation: The KDC (Kerberos Distribution Center) can be a single point of failure.

Confidentiality is incorrect. Kerberos does ensure confidentiality, keeping communications private between systems over a network.

Integrity is incorrect. Kerberos does ensure integrity.

Authentication is incorrect. Kerberos does provide authentication.

References:

CBK pp 181-194

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**QUESTION 121**

Why do buffer overflows happen? What is the main cause?

- A. Because buffers can only hold so much data
- B. Because of improper parameter checking within the application
- C. Because they are an easy weakness to exploit
- D. Because of insufficient system memory

Answer: B

Explanation: Buffer Overflow attack takes advantage of improper parameter checking within the application. This is the classic form of buffer overflow and occurs because the programmer accepts whatever input the user supplies without checking to make sure that the length of the input is less than the size of the buffer in the program.

The buffer overflow problem is one of the oldest and most common problems in software development and programming, dating back to the introduction of interactive computing. It can result when a program fills up the assigned buffer of memory with more data than its buffer can hold. When the program begins to write beyond the end of the buffer, the program's execution path can be changed, or data can be written into areas used by the operating system itself. This can lead to the insertion of malicious code that can be used to gain administrative privileges on the program or system.

As explained by Gaurab, it can become very complex. At the time of input even if you are checking the length of the input, it has to be checked against the buffer size. Consider a case where entry point of data is stored in Buffer1 of Application1 and then you copy it to Buffer2 within Application2 later on, if you are just checking the length of data against Buffer1, it will not ensure that it will not

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cause a buffer overflow in Buffer2 of Application2

A bit of reassurance from the ISC2 book about level of Coding Knowledge needed for the exam: It should be noted that the CISSP is not required to be an expert programmer or know the inner workings of developing application software code, like the FORTRAN programming language, or how to develop Web applet code using Java. It is not even necessary that the CISSP know detailed security-specific coding practices such as the major divisions of buffer overflow exploits or the reason for preferring str(n)cpy to strcpy in the C language (although all such knowledge is, of course, helpful). Because the CISSP may be the person responsible for ensuring that security is included in such developments, the CISSP should know the basic procedures and concepts involved during the design and development of software programming. That is, in order for the CISSP to monitor the software development process and verify that security is included, the CISSP must understand the fundamental concepts of programming developments and the security strengths and weaknesses of various application development processes.

The following are incorrect answers:

"Because buffers can only hold so much data" is incorrect. This is certainly true but is not the best answer because the finite size of the buffer is not the problem -- the problem is that the programmer did not check the size of the input before moving it into the buffer.

"Because they are an easy weakness to exploit" is incorrect. This answer is sometimes true but is not the best answer because the root cause of the buffer overflow is that the programmer did not check the size of the user input.

"Because of insufficient system memory" is incorrect. This is irrelevant to the occurrence of a buffer overflow.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press (Kindle Locations 13319-13323). Auerbach Publications. Kindle Edition.

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## QUESTION 122

What is the main focus of the Bell-LaPadula security model?

- A. Accountability
- B. Integrity
- C. Confidentiality
- D. Availability

Answer: C

Explanation: The Bell-LaPadula model is a formal model dealing with confidentiality.

The Bell-LaPadula Model (abbreviated BLP) is a state machine model used for enforcing access control in government and military applications. It was developed by David Elliott Bell and Leonard J. LaPadula, subsequent to strong guidance from Roger R. Schell to formalize the U.S.

Department of Defense (DoD) multilevel security (MLS) policy. The model is a formal state transition model of computer security policy that describes a set of access control rules which use security labels on objects and clearances for subjects. Security labels range from the most sensitive (e.g. "Top Secret"), down to the least sensitive (e.g., "Unclassified" or "Public").

The Bell-LaPadula model focuses on data confidentiality and controlled access to classified information, in contrast to the Biba Integrity Model which describes rules for the protection of data

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integrity. In this formal model, the entities in an information system are divided into subjects and objects.

The notion of a "secure state" is defined, and it is proven that each state transition preserves security by moving from secure state to secure state, thereby inductively proving that the system satisfies the security objectives of the model. The Bell–LaPadula model is built on the concept of a state machine with a set of allowable states in a computer network system. The transition from one state to another state is defined by transition functions.

A system state is defined to be "secure" if the only permitted access modes of subjects to objects are in accordance with a security policy. To determine whether a specific access mode is allowed, the clearance of a subject is compared to the classification of the object (more precisely, to the combination of classification and set of compartments, making up the security level) to determine if the subject is authorized for the specific access mode.

The clearance/classification scheme is expressed in terms of a lattice. The model defines two mandatory access control (MAC) rules and one discretionary access control (DAC) rule with three security properties:

The Simple Security Property - a subject at a given security level may not read an object at a higher security level (no read-up).

The  $\text{-property}$  (read "star"-property) - a subject at a given security level must not write to any object at a lower security level (no write-down). The  $\text{-property}$  is also known as the Confinement property.

The Discretionary Security Property - use of an access matrix to specify the discretionary access control.

The following are incorrect answers:

Accountability is incorrect. Accountability requires that actions be traceable to the user that performed them and is not addressed by the Bell-LaPadula model.

Integrity is incorrect. Integrity is addressed in the Biba model rather than Bell-Lapadula.

Availability is incorrect. Availability is concerned with assuring that data/services are available to authorized users as specified in service level objectives and is not addressed by the Bell-Lapadula model.

References:

CBK, pp. 325-326

AIO3, pp. 279 - 284

AIOv4 Security Architecture and Design (pages 333 - 336)

AIOv5 Security Architecture and Design (pages 336 - 338)

Wikipedia at [https://en.wikipedia.org/wiki/Bell-La\\_Padula\\_model](https://en.wikipedia.org/wiki/Bell-La_Padula_model)

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## QUESTION 123

Which of the following statements pertaining to the Bell-LaPadula is TRUE if you are NOT making use of the strong star property?

- A. It allows "read up."
- B. It addresses covert channels.
- C. It addresses management of access controls.
- D. It allows "write up."

Answer: D

Explanation: Bell-LaPadula Confidentiality Model 10 The Bell-LaPadula model is perhaps the most well-known and significant security model, in addition to being one of the oldest models used in the creation of modern secure computing systems. Like the Trusted Computer System Evaluation Criteria (or TCSEC), it was inspired by early U.S. Department of Defense security policies and the need to prove that confidentiality could be maintained. In other words, its primary goal is to prevent disclosure as the model system moves from one state (one point in time) to another.

When the strong star property is not being used it means that both the \* property and the Simple Security Property rules would be applied.

The Star (\*) property rule of the Bell-LaPadula model says that subjects cannot write down, this would compromise the confidentiality of the information if someone at the secret layer would write the object down to a confidential container for example.

The Simple Security Property rule states that the subject cannot read up which means that a subject at the secret layer would not be able to access objects at Top Secret for example.

You must remember: The model tells you about are NOT allowed to do. Anything else would be allowed. For example within the Bell LaPadula model you would be allowed to write up as it does not compromise the security of the information. In fact it would upgrade it to the point that you could lock yourself out of your own information if you have only a secret security clearance.

The following are incorrect answers because they are all FALSE:

"It allows read up" is incorrect. The "simple security" property forbids read up.

"It addresses covert channels" is incorrect. Covert channels are not addressed by the Bell-LaPadula model.

"It addresses management of access controls" is incorrect. Management of access controls are beyond the scope of the Bell-LaPadula model.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 17595-17600). Auerbach Publications. Kindle Edition.

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## QUESTION 124

Which security model introduces access to objects only through programs?

- A. The Biba model
- B. The Bell-LaPadula model
- C. The Clark-Wilson model
- D. The information flow model

Answer: C

Explanation: In the Clark-Wilson model, the subject no longer has direct access to objects but instead must access them through programs (well-formed transactions).

The Clark-Wilson integrity model provides a foundation for specifying and analyzing an integrity policy for a computing system.

The model is primarily concerned with formalizing the notion of information integrity. Information integrity is maintained by preventing corruption of data items in a system due to either error or malicious intent. An integrity policy describes how the data items in the system should be kept

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valid from one state of the system to the next and specifies the capabilities of various principals in the system. The model defines enforcement rules and certification rules.

Clark-Wilson is more clearly applicable to business and industry processes in which the integrity of the information content is paramount at any level of classification.

Integrity goals of Clark-Wilson model:

Prevent unauthorized users from making modification (Only this one is addressed by the Biba model).

Separation of duties prevents authorized users from making improper modifications.

Well formed transactions: maintain internal and external consistency i.e. it is a series of operations that are carried out to transfer the data from one consistent state to the other.

The following are incorrect answers:

The Biba model is incorrect. The Biba model is concerned with integrity and controls access to objects based on a comparison of the security level of the subject to that of the object.

The Bell-LaPadula model is incorrect. The Bell-LaPaula model is concerned with confidentiality and controls access to objects based on a comparison of the clearance level of the subject to the classification level of the object.

The information flow model is incorrect. The information flow model uses a lattice where objects are labelled with security classes and information can flow either upward or at the same level. It is similar in framework to the Bell-LaPadula model.

References:

ISC2 Official Study Guide, Pages 325 - 327

AIO3, pp. 284 - 287

AIOv4 Security Architecture and Design (pages 338 - 342)

AIOv5 Security Architecture and Design (pages 341 - 344)

Wikipedia at: [https://en.wikipedia.org/wiki/Clark-Wilson\\_model](https://en.wikipedia.org/wiki/Clark-Wilson_model)

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## QUESTION 125

An Intrusion Detection System (IDS) is what type of control?

- A. A preventive control.
- B. A detective control.
- C. A recovery control.
- D. A directive control.

Answer: B

Explanation: These controls can be used to investigate what happen after the fact. Your IDS may collect information on where the attack came from, what port was used, and other details that could be used in the investigation steps.

"Preventative control" is incorrect. Preventative controls preclude events or actions that might compromise a system or cause a policy violation. An intrusion prevention system would be an example of a preventative control.

"Recovery control" is incorrect. Recovery controls include processes used to return the system to a secure state after the occurrence of a security incident. Backups and redundant components are examples of recovery controls.

"Directive controls" is incorrect. Directive controls are administrative instruments such as policies,

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procedures, guidelines, and agreements. An acceptable use policy is an example of a directive control.

References:

CBK, pp. 646 – 647

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### QUESTION 126

Smart cards are an example of which type of control?

- A. Detective control
- B. Administrative control
- C. Technical control
- D. Physical control

Answer: C

Explanation: Logical or technical controls involve the restriction of access to systems and the protection of information. Smart cards and encryption are examples of these types of control. Controls are put into place to reduce the risk an organization faces, and they come in three main flavors: administrative, technical, and physical. Administrative controls are commonly referred to as “soft controls” because they are more management-oriented. Examples of administrative controls are security documentation, risk management, personnel security, and training. Technical controls (also called logical controls) are software or hardware components, as in firewalls, IDS, encryption, identification and authentication mechanisms. And physical controls are items put into place to protect facility, personnel, and resources. Examples of physical controls are security guards, locks, fencing, and lighting.

Many types of technical controls enable a user to access a system and the resources within that system. A technical control may be a username and password combination, a Kerberos implementation, biometrics, public key infrastructure (PKI), RADIUS, TACACS +, or authentication using a smart card through a reader connected to a system. These technologies verify the user is who he says he is by using different types of authentication methods. Once a user is properly authenticated, he can be authorized and allowed access to network resources.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 245). McGraw-Hill. Kindle Edition.

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 32).

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### QUESTION 127

What ensures that the control mechanisms correctly implement the security policy for the entire life cycle of an information system?

- A. Accountability controls
- B. Mandatory access controls
- C. Assurance procedures
- D. Administrative controls

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Answer: C

Explanation: Controls provide accountability for individuals accessing information. Assurance procedures ensure that access control mechanisms correctly implement the security policy for the entire life cycle of an information system.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 33).

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### QUESTION 128

What security model is dependent on security labels?

- A. Discretionary access control
- B. Label-based access control
- C. Mandatory access control
- D. Non-discretionary access control

Answer: C

Explanation: With mandatory access control (MAC), the authorization of a subject's access to an object is dependant upon labels, which indicate the subject's clearance, and the classification or sensitivity of the object. Label-based access control is not defined.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 33).

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### QUESTION 129

What security model implies a central authority that define rules and sometimes global rules, dictating what subjects can have access to what objects?

- A. Flow Model
- B. Discretionary access control
- C. Mandatory access control
- D. Non-discretionary access control

Answer: D

Explanation: As a security administrator you might configure user profiles so that users cannot change the system's time, alter system configuration files, access a command prompt, or install unapproved applications. This type of access control is referred to as nondiscretionary, meaning that access decisions are not made at the discretion of the user. Nondiscretionary access controls are put into place by an authoritative entity (usually a security administrator) with the goal of protecting the organization's most critical assets.

Non-discretionary access control is when a central authority determines what subjects can have access to what objects based on the organizational security policy. Centralized access control is

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not an existing security model.

Both, Rule Based Access Control (RuBAC or RBAC) and Role Based Access Controls (RBAC) falls into this category.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 221). McGraw-Hill. Kindle Edition.

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 33).

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### QUESTION 130

Which type of password token involves time synchronization?

- A. Static password tokens
- B. Synchronous dynamic password tokens
- C. Asynchronous dynamic password tokens
- D. Challenge-response tokens

Answer: B

Explanation: Synchronous dynamic password tokens generate a new unique password value at fixed time intervals, so the server and token need to be synchronized for the password to be accepted.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 37).

Also check out: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 4: Access Control (page 136).

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### QUESTION 131

Which of the following statements pertaining to biometrics is false?

- A. Increased system sensitivity can cause a higher false rejection rate
- B. The crossover error rate is the point at which false rejection rate equals the false acceptance rate.
- C. False acceptance rate is also known as Type II error.
- D. Biometrics are based on the Type 2 authentication mechanism.

Answer: D

Explanation: Authentication is based on three factor types: type 1 is something you know, type 2 is something you have and type 3 is something you are. Biometrics are based on the Type 3 authentication mechanism.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 37).

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**QUESTION 132**

Which of the following statements pertaining to Kerberos is TRUE?

- A. Kerberos does not address availability
- B. Kerberos does not address integrity
- C. Kerberos does not make use of Symmetric Keys
- D. Kerberos cannot address confidentiality of information

Answer: A

Explanation: The question was asking for a TRUE statement and the only correct statement is "Kerberos does not address availability".

Kerberos addresses the confidentiality and integrity of information. It does not directly address availability.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 42).

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**QUESTION 133**

Database views are NOT used to:

- A. Implement referential integrity
- B. Implement least privilege
- C. To implement content-dependent access restrictions
- D. Implement need-to-know

Answer: A

Explanation: A view is considered as a virtual table that is derived from other tables. It can be used to restrict access to certain information within the database, to hide attributes, and to implement content-dependent access restrictions. It does not implement referential integrity.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 46).

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**QUESTION 134**

What IDS approach relies on a database of known attacks?

- A. Signature-based intrusion detection
- B. Statistical anomaly-based intrusion detection
- C. Behavior-based intrusion detection
- D. Network-based intrusion detection

Answer: A

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Explanation: A weakness of the signature-based (or knowledge-based) intrusion detection approach is that only attack signatures that are stored in a database are detected. Network-based intrusion detection can either be signature-based or statistical anomaly-based (also called behavior-based).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 49).

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### QUESTION 135

What refers to legitimate users accessing networked services that would normally be restricted to them?

- A. Spoofing
- B. Piggybacking
- C. Eavesdropping
- D. Logon abuse

Answer: D

Explanation: Unauthorized access of restricted network services by the circumvention of security access controls is known as logon abuse. This type of abuse refers to users who may be internal to the network but access resources they would not normally be allowed.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 74).

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### QUESTION 136

Which of the following is not a two-factor authentication mechanism?

- A. Something you have and something you know.
- B. Something you do and a password.
- C. A smartcard and something you are.
- D. Something you know and a password.

Answer: D

Explanation: Something you know and a password fits within only one of the three ways authentication could be done. A password is an example of something you know, thereby something you know and a password does not constitute a two-factor authentication as both are in the same category of factors.

A two-factor (strong) authentication relies on two different kinds of authentication factors out of a list of three possible choice:

something you know (e.g. a PIN or password),  
something you have (e.g. a smart card, token, magnetic card),  
something you are is mostly Biometrics (e.g. a fingerprint) or something you do (e.g. signature dynamics).

**TIP FROM CLEMENT:**

On the real exam you can expect to see synonyms and sometimes sub-categories under the main categories. People are familiar with Pin, Passphrase, Password as subset of Something you know. However, when people see choices such as Something you do or Something you are they immediately get confused and they do not think of them as subset of Biometrics where you have Biometric implementation based on behavior and physiological attributes. So something you do falls under the Something you are category as a subset.

Something your do would be signing your name or typing text on your keyboard for example. Strong authentication is simply when you make use of two factors that are within two different categories.

Reference(s) used for this question:

Shon Harris, CISSP All In One, Fifth Edition, pages 158-159

**QUESTION 137**

Which of the following access control models introduces user security clearance and data classification?

- A. Role-based access control
- B. Discretionary access control
- C. Non-discretionary access control
- D. Mandatory access control

Answer: D

Explanation: The mandatory access control model is based on a security label system. Users are given a security clearance and data is classified. The classification is stored in the security labels of the resources. Classification labels specify the level of trust a user must have to access a certain file.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 4: Access Control (Page 154).

**QUESTION 138**

Password management falls into which control category?

- A. Compensating
- B. Detective
- C. Preventive
- D. Technical

Answer: C

Explanation: Password management is an example of preventive control.

Proper passwords prevent unauthorized users from accessing a system.

There are literally hundreds of different access approaches, control methods, and technologies, both in the physical world and in the virtual electronic world. Each method addresses a different type of access control or a specific access need.

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For example, access control solutions may incorporate identification and authentication mechanisms, filters, rules, rights, logging and monitoring, policy, and a plethora of other controls. However, despite the diversity of access control methods, all access control systems can be categorized into seven primary categories.

The seven main categories of access control are:

- 1 Directive: Controls designed to specify acceptable rules of behavior within an organization
- 2 Deterrent: Controls designed to discourage people from violating security directives
- 3 Preventive: Controls implemented to prevent a security incident or information breach
- 4 Compensating: Controls implemented to substitute for the loss of primary controls and mitigate risk down to an acceptable level
- 5 Detective: Controls designed to signal a warning when a security control has been breached
- 6 Corrective: Controls implemented to remedy circumstance, mitigate damage, or restore controls
- 7 Recovery: Controls implemented to restore conditions to normal after a security incident

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 1156-1176). Auerbach Publications. Kindle Edition.

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### QUESTION 139

Which of the following access control models requires security clearance for subjects?

- A. Identity-based access control
- B. Role-based access control
- C. Discretionary access control
- D. Mandatory access control

Answer: D

Explanation: With mandatory access control (MAC), the authorization of a subject's access to an object is dependant upon labels, which indicate the subject's clearance. Identity-based access control is a type of discretionary access control. A role-based access control is a type of nondiscretionary access control.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 33).

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### QUESTION 140

Which of the following would describe a type of biometric error refers to as false rejection rate?

- A. Type I error
- B. Type II error
- C. Type III error
- D. CER error

Answer: A

Explanation: When a biometric system rejects an authorized individual, it is called a Type I error.

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When a system accepts impostors who should be rejected (false positive), it is called a Type II error.

The Crossover Error Rate (CER), stated in a percentage, represents the point at which false rejection (Type I) rate equals the false acceptance (Type II) rate.

Type III error is not defined and simply a distracter in this case. Some people get trick on this one because they are thinking about Authentication Factors where Biometric is a type III authentication factor.

Beware not to mix authentication factor with biometric errors. The 3 authentication factors are:

Type 1 Something you know

Type 2 Something you have

Type 3 Something you are

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 4: Access Control (page 128).

and

<https://pciguru.wordpress.com/2010/05/01/one-two-and-three-factor-authentication/>

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### QUESTION 141

Which of the following access control models requires defining classification for objects?

- A. Role-based access control
- B. Discretionary access control
- C. Identity-based access control
- D. Mandatory access control

Answer: D

Explanation: With mandatory access control (MAC), the authorization of a subject's access to an object is dependant upon labels, which indicate the subject's clearance, and classification of objects.

The Following answers were incorrect:

Identity-based Access Control is a type of Discretionary Access Control (DAC), they are synonymous.

Role Based Access Control (RBAC) and Rule Based Access Control (RuBAC or RBAC) are types of Non Discretionary Access Control (NDAC).

Tip:

When you have two answers that are synonymous they are not the right choice for sure.

There is only one access control model that makes use of Label, Clearances, and Categories, it is Mandatory Access Control, none of the other one makes use of those items.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 33).

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### QUESTION 142

In the context of access control, locks, gates, guards are examples of which of the following?

- 
- A. Administrative controls
  - B. Technical controls
  - C. Physical controls
  - D. Logical controls

Answer: C

Explanation: Administrative, technical and physical controls are categories of access control mechanisms.

Logical and Technical controls are synonymous. So both of them could be eliminated as possible choices.

Physical Controls: These are controls to protect the organization's people and physical environment, such as locks, gates, and guards. Physical controls may be called "operational controls" in some contexts.

Physical security covers a broad spectrum of controls to protect the physical assets (primarily the people) in an organization. Physical Controls are sometimes referred to as "operational" controls in some risk management frameworks. These controls range from doors, locks, and windows to environment controls, construction standards, and guards. Typically, physical security is based on the notion of establishing security zones or concentric areas within a facility that require increased security as you get closer to the valuable assets inside the facility. Security zones are the physical representation of the defense-in-depth principle discussed earlier in this chapter. Typically, security zones are associated with rooms, offices, floors, or smaller elements, such as a cabinet or storage locker. The design of the physical security controls within the facility must take into account the protection of the asset as well as the individuals working in that area.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 1301-1303). Auerbach Publications. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 1312-1318). Auerbach Publications. Kindle Edition.

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### QUESTION 143

Which of the following statements pertaining to Kerberos is true?

- A. Kerberos uses public key cryptography.
- B. Kerberos uses X.509 certificates.
- C. Kerberos is a credential-based authentication system.
- D. Kerberos was developed by Microsoft.

Answer: C

Explanation: Kerberos is a trusted, credential-based, third-party authentication protocol that was developed at MIT and that uses symmetric (secret) key cryptography to authenticate clients to other entities on a network for access to services. It does not use X.509 certificates, which are used in public key cryptography.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten

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Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 40).

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**QUESTION 144**

Which of the following statements pertaining to using Kerberos without any extension is false?

- A. A client can be impersonated by password-guessing.
- B. Kerberos is mostly a third-party authentication protocol.
- C. Kerberos uses public key cryptography.
- D. Kerberos provides robust authentication.

Answer: C

Explanation: Kerberos is a trusted, credential-based, third-party authentication protocol that uses symmetric (secret) key cryptography to provide robust authentication to clients accessing services on a network.

Because a client's password is used in the initiation of the Kerberos request for the service protocol, password guessing can be used to impersonate a client.

Here is a nice overview of HOW Kerberos is implemented as described in RFC 4556:

#### 1 Introduction

The Kerberos V5 protocol [RFC4120] involves use of a trusted third party known as the Key Distribution Center (KDC) to negotiate shared session keys between clients and services and provide mutual authentication between them.

The corner-stones of Kerberos V5 are the Ticket and the Authenticator. A Ticket encapsulates a symmetric key (the ticket session key) in an envelope (a public message) intended for a specific service. The contents of the Ticket are encrypted with a symmetric key shared between the service principal and the issuing KDC. The encrypted part of the Ticket contains the client principal name, among other items. An Authenticator is a record that can be shown to have been recently generated using the ticket session key in the associated Ticket. The ticket session key is known by the client who requested the ticket. The contents of the Authenticator are encrypted with the associated ticket session key. The encrypted part of an Authenticator contains a timestamp and the client principal name, among other items.

As shown in Figure 1, below, the Kerberos V5 protocol consists of the following message exchanges between the client and the KDC, and the client and the application service:

- The Authentication Service (AS) Exchange

The client obtains an "initial" ticket from the Kerberos authentication server (AS), typically a Ticket Granting Ticket (TGT). The AS-REQ message and the AS-REP message are the request and the reply message, respectively, between the client and the AS.

- The Ticket Granting Service (TGS) Exchange

The client subsequently uses the TGT to authenticate and request a service ticket for a particular service, from the Kerberos ticket-granting server (TGS). The TGS-REQ message and the TGS-REP message are the request and the reply message respectively between the client and the TGS.

- The Client/Server Authentication Protocol (AP) Exchange

The client then makes a request with an AP-REQ message, consisting of a service ticket and an authenticator that certifies the client's possession of the ticket session key. The server may optionally reply with an AP-REP message. AP exchanges typically negotiate session-specific symmetric keys.

Usually, the AS and TGS are integrated in a single device also known as the KDC.

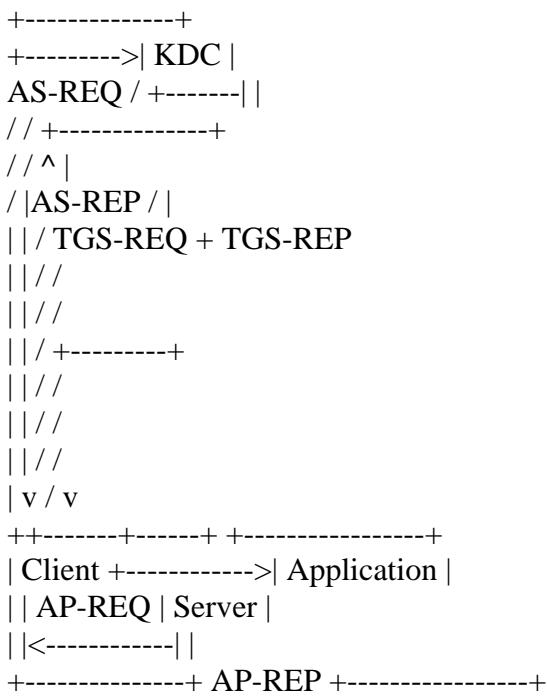


Figure 1: The Message Exchanges in the Kerberos V5 Protocol

In the AS exchange, the KDC reply contains the ticket session key, among other items, that is encrypted using a key (the AS reply key) shared between the client and the KDC. The AS reply key is typically derived from the client's password for human users. Therefore, for human users, the attack resistance strength of the Kerberos protocol is no stronger than the strength of their passwords.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 40).

And

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 4: Access Control (pages 147-151).

and

<http://www.ietf.org/rfc/rfc4556.txt>

### QUESTION 145

Which access control model would a lattice-based access control model be an example of?

- A. Mandatory access control.
- B. Discretionary access control.
- C. Non-discretionary access control.
- D. Rule-based access control.

Answer: A

Explanation: In a lattice model, there are pairs of elements that have the least upper bound of values and greatest lower bound of values. In a Mandatory Access Control (MAC) model, users and data owners do not have as much freedom to determine who can access files.

#### FIRST: The Lattice

A lattice is simply an access control tool usually used to implement Mandatory Access Control (MAC) and it could also be used to implement RBAC but this is not as common. The lattice model can be used for Integrity level or file permissions as well. The lattice has a least upper bound and greatest lower bound. It makes use of pair of elements such as the subject security clearance pairing with the object sensitivity label.

#### SECOND: DAC (Discretionary Access Control)

Let's get into Discretionary Access Control: It is an access control method where the owner (read the creator of the object) will decide who has access at his own discretion. As we all know, users are sometimes insane. They will share their files with other users based on their identity but nothing prevent the user from further sharing it with other users on the network. Very quickly you loose control on the flow of information and who has access to what. It is used in small and friendly environment where a low level of security is all that is required.

#### THIRD: MAC (Mandatory Access Control)

All of the following are forms of Mandatory Access Control:

##### Mandatory Access control (MAC) (Implemented using the lattice)

You must remember that MAC makes use of Security Clearance for the subject and also Labels will be assigned to the objects. The clearance of the Subject must dominate (be equal or higher) the clearance of the Object being accessed. The label attached to the object will indicate the sensitivity level and the categories the object belongs to. The categories are used to implement the Need to Know.

All of the following are forms of Non Discretionary Access Control:

##### Role Based Access Control (RBAC)

##### Rule Based Access Control (Think Firewall in this case)

The official ISC2 book says that RBAC (synonymous with Non Discretionary Access Control) is a form of DAC but they are simply wrong. RBAC is a form of Non Discretionary Access Control. Non Discretionary DOES NOT equal mandatory access control as there is no labels and clearance involved.

I hope this clarifies the whole drama related to what is what in the world of access control.

In the same line of taught, you should be familiar with the difference between Explicit permission

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(the user has his own profile) versus Implicit (the user inherit permissions by being a member of a role for example).

The following answers are incorrect:

Discretionary access control. Is incorrect because in a Discretionary Access Control (DAC) model, access is restricted based on the authorization granted to the users. It is identity based access control only. It does not make use of a lattice.

Non-discretionary access control. Is incorrect because Non-discretionary Access Control (NDAC) uses the role-based access control method to determine access rights and permissions. It is often times used as a synonym to RBAC which is Role Based Access Control. The user inherit permission from the role when they are assigned into the role. This type of access could make use of a lattice but could also be implemented without the use of a lattice in some case. Mandatory Access Control was a better choice than this one, but RBAC could also make use of a lattice. The BEST answer was MAC.

Rule-based access control. Is incorrect because it is an example of a Non-discretionary Access Control (NDAC) access control mode. You have rules that are globally applied to all users. There is no such thing as a lattice being use in Rule-Based Access Control.

References:

AIOv3 Access Control (pages 161 - 168)

AIOv3 Security Models and Architecture (pages 291 - 293)

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## QUESTION 146

Which of the following is an example of discretionary access control?

- A. Identity-based access control
- B. Task-based access control
- C. Role-based access control
- D. Rule-based access control

Answer: A

Explanation: An identity-based access control is an example of discretionary access control that is based on an individual's identity. Identity-based access control (IBAC) is access control based on the identity of the user (typically relayed as a characteristic of the process acting on behalf of that user) where access authorizations to specific objects are assigned based on user identity.

Rule Based Access Control (RuBAC) and Role Based Access Control (RBAC) are examples of non-discretionary access controls.

Rule-based access control is a type of non-discretionary access control because this access is determined by rules and the subject does not decide what those rules will be, the rules are uniformly applied to ALL of the users or subjects.

In general, all access control policies other than DAC are grouped in the category of non-discretionary access control (NDAC). As the name implies, policies in this category have rules that are not established at the discretion of the user. Non-discretionary policies establish controls that cannot be changed by users, but only through administrative action.

Both Role Based Access Control (RBAC) and Rule Based Access Control (RuBAC) fall within Non Discretionary Access Control (NDAC). If it is not DAC or MAC then it is most likely NDAC.

BELOW YOU HAVE A DESCRIPTION OF THE DIFFERENT CATEGORIES:

**MAC = Mandatory Access Control**

Under a mandatory access control environment, the system or security administrator will define what permissions subjects have on objects. The administrator does not dictate user's access but simply configure the proper level of access as dictated by the Data Owner.

The MAC system will look at the Security Clearance of the subject and compare it with the object sensitivity level or classification level. This is what is called the dominance relationship.

The subject must DOMINATE the object sensitivity level. Which means that the subject must have a security clearance equal or higher than the object he is attempting to access.

MAC also introduce the concept of labels. Every objects will have a label attached to them indicating the classification of the object as well as categories that are used to impose the need to know (NTK) principle. Even thou a user has a security clearance of Secret it does not mean he would be able to access any Secret documents within the system. He would be allowed to access only Secret document for which he has a Need To Know, formal approval, and object where the user belong to one of the categories attached to the object.

If there is no clearance and no labels then IT IS NOT Mandatory Access Control.

Many of the other models can mimic MAC but none of them have labels and a dominance relationship so they are NOT in the MAC category.

**DAC = Discretionary Access Control**

DAC is also known as: Identity Based access control system.

The owner of an object is define as the person who created the object. As such the owner has the discretion to grant access to other users on the network. Access will be granted based solely on the identity of those users.

Such system is good for low level of security. One of the major problem is the fact that a user who has access to someone's else file can further share the file with other users without the knowledge or permission of the owner of the file. Very quickly this could become the wild wild west as there is no control on the dissemination of the information.

**RBAC = Role Based Access Control**

RBAC is a form of Non-Discretionary access control.

Role Based access control usually maps directly with the different types of jobs performed by employees within a company.

For example there might be 5 security administrator within your company. Instead of creating each of their profile one by one, you would simply create a role and assign the administrators to the role. Once an administrator has been assigned to a role, he will IMPLICITLY inherit the permissions of that role.

RBAC is great tool for environment where there is a large rotation of employees on a daily basis such as a very large help desk for example.

**RBAC or RuBAC = Rule Based Access Control**

RuBAC is a form of Non-Discretionary access control.

A good example of a Rule Based access control device would be a Firewall. A single set of rules is imposed to all users attempting to connect through the firewall.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 33  
and

NISTIR-7316 at <http://csrc.nist.gov/publications/nistir/7316/NISTIR-7316.pdf>  
and

[http://itlaw.wikia.com/wiki/Identity-based\\_access\\_control](http://itlaw.wikia.com/wiki/Identity-based_access_control)

**QUESTION 147**

Which of the following would be used to implement Mandatory Access Control (MAC)?

- A. Clark-Wilson Access Control
- B. Role-based access control
- C. Lattice-based access control
- D. User dictated access control

Answer: C

Explanation: The lattice is a mechanism used to implement Mandatory Access Control (MAC)

Under Mandatory Access Control (MAC) you have:

Mandatory Access Control

Under Non-Discretionary Access Control (NDAC) you have:

Rule-Based Access Control

Role-Based Access Control

Under Discretionary Access Control (DAC) you have:

Discretionary Access Control

The Lattice Based Access Control is a type of access control used to implement other access control method. A lattice is an ordered list of elements that has a least upper bound and a most lower bound. The lattice can be used for MAC, DAC, Integrity level, File Permission, and more. For example in the case of MAC, if we look at common government classifications, we have the following:

TOP SECRET

SECRET -----I am the user at secret

CONFIDENTIAL

SENSITIVE BUT UNCLASSIFIED

UNCLASSIFIED

If you look at the diagram above where I am a user at SECRET it means that I can access document at lower classification but not document at TOP SECRET. The lattice is a list of ORDERED ELEMENT, in this case the ordered elements are classification levels. My least upper bound is SECRET and my most lower bound is UNCLASSIFIED.

However the lattice could also be used for Integrity Levels such as:

VERY HIGH

HIGH

MEDIUM -----I am a user, process, application at the medium level

LOW

VERY LOW

In the case of Integrity levels you have to think about TRUST. Of course if I take for example the VISTA operating system which is based on Biba then Integrity Levels would be used. As a user having access to the system I cannot tell a process running with administrative privilege what to do. Else any users on the system could take control of the system by getting highly privileged process to do things on their behalf. So no read down would be allowed in this case and this is an example of the Biba model.

Last but not least the lattice could be used for file permissions:

RWX

RW -----User at this level

R

If I am a user with READ and WRITE (RW) access privilege then I cannot execute the file because I do not have execute permission which is the X under Linux and UNIX.

Many people confuse the Lattice Model and many books says MAC = LATTICE, however the lattice can be used for other purposes.

There is also Role Based Access Control (RBAC) that exists out there. It COULD be used to simulate MAC but it is not MAC as it does not make use of Label on objects indicating sensitivity and categories. MAC also require a clearance that dominates the object.

You can get more info about RBAC at:<http://csrc.nist.gov/groups/SNS/rbac/faq.html#03>

Also note that many book uses the same acronym for Role Based Access Control and Rule Based Access Control which is RBAC, this can be confusing.

The proper way of writing the acronym for Rule Based Access Control is RuBAC, unfortunately it is not commonly used.

References:

There is a great article on technet that talks about the lattice in VISTA:

<http://blogs.technet.com/b/steriley/archive/2006/07/21/442870aspx>

also see:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 33).

and

[http://www.microsoft-watch.com/content/vista/gaging\\_vistas\\_integrity.html](http://www.microsoft-watch.com/content/vista/gaging_vistas_integrity.html)

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### QUESTION 148

What does the Clark-Wilson security model focus on?

- A. Confidentiality
- B. Integrity
- C. Accountability
- D. Availability

Answer: B

Explanation: The Clark-Wilson model addresses integrity. It incorporates mechanisms to enforce internal and external consistency, a separation of duty, and a mandatory integrity policy.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architectures and Models (page 205).

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### QUESTION 149

What does the simple security (ss) property mean in the Bell-LaPadula model?

- A. No read up
- B. No write down
- C. No read down

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D. No write up

Answer: A

Explanation: The ss (simple security) property of the Bell-LaPadula access control model states that reading of information by a subject at a lower sensitivity level from an object at a higher sensitivity level is not permitted (no read up).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architectures and Models (page 202).

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### QUESTION 150

What does the \* (star) property mean in the Bell-LaPadula model?

- A. No write up
- B. No read up
- C. No write down
- D. No read down

Answer: C

Explanation: The \*- (star) property of the Bell-LaPadula access control model states that writing of information by a subject at a higher level of sensitivity to an object at a lower level of sensitivity is not permitted (no write down).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architectures and Models (page 202).

Also check out: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 5: Security Models and Architecture (page 242, 243).

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### QUESTION 151

What does the \* (star) integrity axiom mean in the Biba model?

- A. No read up
- B. No write down
- C. No read down
- D. No write up

Answer: D

Explanation: The \*- (star) integrity axiom of the Biba access control model states that an object at one level of integrity is not permitted to modify an object of a higher level of integrity (no write up).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architectures and Models (page 205).

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**QUESTION 152**

What is the Biba security model concerned with?

- A. Confidentiality
- B. Reliability
- C. Availability
- D. Integrity

Answer: D

Explanation: The Biba security model addresses the integrity of data being threatened when subjects at lower security levels are able to write to objects at higher security levels and when subjects can read data at lower levels.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 5: Security Models and Architecture (Page 244).

**QUESTION 153**

Which security model uses division of operations into different parts and requires different users to perform each part?

- A. Bell-LaPadula model
- B. Biba model
- C. Clark-Wilson model
- D. Non-interference model

Answer: C

Explanation: The Clark-Wilson model uses separation of duties, which divides an operation into different parts and requires different users to perform each part. This prevents authorized users from making unauthorized modifications to data, thereby protecting its integrity.

The Clark-Wilson integrity model provides a foundation for specifying and analyzing an integrity policy for a computing system.

The model is primarily concerned with formalizing the notion of information integrity. Information integrity is maintained by preventing corruption of data items in a system due to either error or malicious intent. An integrity policy describes how the data items in the system should be kept valid from one state of the system to the next and specifies the capabilities of various principals in the system. The model defines enforcement rules and certification rules.

The model's enforcement and certification rules define data items and processes that provide the basis for an integrity policy. The core of the model is based on the notion of a transaction.

A well-formed transaction is a series of operations that transition a system from one consistent state to another consistent state.

In this model the integrity policy addresses the integrity of the transactions.

The principle of separation of duty requires that the certifier of a transaction and the implementer be different entities.

The model contains a number of basic constructs that represent both data items and processes that operate on those data items. The key data type in the Clark-Wilson model is a Constrained

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Data Item (CDI). An Integrity Verification Procedure (IVP) ensures that all CDIs in the system are valid at a certain state. Transactions that enforce the integrity policy are represented by Transformation Procedures (TPs). A TP takes as input a CDI or Unconstrained Data Item (UDI) and produces a CDI. A TP must transition the system from one valid state to another valid state. UDIs represent system input (such as that provided by a user or adversary). A TP must guarantee (via certification) that it transforms all possible values of a UDI to a “safe” CDI.

In general, preservation of data integrity has three goals:

Prevent data modification by unauthorized parties

Prevent unauthorized data modification by authorized parties

Maintain internal and external consistency (i.e. data reflects the real world)

Clark-Wilson addresses all three rules but BIBA addresses only the first rule of intergrity.

References:

HARRIS, Shon, All-In-One CISSP Certification Fifth Edition, McGraw-Hill/Osborne, Chapter 5: Security Architecture and Design (Page 341-344).

and

[http://en.wikipedia.org/wiki/Clark-Wilson\\_model](http://en.wikipedia.org/wiki/Clark-Wilson_model)

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### QUESTION 154

Which type of control is concerned with avoiding occurrences of risks?

- A. Deterrent controls
- B. Detective controls
- C. Preventive controls
- D. Compensating controls

Answer: C

Explanation: Preventive controls are concerned with avoiding occurrences of risks while deterrent controls are concerned with discouraging violations. Detecting controls identify occurrences and compensating controls are alternative controls, used to compensate weaknesses in other controls. Supervision is an example of compensating control.

Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 155

Which type of control is concerned with restoring controls?

- A. Compensating controls
- B. Corrective controls
- C. Detective controls
- D. Preventive controls

Answer: B

Explanation: Corrective controls are concerned with remedying circumstances and restoring controls.

Detective controls are concerned with investigating what happen after the fact such as logs and

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video surveillance tapes for example.

Compensating controls are alternative controls, used to compensate weaknesses in other controls.

Preventive controls are concerned with avoiding occurrences of risks.

Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 156

Which of the following biometric parameters are better suited for authentication use over a long period of time?

- A. Iris pattern
- B. Voice pattern
- C. Signature dynamics
- D. Retina pattern

Answer: A

Explanation: The iris pattern is considered lifelong. Unique features of the iris are: freckles, rings, rifts, pits, striations, fibers, filaments, furrows, vasculature and coronas. Voice, signature and retina patterns are more likely to change over time, thus are not as suitable for authentication over a long period of time without needing re-enrollment.

Source: FERREL, Robert G, questions and Answers for the CISSP Exam, domain 1 (derived from the Information Security Management Handbook, 4th Ed., by Tipton & Krause).

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### QUESTION 157

Which of the following is required in order to provide accountability?

- A. Authentication
- B. Integrity
- C. Confidentiality
- D. Audit trails

Answer: D

Explanation: Accountability can actually be seen in two different ways:

1) Although audit trails are also needed for accountability, no user can be accountable for their actions unless properly authenticated.

2) Accountability is another facet of access control. Individuals on a system are responsible for their actions. This accountability property enables system activities to be traced to the proper individuals. Accountability is supported by audit trails that record events on the system and network. Audit trails can be used for intrusion detection and for the reconstruction of past events. Monitoring individual activities, such as keystroke monitoring, should be accomplished in accordance with the company policy and appropriate laws. Banners at the log-on time should notify the user of any monitoring that is being conducted.

The point is that unless you employ an appropriate auditing mechanism, you don't have accountability. Authorization only gives a user certain permissions on the network. Accountability

is far more complex because it also includes intrusion detection, unauthorized actions by both unauthorized users and authorized users, and system faults. The audit trail provides the proof that unauthorized modifications by both authorized and unauthorized users took place. No proof, No accountability.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Page 50

The Shon Harris AIO book, 4th Edition, on Page 243 also states:

Auditing Capabilities ensures users are accountable for their actions, verify that the security policies are enforced,

and can be used as investigation tools. Accountability is tracked by recording user, system, and application activities.

This recording is done through auditing functions and mechanisms within an operating system or application.

Audit trail contain information about operating System activities, application events, and user actions.

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### QUESTION 158

Which of the following access control techniques best gives the security officers the ability to specify and enforce enterprise-specific security policies in a way that maps naturally to an organization's structure?

- A. Access control lists
- B. Discretionary access control
- C. Role-based access control
- D. Non-mandatory access control

Answer: C

Explanation: Role-based access control (RBAC) gives the security officers the ability to specify and enforce enterprise-specific security policies in a way that maps naturally to an organization's structure. Each user is assigned one or more roles, and each role is assigned one or more privileges that are given to users in that role. An access control list (ACL) is a table that tells a system which access rights each user has to a particular system object. With discretionary access control, administration is decentralized and owners of resources control other users' access. Nonmandatory access control is not a defined access control technique.

Source: ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 2: Access Control Systems and Methodology (page 9).

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### QUESTION 159

Which access control model was proposed for enforcing access control in government and military applications?

- A. Bell-LaPadula model
- B. Biba model
- C. Sutherland model
- D. Brewer-Nash model

Answer: A

Explanation: The Bell-LaPadula model, mostly concerned with confidentiality, was proposed for enforcing access control in government and military applications. It supports mandatory access control by determining the access rights from the security levels associated with subjects and objects. It also supports discretionary access control by checking access rights from an access matrix. The Biba model, introduced in 1977, the Sutherland model, published in 1986, and the Brewer-Nash model, published in 1989, are concerned with integrity.

Source: ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 2: Access Control Systems and Methodology (page 11).

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### QUESTION 160

Which access control model achieves data integrity through well-formed transactions and separation of duties?

- A. Clark-Wilson model
- B. Biba model
- C. Non-interference model
- D. Sutherland model

Answer: A

Explanation: The Clark-Wilson model differs from other models that are subject- and object-oriented by introducing a third access element programs resulting in what is called an access triple, which prevents unauthorized users from modifying data or programs. The Biba model uses objects and subjects and addresses integrity based on a hierarchical lattice of integrity levels. The non-interference model is related to the information flow model with restrictions on the information flow. The Sutherland model approaches integrity by focusing on the problem of inference.

Source: ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 2: Access Control Systems and Methodology (page 12).

And: KRAUSE, Micki & TIPTON, Harold F., Handbook of Information Security Management, CRC Press, 1997, Domain 1: Access Control.

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### QUESTION 161

This is a common security issue that is extremely hard to control in large environments. It occurs when a user has more computer rights, permissions, and access than what is required for the tasks the user needs to fulfill. What best describes this scenario?

- A. Excessive Rights
- B. Excessive Access
- C. Excessive Permissions
- D. Excessive Privileges

Answer: D

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Explanation: Even thou all 4 terms are very close to each other, the best choice is Excessive Privileges which would include the other three choices presented.

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, Page 645  
and

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### QUESTION 162

Which of the following are additional access control objectives?

- A. Consistency and utility
- B. Reliability and utility
- C. Usefulness and utility
- D. Convenience and utility

Answer: B

Explanation: Availability assures that a system's authorized users have timely and uninterrupted access to the information in the system. The additional access control objectives are reliability and utility. These and other related objectives flow from the organizational security policy. This policy is a high-level statement of management intent regarding the control of access to information and the personnel who are authorized to receive that information. Three things that must be considered for the planning and implementation of access control mechanisms are the threats to the system, the system's vulnerability to these threats, and the risk that the threat may materialize  
Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 32

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### QUESTION 163

Controls are implemented to:

- A. eliminate risk and reduce the potential for loss
- B. mitigate risk and eliminate the potential for loss
- C. mitigate risk and reduce the potential for loss
- D. eliminate risk and eliminate the potential for loss

Answer: C

Explanation: Controls are implemented to mitigate risk and reduce the potential for loss. Preventive controls are put in place to inhibit harmful occurrences; detective controls are established to discover harmful occurrences; corrective controls are used to restore systems that are victims of harmful attacks.

It is not feasible and possible to eliminate all risks and the potential for loss as risk/threats are constantly changing.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 32

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**QUESTION 164**

Logical or technical controls involve the restriction of access to systems and the protection of information. Which of the following statements pertaining to these types of controls is correct?

- A. Examples of these types of controls include policies and procedures, security awareness training, background checks, work habit checks but do not include a review of vacation history, and also do not include increased supervision.
- B. Examples of these types of controls do not include encryption, smart cards, access lists, and transmission protocols.
- C. Examples of these types of controls are encryption, smart cards, access lists, and transmission protocols.
- D. Examples of these types of controls include policies and procedures, security awareness training, background checks, work habit checks, a review of vacation history, and increased supervision.

Answer: C

Explanation: Logical or technical controls involve the restriction of access to systems and the protection of information. Examples of these types of controls are encryption, smart cards, access lists, and transmission protocols.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 33

**QUESTION 165**

Controls provide accountability for individuals who are accessing sensitive information. This accountability is accomplished:

- A. through access control mechanisms that require identification and authentication and through the audit function.
- B. through logical or technical controls involving the restriction of access to systems and the protection of information.
- C. through logical or technical controls but not involving the restriction of access to systems and the protection of information.
- D. through access control mechanisms that do not require identification and authentication and do not operate through the audit function.

Answer: A

Explanation: Controls provide accountability for individuals who are accessing sensitive information. This accountability is accomplished through access control mechanisms that require identification and authentication and through the audit function. These controls must be in accordance with and accurately represent the organization's security policy. Assurance procedures ensure that the control mechanisms correctly implement the security policy for the entire life cycle of an information system.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 33

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**QUESTION 166**

In non-discretionary access control using Role Based Access Control (RBAC), a central authority determines what subjects can have access to certain objects based on the organizational security policy. The access controls may be based on:

- A. The society's role in the organization
- B. The individual's role in the organization
- C. The group-dynamics as they relate to the individual's role in the organization
- D. The group-dynamics as they relate to the master-slave role in the organization

Answer: B

Explanation: In Non-Discretionary Access Control, when Role Based Access Control is being used, a central authority determines what subjects can have access to certain objects based on the organizational security policy. The access controls may be based on the individual's role in the organization.

Reference(S) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 33

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**QUESTION 167**

In an organization where there are frequent personnel changes, non-discretionary access control using Role Based Access Control (RBAC) is useful because:

- A. people need not use discretion
- B. the access controls are based on the individual's role or title within the organization.
- C. the access controls are not based on the individual's role or title within the organization
- D. the access controls are often based on the individual's role or title within the organization

Answer: B

Explanation: In an organization where there are frequent personnel changes, non-discretionary access control (also called Role Based Access Control) is useful because the access controls are based on the individual's role or title within the organization. You can easily configure a new employee access by assigning the user to a role that has been predefined. The user will implicitly inherit the permissions of the role by being a member of that role.

These access permissions defined within the role do not need to be changed whenever a new person takes over the role.

Another type of non-discretionary access control model is the Rule Based Access Control (RBAC or RuBAC) where a global set of rule is uniformly applied to all subjects accessing the resources. A good example of RuBAC would be a firewall.

This question is a sneaky one, one of the choice has only one added word to it which is often. Reading questions and their choices very carefully is a must for the real exam. Reading it twice if needed is recommended.

Shon Harris in her book lists the following ways of managing RBAC:

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Role-based access control can be managed in the following ways:

- Non-RBAC Users are mapped directly to applications and no roles are used. (No roles being used)
- Limited RBAC Users are mapped to multiple roles and mapped directly to other types of applications that do not have role-based access functionality. (A mix of roles for applications that supports roles and explicit access control would be used for applications that do not support roles)
- Hybrid RBAC Users are mapped to multiapplication roles with only selected rights assigned to those roles.
- Full RBAC Users are mapped to enterprise roles. (Roles are used for all access being granted)

NIST defines RBAC as:

Security administration can be costly and prone to error because administrators usually specify access control lists for each user on the system individually. With RBAC, security is managed at a level that corresponds closely to the organization's structure. Each user is assigned one or more roles, and each role is assigned one or more privileges that are permitted to users in that role.

Security administration with RBAC consists of determining the operations that must be executed by persons in particular jobs, and assigning employees to the proper roles. Complexities introduced by mutually exclusive roles or role hierarchies are handled by the RBAC software, making security administration easier.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 32

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition McGraw-Hill.

and

<http://csrc.nist.gov/groups/SNS/rbac/>

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## QUESTION 168

Another type of access control is lattice-based access control. In this type of control a lattice model is applied. How is this type of access control concept applied?

- A. The pair of elements is the subject and object, and the subject has an upper bound equal or higher than the upper bound of the object being accessed.
- B. The pair of elements is the subject and object, and the subject has an upper bound lower than the upper bound of the object being accessed.
- C. The pair of elements is the subject and object, and the subject has no special upper or lower bound needed within the lattice.
- D. The pair of elements is the subject and object, and the subject has no access rights in relation to an object.

Answer: A

Explanation: In this type of control, a lattice model is applied.

To apply this concept to access control, the pair of elements is the subject and object, and the subject has to have an upper bound equal or higher than the object being accessed.

WIKIPEDIA has a great explanation as well:

In computer security, lattice-based access control (LBAC) is a complex access control based on

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the interaction between any combination of objects (such as resources, computers, and applications) and subjects (such as individuals, groups or organizations).

In this type of label-based mandatory access control model, a lattice is used to define the levels of security that an object may have and that a subject may have access to. The subject is only allowed to access an object if the security level of the subject is greater than or equal to that of the object.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 34  
and  
[http://en.wikipedia.org/wiki/Lattice-based\\_access\\_control](http://en.wikipedia.org/wiki/Lattice-based_access_control)

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### QUESTION 169

Detective/Technical measures:

- A. include intrusion detection systems and automatically-generated violation reports from audit trail information.
- B. do not include intrusion detection systems and automatically-generated violation reports from audit trail information.
- C. include intrusion detection systems but do not include automatically-generated violation reports from audit trail information.
- D. include intrusion detection systems and customised-generated violation reports from audit trail information.

Answer: A

Explanation: Detective/Technical measures include intrusion detection systems and automatically-generated violation reports from audit trail information. These reports can indicate variations from "normal" operation or detect known signatures of unauthorized access episodes. In order to limit the amount of audit information flagged and reported by automated violation analysis and reporting mechanisms, clipping levels can be set.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 35

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### QUESTION 170

Passwords can be required to change monthly, quarterly, or at other intervals:

- A. depending on the criticality of the information needing protection
- B. depending on the criticality of the information needing protection and the password's frequency of use.
- C. depending on the password's frequency of use.
- D. not depending on the criticality of the information needing protection but depending on the password's frequency of use.

Answer: B

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Explanation: Passwords can be compromised and must be protected. In the ideal case, a password should only be used once. The changing of passwords can also fall between these two extremes. Passwords can be required to change monthly, quarterly, or at other intervals, depending on the criticality of the information needing protection and the password's frequency of use. Obviously, the more times a password is used, the more chance there is of it being compromised.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 36 & 37

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### QUESTION 171

When submitting a passphrase for authentication, the passphrase is converted into ...

- A. a virtual password by the system.
- B. a new passphrase by the system.
- C. a new passphrase by the encryption technology
- D. a real password by the system which can be used forever.

Answer: A

Explanation: Passwords can be compromised and must be protected. In the ideal case, a password should only be used once. The changing of passwords can also fall between these two extremes.

Passwords can be required to change monthly, quarterly, or at other intervals, depending on the criticality of the information needing protection and the password's frequency of use. Obviously, the more times a password is used, the more chance there is of it being compromised. It is recommended to use a passphrase instead of a password. A passphrase is more resistant to attacks. The passphrase is converted into a virtual password by the system. Often time the passphrase will exceed the maximum length supported by the system and it must be truncated into a Virtual Password.

Reference(s) used for this question:

<http://www.itl.nist.gov/fipspubs/fip112.htm>

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 36 & 37

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### QUESTION 172

In the context of Biometric authentication, what is a quick way to compare the accuracy of devices.

In general, the device that have the lowest value would be the most accurate. Which of the following would be used to compare accuracy of devices?

- A. the CER is used.
- B. the FRR is used
- C. the FAR is used
- D. The FER is used

Answer: A

Explanation: equal error rate or crossover error rate (EER or CER): the rate at which both accept and reject errors are equal. The value of the EER can be easily obtained from the ROC curve. The EER is a quick way to compare the accuracy of devices with different ROC curves. In general, the device with the lowest EER is most accurate.

In the context of Biometric Authentication almost all types of detection permit a system's sensitivity to be increased or decreased during an inspection process. If the system's sensitivity is increased, such as in an airport metal detector, the system becomes increasingly selective and has a higher False Reject Rate (FRR).

Conversely, if the sensitivity is decreased, the False Acceptance Rate (FAR) will increase.

Thus, to have a valid measure of the system performance, the CrossOver Error Rate (CER) is used.

The following are used as performance metrics for biometric systems:

false accept rate or false match rate (FAR or FMR): the probability that the system incorrectly matches the input pattern to a non-matching template in the database. It measures the percent of invalid inputs which are incorrectly accepted. In case of similarity scale, if the person is imposter in real, but the matching score is higher than the threshold, then he is treated as genuine that increase the FAR and hence performance also depends upon the selection of threshold value.

false reject rate or false non-match rate (FRR or FNMR): the probability that the system fails to detect a match between the input pattern and a matching template in the database. It measures the percent of valid inputs which are incorrectly rejected.

failure to enroll rate (FTE or FER): the rate at which attempts to create a template from an input is unsuccessful. This is most commonly caused by low quality inputs.

failure to capture rate (FTC): Within automatic systems, the probability that the system fails to detect a biometric input when presented correctly.

template capacity: the maximum number of sets of data which can be stored in the system.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 37  
and

Wikipedia at: <https://en.wikipedia.org/wiki/Biometrics>

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### QUESTION 173

The throughput rate is the rate at which individuals, once enrolled, can be processed and identified or authenticated by a biometric system. Acceptable throughput rates are in the range of:

- A. 100 subjects per minute.
- B. 25 subjects per minute.
- C. 10 subjects per minute.
- D. 50 subjects per minute.

Answer: C

Explanation: The throughput rate is the rate at which individuals, once enrolled, can be processed and identified or authenticated by a biometric system.

Acceptable throughput rates are in the range of 10 subjects per minute.

Things that may impact the throughput rate for some types of biometric systems may include:  
A concern with retina scanning systems may be the exchange of body fluids on the eyepiece.  
Another concern would be the retinal pattern that could reveal changes in a person's health, such as diabetes or high blood pressure.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 38

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**QUESTION 174**

Which of the following biometric devices has the lowest user acceptance level?

- A. Retina Scan
- B. Fingerprint scan
- C. Hand geometry
- D. Signature recognition

Answer: A

Explanation: According to the cited reference, of the given options, the Retina scan has the lowest user acceptance level as it is needed for the user to get his eye close to a device and it is not user friendly and very intrusive.

However, retina scan is the most precise with about one error per 10 millions usage.

Look at the 2 tables below. If necessary right click on the image and save it on your desktop for a larger view or visit the web site directly at

<https://sites.google.com/site/biometricsecuritysolutions/crossover-accuracy> .

Biometric Comparison Chart

Biometric Aspect Descriptions

Reference(s) used for this question:

RHODES, Keith A., Chief Technologist, United States General Accounting Office, National Preparedness, Technologies to Secure Federal Buildings, April 2002 (page 10).  
and

<https://sites.google.com/site/biometricsecuritysolutions/crossover-accuracy>

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**QUESTION 175**

Which of the following would be an example of the best password?

- A. golf001
- B. Elizabeth
- C. T1me4g0lF
- D. password

Answer: C

Explanation: The best passwords are those that are both easy to remember and hard to crack using a dictionary attack. The best way to create passwords that fulfil both criteria is to use two small unrelated words or phonemes, ideally with upper and lower case characters, a special character, and/or a number. Shouldn't be used: common names, DOB, spouse, phone numbers,

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words found in dictionaries or system defaults.

Source: ROTHKE, Ben, CISSP CBK Review presentation on domain 1

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### QUESTION 176

Which of the following tools is less likely to be used by a hacker?

- A. 10phcrack
- B. Tripwire
- C. OphCrack
- D. John the Ripper

Answer: B

Explanation: Tripwire is an integrity checking product, triggering alarms when important files (e.g. system or configuration files) are modified.

This is a tool that is not likely to be used by hackers, other than for studying its workings in order to circumvent it.

Other programs are password-cracking programs and are likely to be used by security administrators as well as by hackers. More info regarding Tripwire available on the Tripwire, Inc. Web Site.

NOTE:

The biggest competitor to the commercial version of Tripwire is the freeware version of Tripwire.

You can get the Open Source version of Tripwire at the following URL:

<http://sourceforge.net/projects/tripwire/>

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### QUESTION 177

What is an error called that causes a system to be vulnerable because of the environment in which it is installed?

- A. Configuration error
- B. Environmental error
- C. Access validation error
- D. Exceptional condition handling error

Answer: B

Explanation: In an environmental error, the environment in which a system is installed somehow causes the system to be vulnerable. This may be due, for example, to an unexpected interaction between an application and the operating system or between two applications on the same host. A configuration error occurs when user controllable settings in a system are set such that the system is vulnerable. In an access validation error, the system is vulnerable because the access control mechanism is faulty. In an exceptional condition handling error, the system somehow becomes vulnerable due to an exceptional condition that has arisen.

Source: DUPUIS, Clement, Access Control Systems and Methodology CISSP Open Study Guide, version 10, march 2002 (page 106).

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**QUESTION 178**

A network-based vulnerability assessment is a type of test also referred to as:

- A. An active vulnerability assessment.
- B. A routing vulnerability assessment.
- C. A host-based vulnerability assessment.
- D. A passive vulnerability assessment.

Answer: A

Explanation: A network-based vulnerability assessment tool/system either re-enacts system attacks, noting and recording responses to the attacks, or probes different targets to infer weaknesses from their responses.

Since the assessment is actively attacking or scanning targeted systems, network-based vulnerability assessment systems are also called active vulnerability systems.

There are mostly two main types of test:

PASSIVE: You don't send any packet or interact with the remote target. You make use of public database and other techniques to gather information about your target.

ACTIVE: You do send packets to your target, you attempt to stimulate response which will help you in gathering information about hosts that are alive, services runnings, port state, and more.

See example below of both types of attacks:

Eavesdropping and sniffing data as it passes over a network are considered passive attacks because the attacker is not affecting the protocol, algorithm, key, message, or any parts of the encryption system. Passive attacks are hard to detect, so in most cases methods are put in place to try to prevent them rather than to detect and stop them.

Altering messages , modifying system files, and masquerading as another individual are acts that are considered active attacks because the attacker is actually doing something instead of sitting back and gathering data. Passive attacks are usually used to gain information prior to carrying out an active attack.

**IMPORTANT NOTE:**

On the commercial vendors will sometimes use different names for different types of scans.

However, the exam is product agnostic. They do not use vendor terms but general terms.

Experience could trick you into selecting the wrong choice sometimes. See feedback from Jason below:

"I am a system security analyst. It is my daily duty to perform system vulnerability analysis. We use Nessus and Retina (among other tools) to perform our network based vulnerability scanning. Both commercially available tools refer to a network based vulnerability scan as a "credentialed" scan. Without credentials, the scan tool cannot login to the system being scanned, and as such will only receive a port scan to see what ports are open and exploitable"

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 865). McGraw-Hill. Kindle Edition.

and

DUPUIS, Clement, Access Control Systems and Methodology CISSP Open Study Guide, version 10, march 2002 (page 97).

**QUESTION 179**

Why would anomaly detection IDSs often generate a large number of false positives?

- A. Because they can only identify correctly attacks they already know about.
- B. Because they are application-based are more subject to attacks.
- C. Because they can't identify abnormal behavior.
- D. Because normal patterns of user and system behavior can vary wildly.

Answer: D

Explanation: Unfortunately, anomaly detectors and the Intrusion Detection Systems (IDS) based on them often produce a large number of false alarms, as normal patterns of user and system behavior can vary wildly. Being only able to identify correctly attacks they already know about is a characteristic of misuse detection (signature-based) IDSs. Application-based IDSs are a special subset of host-based IDSs that analyze the events transpiring within a software application. They are more vulnerable to attacks than host-based IDSs. Not being able to identify abnormal behavior would not cause false positives, since they are not identified.

Source: DUPUIS, Clément, Access Control Systems and Methodology CISSP Open Study Guide, version 10, march 2002 (page 92).

**QUESTION 180**

Ensuring least privilege does not require:

- A. Identifying what the user's job is.
- B. Ensuring that the user alone does not have sufficient rights to subvert an important process.
- C. Determining the minimum set of privileges required for a user to perform their duties.
- D. Restricting the user to required privileges and nothing more.

Answer: B

Explanation: Ensuring that the user alone does not have sufficient rights to subvert an important process is a concern of the separation of duties principle and it does not concern the least privilege principle.

Source: DUPUIS, Clément, Access Control Systems and Methodology CISSP Open Study Guide, version 10, march 2002 (page 33).

**QUESTION 181**

Which of the following is NOT a form of detective technical control?

- A. Audit trails
- B. Access control software
- C. Honeypot
- D. Intrusion detection system

Answer: B

Explanation: Detective technical controls warn of technical access control violations. Access control software is a rather an example of a preventive technical control. Other choices represent detective technical controls.

Source: DUPUIS, Cl?ment, Access Control Systems and Methodology CISSP Open Study Guide, version 10 (march 2002).

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### QUESTION 182

Which of the following does not apply to system-generated passwords?

- A. Passwords are harder to remember for users.
- B. If the password-generating algorithm gets to be known, the entire system is in jeopardy.
- C. Passwords are more vulnerable to brute force and dictionary attacks.
- D. Passwords are harder to guess for attackers.

Answer: C

Explanation: Users tend to choose easier to remember passwords. System-generated passwords can provide stronger, harder to guess passwords. Since they are based on rules provided by the administrator, they can include combinations of uppercase/lowercase letters, numbers and special characters, making them less vulnerable to brute force and dictionary attacks. One danger is that they are also harder to remember for users, who will tend to write them down, making them more vulnerable to anyone having access to the user's desk. Another danger with system-generated passwords is that if the password-generating algorithm gets to be known, the entire system is in jeopardy.

Source: RUSSEL, Deborah & GANGEMI, G.T. Sr., Computer Security Basics, O'Reilly, July 1992 (page 64).

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### QUESTION 183

Which of the following is not a preventive login control?

- A. Last login message
- B. Password aging
- C. Minimum password length
- D. Account expiration

Answer: A

Explanation: The last login message displays the last login date and time, allowing a user to discover if their account was used by someone else. Hence, this is rather a detective control.

Source: RUSSEL, Deborah & GANGEMI, G.T. Sr., Computer Security Basics, O'Reilly, July 1992 (page 63).

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### QUESTION 184

What is the most critical characteristic of a biometric identifying system?

- A. Perceived intrusiveness

- B. Storage requirements
- C. Accuracy
- D. Scalability

Answer: C

Explanation: Accuracy is the most critical characteristic of a biometric identifying verification system.

Accuracy is measured in terms of false rejection rate (FRR, or type I errors) and false acceptance rate (FAR or type II errors).

The Crossover Error Rate (CER) is the point at which the FRR equals the FAR and has become the most important measure of biometric system accuracy.

Source: TIPTON, Harold F. & KRAUSE, Micki, Information Security Management Handbook, 4th edition (volume 1), 2000, CRC Press, Chapter 1, Biometric Identification (page 9).

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### QUESTION 185

What is considered the most important type of error to avoid for a biometric access control system?

- A. Type I Error
- B. Type II Error
- C. Combined Error Rate
- D. Crossover Error Rate

Answer: B

Explanation: When a biometric system is used for access control, the most important error is the false accept or false acceptance rate, or Type II error, where the system would accept an impostor.

A Type I error is known as the false reject or false rejection rate and is not as important in the security context as a type II error rate. A type one is when a valid company employee is rejected by the system and he cannot get access even thou it is a valid user.

The Crossover Error Rate (CER) is the point at which the false rejection rate equals the false acceptance rate if you would create a graph of Type I and Type II errors. The lower the CER the better the device would be.

The Combined Error Rate is a distracter and does not exist.

Source: TIPTON, Harold F. & KRAUSE, Micki, Information Security Management Handbook, 4th edition (volume 1), 2000, CRC Press, Chapter 1, Biometric Identification (page 10).

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### QUESTION 186

How can an individual/person best be identified or authenticated to prevent local masquerading attacks?

- A. User Id and password
- B. Smart card and PIN code
- C. Two-factor authentication

## D. Biometrics

Answer: D

Explanation: The only way to be truly positive in authenticating identity for access is to base the authentication on the physical attributes of the persons themselves (i.e., biometric identification). Physical attributes cannot be shared, borrowed, or duplicated. They ensure that you do identify the person, however they are not perfect and they would have to be supplemented by another factor. Some people are getting thrown off by the term Masquerade. In general, a masquerade is a disguise. In terms of communications security issues, a masquerade is a type of attack where the attacker pretends to be an authorized user of a system in order to gain access to it or to gain greater privileges than they are authorized for. A masquerade may be attempted through the use of stolen logon IDs and passwords, through finding security gaps in programs, or through bypassing the authentication mechanism. Spoofing is another term used to describe this type of attack as well.

A UserId only provides for identification.

A password is a weak authentication mechanism since passwords can be disclosed, shared, written down, and more.

A smart card can be stolen and its corresponding PIN code can be guessed by an intruder. A smartcard can be borrowed by a friend of yours and you would have no clue as to who is really logging in using that smart card.

Any form of two-factor authentication not involving biometrics cannot be as reliable as a biometric system to identify the person.

See an extract below from the HISM book volume 1 Biometric identifying verification systems control people. If the person with the correct hand, eye, face, signature, or voice is not present, the identification and verification cannot take place and the desired action (i.e., portal passage, data, or resource access) does not occur.

As has been demonstrated many times, adversaries and criminals obtain and successfully use access cards, even those that require the addition of a PIN. This is because these systems control only pieces of plastic (and sometimes information), rather than people. Real asset and resource protection can only be accomplished by people, not cards and information, because unauthorized persons can (and do) obtain the cards and information.

Further, life-cycle costs are significantly reduced because no card or PIN administration system or personnel are required. The authorized person does not lose physical characteristics (i.e., hands, face, eyes, signature, or voice), but cards and PINs are continuously lost, stolen, or forgotten. This is why card access systems require systems and people to administer, control, record, and issue (new) cards and PINs. Moreover, the cards are an expensive and recurring cost.

### NOTE FROM CLEMENT:

This question has been generating lots of interest. The keyword in the question is: Individual (the person) and also the authenticated portion as well.

I totally agree with you that Two Factors or Strong Authentication would be the strongest means of authentication. However the question is not asking what is the strongest mean of authentication, it is asking what is the best way to identify the user (individual) behind the technology. When answering questions do not make assumptions to facts not presented in the question or answers. Nothing can beat Biometrics in such case. You cannot lend your fingerprint and pin to someone else, you cannot borrow one of my eye balls to defeat the Iris or Retina scan. This is why it is the

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best method to authenticate the user.

I think the reference is playing with semantics and that makes it a bit confusing. I have improved the question to make it a lot clearer and I have also improved the explanations attached with the question.

The reference mentioned above refers to authenticating the identity for access. So the distinction is being made that there is identity and there is authentication. In the case of physical security the enrollment process is where the identity of the user would be validated and then the biometrics features provided by the user would authenticate the user on a one to one matching basis (for authentication) with the reference contained in the database of biometrics templates. In the case of system access, the user might have to provide a username, a pin, a passphrase, a smart card, and then provide his biometric attributes.

Biometric can also be used for Identification purpose where you do a one to many match. You take a facial scan of someone within an airport and you attempt to match it with a large database of known criminal and terrorists. This is how you could use biometric for Identification.

There are always THREE means of authentication, they are:

Something you know (Type 1)

Something you have (Type 2)

Something you are (Type 3)

Reference(s) used for this question:

TIPTON, Harold F. & KRAUSE, Micki, Information Security Management Handbook, 4th edition (volume 1), 2000, CRC Press, Chapter 1, Biometric Identification (page 7).

and

Search Security at <http://searchsecurity.techtarget.com/definition/masquerade>

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## QUESTION 187

Which authentication technique best protects against hijacking?

- A. Static authentication
- B. Continuous authentication
- C. Robust authentication
- D. Strong authentication

Answer: B

Explanation: A continuous authentication provides protection against impostors who can see, alter, and insert information passed between the claimant and verifier even after the claimant/verifier authentication is complete. This is the best protection against hijacking. Static authentication is the type of authentication provided by traditional password schemes and the strength of the authentication is highly dependent on the difficulty of guessing passwords. The robust authentication mechanism relies on dynamic authentication data that changes with each authenticated session between a claimant and a verifier, and it does not protect against hijacking. Strong authentication refers to a two-factor authentication (like something a user knows and something a user is).

Source: TIPTON, Harold F. & KRAUSE, Micki, Information Security Management Handbook, 4th edition (volume 1), 2000, CRC Press, Chapter 3: Secured Connections to External Networks (page 51).

**QUESTION 188**

Which of the following is not a security goal for remote access?

- A. Reliable authentication of users and systems
- B. Protection of confidential data
- C. Easy to manage access control to systems and network resources
- D. Automated login for remote users

Answer: D

Explanation: An automated login function for remote users would imply a weak authentication, thus certainly not a security goal.

Source: TIPTON, Harold F. & KRAUSE, Micki, Information Security Management Handbook, 4th edition, volume 2, 2001, CRC Press, Chapter 5: An Introduction to Secure Remote Access (page 100).

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**QUESTION 189**

Which of the following is most concerned with personnel security?

- A. Management controls
- B. Operational controls
- C. Technical controls
- D. Human resources controls

Answer: B

Explanation: Many important issues in computer security involve human users, designers, implementers, and managers.

A broad range of security issues relates to how these individuals interact with computers and the access and authorities they need to do their jobs. Since operational controls address security methods focusing on mechanisms primarily implemented and executed by people (as opposed to systems), personnel security is considered a form of operational control.

Operational controls are put in place to improve security of a particular system (or group of systems). They often require specialized expertise and often rely upon management activities as well as technical controls. Implementing dual control and making sure that you have more than one person that can perform a task would fall into this category as well.

Management controls focus on the management of the IT security system and the management of risk for a system. They are techniques and concerns that are normally addressed by management. Technical controls focus on security controls that the computer system executes. The controls can provide automated protection for unauthorized access or misuse, facilitate detection of security violations, and support security requirements for applications and data.

Reference use for this question:

NIST SP 800-53 Revision 4 <http://dx.doi.org/106028/NIST.SP.800-53r4>

You can get it as a word document by clicking [HERE](#)

NIST SP 800-53 Revision 4 has superseded the document below:

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SWANSON, Marianne, NIST Special Publication 800-26, Security Self-Assessment Guide for Information Technology Systems, November 2001 (Page A-18).

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**QUESTION 190**

Which of the following questions is less likely to help in assessing identification and authentication controls?

- A. Is a current list maintained and approved of authorized users and their access?
- B. Are passwords changed at least every ninety days or earlier if needed?
- C. Are inactive user identifications disabled after a specified period of time?
- D. Is there a process for reporting incidents?

Answer: D

Explanation: Identification and authentication is a technical measure that prevents unauthorized people (or unauthorized processes) from entering an IT system. Access control usually requires that the system be able to identify and differentiate among users. Reporting incidents is more related to incident response capability (operational control) than to identification and authentication (technical control).

Source: SWANSON, Marianne, NIST Special Publication 800-26, Security Self-Assessment Guide for Information Technology Systems, November 2001 (Pages A-30 to A-32).

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**QUESTION 191**

How would nonrepudiation be best classified as?

- A. A preventive control
- B. A logical control
- C. A corrective control
- D. A compensating control

Answer: A

Explanation: Systems accountability depends on the ability to ensure that senders cannot deny sending information and that receivers cannot deny receiving it. Because the mechanisms implemented in nonrepudiation prevent the ability to successfully repudiate an action, it can be considered as a preventive control.

Source: STONEBURNER, Gary, NIST Special Publication 800-33: Underlying Technical Models for Information Technology Security, National Institute of Standards and Technology, December 2001, page 7

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**QUESTION 192**

What are cognitive passwords?

- A. Passwords that can be used only once.
- B. Fact or opinion-based information used to verify an individual's identity.
- C. Password generators that use a challenge response scheme.

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D. Passphrases.

Answer: B

Explanation: Cognitive passwords are fact or opinion-based information used to verify an individual's identity. Passwords that can be used only once are one-time or dynamic passwords. Password generators that use a challenge response scheme refer to token devices.

A passphrase is a sequence of characters that is longer than a password and is transformed into a virtual password.

Source: WALLHOFF, John, CISSP Summary 2002, April 2002, CBK#1 Access Control System & Methodology (page 2), /Documents/CISSP\_Summary\_2002/index.html.

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### QUESTION 193

Which of the following Kerberos components holds all users' and services' cryptographic keys?

- A. The Key Distribution Service
- B. The Authentication Service
- C. The Key Distribution Center
- D. The Key Granting Service

Answer: C

Explanation: The Key Distribution Center (KDC) holds all users' and services' cryptographic keys. It provides authentication services, as well as key distribution functionality. The Authentication Service is the part of the KDC that authenticates a principal. The Key Distribution Service and Key Granting Service are distractors and are not defined Kerberos components.

Source: WALLHOFF, John, CISSP Summary 2002, April 2002, CBK#1 Access Control System & Methodology (page 3), /Documents/CISSP\_Summary\_2002/index.html.

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### QUESTION 194

Most access violations are:

- A. Accidental
- B. Caused by internal hackers
- C. Caused by external hackers
- D. Related to Internet

Answer: A

Explanation: The most likely source of exposure is from the uninformed, accidental or unknowing person, although the greatest impact may be from those with malicious or fraudulent intent.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, Chapter 4: Protection of Information Assets (page 192).

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### QUESTION 195

Which of the following biometrics devices has the highest Crossover Error Rate (CER)?

- A. Iris scan
- B. Hand geometry
- C. Voice pattern
- D. Fingerprints

Answer: C

Explanation: The Crossover Error Rate (CER) is the point where false rejection rate (type I error) equals the false acceptance rate (type II error). The lower the CER, the better the accuracy of the device. At the time of this writing, response times and accuracy of some devices are:

System type Response time Accuracy (CER)

Fingerprints 5-7 secs. 5%

Hand Geometry 3-5 secs. 2%

Voice Pattern 10-14 secs. 10%

Retina Scan 4-7 secs. 15%

Iris Scan 25-4 secs. 05%

The term EER which means Equal Error Rate is sometimes used instead of the term CER. It has the same meaning.

Source: Chris Hare's CISSP Study Notes on Physical Security, based on ISC2 CBK document.

Available at <http://www.ccure.org>.

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### QUESTION 196

Which of the following is not a service provided by AAA servers (Radius, TACACS and DIAMETER)?

- A. Authentication
- B. Administration
- C. Accounting
- D. Authorization

Answer: B

Explanation: Radius, TACACS and DIAMETER are classified as authentication, authorization, and accounting (AAA) servers.

Source: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 2, 2001, CRC Press, NY, Page 33

also see:

The term "AAA" is often used, describing cornerstone concepts [of the AIC triad] Authentication, Authorization, and Accountability. Left out of the AAA acronym is Identification which is required before the three "A's" can follow. Identity is a claim, Authentication proves an identity, Authorization describes the action you can perform on a system once you have been identified and authenticated, and accountability holds users accountable for their actions.

Reference: CISSP Study Guide, Conrad Misenar, Feldman p. 10-11, (c) 2010 Elsevier.

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### QUESTION 197

Which of the following protocol was used by the INITIAL version of the Terminal Access Controller

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Access Control System TACACS for communication between clients and servers?

- A. TCP
- B. SSL
- C. UDP
- D. SSH

Answer: C

Explanation: The original TACACS, developed in the early ARPANet days, had very limited functionality and used the UDP transport. In the early 1990s, the protocol was extended to include additional functionality and the transport changed to TCP.

TACACS is defined in RFC 1492, and uses (either TCP or UDP) port 49 by default. TACACS allows a client to accept a username and password and send a query to a TACACS authentication server, sometimes called a TACACS daemon or simply TACACSD. TACACSD uses TCP and usually runs on port 49. It would determine whether to accept or deny the authentication request and send a response back.

#### TACACS+

TACACS+ and RADIUS have generally replaced TACACS and XTACACS in more recently built or updated networks. TACACS+ is an entirely new protocol and is not compatible with TACACS or XTACACS. TACACS+ uses the Transmission Control Protocol (TCP) and RADIUS uses the User Datagram Protocol (UDP). Since TCP is connection oriented protocol, TACACS+ does not have to implement transmission control. RADIUS, however, does have to detect and correct transmission errors like packet loss, timeout etc. since it rides on UDP which is connectionless.

RADIUS encrypts only the users' password as it travels from the RADIUS client to RADIUS server. All other information such as the username, authorization, accounting are transmitted in clear text. Therefore it is vulnerable to different types of attacks. TACACS+ encrypts all the information mentioned above and therefore does not have the vulnerabilities present in the RADIUS protocol. RADIUS and TACACS + are client/ server protocols, which means the server portion cannot send unsolicited commands to the client portion. The server portion can only speak when spoken to. Diameter is a peer-based protocol that allows either end to initiate communication. This functionality allows the Diameter server to send a message to the access server to request the user to provide another authentication credential if she is attempting to access a secure resource.

Reference(s) used for this question:

<http://en.wikipedia.org/wiki/TACACS>

and

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 239). McGraw-Hill. Kindle Edition.

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### QUESTION 198

Which of the following can best eliminate dial-up access through a Remote Access Server as a hacking vector?

- A. Using a TACACS+ server.
- B. Installing the Remote Access Server outside the firewall and forcing legitimate users to authenticate to the firewall.

- 
- C. Setting modem ring count to at least 5
  - D. Only attaching modems to non-networked hosts.

Answer: B

Explanation: Containing the dial-up problem is conceptually easy: by installing the Remote Access Server outside the firewall and forcing legitimate users to authenticate to the firewall, any access to internal resources through the RAS can be filtered as would any other connection coming from the Internet.

The use of a TACACS+ Server by itself cannot eliminate hacking.

Setting a modem ring count to 5 may help in defeating war-dialing hackers who look for modem by dialing long series of numbers.

Attaching modems only to non-networked hosts is not practical and would not prevent these hosts from being hacked.

Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 2: Hackers.

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### QUESTION 199

In the Bell-LaPadula model, the Star-property is also called:

- A. The simple security property
- B. The confidentiality property
- C. The confinement property
- D. The tranquility property

Answer: C

Explanation: The Bell-LaPadula model focuses on data confidentiality and access to classified information, in contrast to the Biba Integrity Model which describes rules for the protection of data integrity.

In this formal model, the entities in an information system are divided into subjects and objects.

The notion of a "secure state" is defined, and it is proven that each state transition preserves security by moving from secure state to secure state, thereby proving that the system satisfies the security objectives of the model.

The Bell-LaPadula model is built on the concept of a state machine with a set of allowable states in a system. The transition from one state to another state is defined by transition functions.

A system state is defined to be "secure" if the only permitted access modes of subjects to objects are in accordance with a security policy.

To determine whether a specific access mode is allowed, the clearance of a subject is compared to the classification of the object (more precisely, to the combination of classification and set of compartments, making up the security level) to determine if the subject is authorized for the specific access mode.

The clearance/classification scheme is expressed in terms of a lattice. The model defines two mandatory access control (MAC) rules and one discretionary access control (DAC) rule with three security properties:

The Simple Security Property - a subject at a given security level may not read an object at a

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higher security level (no read-up).

The \*-property (read "star"-property) - a subject at a given security level must not write to any object at a lower security level (no write-down). The \*-property is also known as the Confinement property.

The Discretionary Security Property - use an access control matrix to specify the discretionary access control.

The transfer of information from a high-sensitivity document to a lower-sensitivity document may happen in the Bell-LaPadula model via the concept of trusted subjects. Trusted Subjects are not restricted by the \*-property. Untrusted subjects are.

Trusted Subjects must be shown to be trustworthy with regard to the security policy. This security model is directed toward access control and is characterized by the phrase: "no read up, no write down." Compare the Biba model, the Clark-Wilson model and the Chinese Wall.

With Bell-LaPadula, users can create content only at or above their own security level (i.e. secret researchers can create secret or top-secret files but may not create public files; no write-down).

Conversely, users can view content only at or below their own security level (i.e. secret researchers can view public or secret files, but may not view top-secret files; no read-up).

#### Strong \* Property

The Strong \* Property is an alternative to the \*-Property in which subjects may write to objects with only a matching security level. Thus, the write-up operation permitted in the usual \*-Property is not present, only a write-to-same level operation. The Strong \* Property is usually discussed in the context of multilevel database management systems and is motivated by integrity concerns.

#### Tranquility principle

The tranquility principle of the Bell-LaPadula model states that the classification of a subject or object does not change while it is being referenced. There are two forms to the tranquility principle: the "principle of strong tranquility" states that security levels do not change during the normal operation of the system and the "principle of weak tranquility" states that security levels do not change in a way that violates the rules of a given security policy.

Another interpretation of the tranquility principles is that they both apply only to the period of time during which an operation involving an object or subject is occurring. That is, the strong tranquility principle means that an object's security level/label will not change during an operation (such as read or write); the weak tranquility principle means that an object's security level/label may change in a way that does not violate the security policy during an operation.

Reference(s) used for this question:

[http://en.wikipedia.org/wiki/Biba\\_Model](http://en.wikipedia.org/wiki/Biba_Model)

[http://en.wikipedia.org/wiki/Mandatory\\_access\\_control](http://en.wikipedia.org/wiki/Mandatory_access_control)

[http://en.wikipedia.org/wiki/Discretionary\\_access\\_control](http://en.wikipedia.org/wiki/Discretionary_access_control)

[http://en.wikipedia.org/wiki/Clark-Wilson\\_model](http://en.wikipedia.org/wiki/Clark-Wilson_model)

[http://en.wikipedia.org/wiki/Brewer\\_and\\_Nash\\_model](http://en.wikipedia.org/wiki/Brewer_and_Nash_model)

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## QUESTION 200

An attack initiated by an entity that is authorized to access system resources but uses them in a way not approved by those who granted the authorization is known as a(n):

- A. active attack.
- B. outside attack.
- C. inside attack.

D. passive attack.

Answer: C

Explanation: An inside attack is an attack initiated by an entity inside the security perimeter, an entity that is authorized to access system resources but uses them in a way not approved by those who granted the authorization whereas an outside attack is initiated from outside the perimeter, by an unauthorized or illegitimate user of the system. An active attack attempts to alter system resources to affect their operation and a passive attack attempts to learn or make use of the information from the system but does not affect system resources.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000

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### QUESTION 201

Which of the following can be defined as a framework that supports multiple, optional authentication mechanisms for PPP, including cleartext passwords, challenge-response, and arbitrary dialog sequences?

- A. Extensible Authentication Protocol
- B. Challenge Handshake Authentication Protocol
- C. Remote Authentication Dial-In User Service
- D. Multilevel Authentication Protocol.

Answer: A

Explanation: RFC 2828 (Internet Security Glossary) defines the Extensible Authentication Protocol as a framework that supports multiple, optional authentication mechanisms for PPP, including cleartext passwords, challenge-response, and arbitrary dialog sequences. It is intended for use primarily by a host or router that connects to a PPP network server via switched circuits or dial-up lines. The Remote Authentication Dial-In User Service (RADIUS) is defined as an Internet protocol for carrying dial-in user's authentication information and configuration information between a shared, centralized authentication server and a network access server that needs to authenticate the users of its network access ports. The other option is a distracter.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000

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### QUESTION 202

What is the name of the first mathematical model of a multi-level security policy used to define the concept of a secure state, the modes of access, and rules for granting access?

- A. Clark and Wilson Model
- B. Harrison-Ruzzo-Ullman Model
- C. Rivest and Shamir Model
- D. Bell-LaPadula Model

Answer: D

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

**QUESTION 203**

What is the PRIMARY use of a password?

- A. Allow access to files.
- B. Identify the user.
- C. Authenticate the user.
- D. Segregate various user's accesses.

Answer: C

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

**QUESTION 204**

The three classic ways of authenticating yourself to the computer security software are: something you know, something you have, and something:

- A. you need.
- B. you read.
- C. you are.
- D. you do.

Answer: C

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

**QUESTION 205**

An access system that grants users only those rights necessary for them to perform their work is operating on which security principle?

- A. Discretionary Access
- B. Least Privilege
- C. Mandatory Access
- D. Separation of Duties

Answer: B

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

**QUESTION 206**

Pin, Password, Passphrases, Tokens, smart cards, and biometric devices are all items that can be used for Authentication. When one of these item listed above in conjunction with a second factor to validate authentication, it provides robust authentication of the individual by practicing which of the following?

- A. Multi-party authentication

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- B. Two-factor authentication
  - C. Mandatory authentication
  - D. Discretionary authentication

Answer: B

Explanation: Once an identity is established it must be authenticated. There exist numerous technologies and implementation of authentication methods however they almost all fall under three major areas.

There are three fundamental types of authentication:

Authentication by knowledge—something a person knows

Authentication by possession—something a person has

Authentication by characteristic—something a person is

Logical controls related to these types are called “factors.”

Something you know can be a password or PIN, something you have can be a token fob or smart card, and something you are is usually some form of biometrics.

Single-factor authentication is the employment of one of these factors, two-factor authentication is using two of the three factors, and three-factor authentication is the combination of all three factors.

The general term for the use of more than one factor during authentication is multifactor authentication or strong authentication.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 2367-2379). Auerbach Publications. Kindle Edition.

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### QUESTION 207

What would you call a network security control deployed in line to detects, alerts, and takes action when a possible intrusion is detected.

- A. Application Based Instrusion Detection Systems (AIDS)
- B. Network Based Intrusion Detection System (NIDS)
- C. Intrusion Prevention System (IPS)
- D. Host Based Intrusion Detection System (HIDS)

Answer: C

Explanation: IPS is a preventive and proactive mechanism whereas an IDS is detective and after the fact technology.

The following answers are incorrect:

HIDS, NIDS, AIDS are all type of Intrusion Detective Systems.

HIDS: Host Based Intrusion Detection System

HIDS is a software cluster that consists of an auditor for the file system, log file analyzers, an operating system monitor, and a monitor for software changes. HIDS are used to supplement NIDS. NIDS cannot make sense of encrypted traffic but the HIDS might be able to detect that suspicious activities are taking place after the decryption took place.

NIDS: Network Based Intrusion Detection System

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NIDS software is used mostly for analyzing network activities. The NIDS will analyze ALL the traffic to identify any pattern that might indicate that an attack might be attempted.

AIDS: Application BASED Instruction Detection System

The most popular non-commercial AIDS tools are honeypots. A honeypot is network services emulation software that allows system administrators to monitor an intruder's actions. For Web applications, mod\_security, an open source intrusion detection and prevention engine, is very popular AIDS software. Operating as an Apache Web server module, mod\_security examines HTTP queries to protect Web applications from known and sometimes unknown attacks.

The following reference(s) were/was used to create this question:

Shon Harris AIO 4th Edition page 260 from Access Control.

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### QUESTION 208

What is a security policy?

- A. High level statements on management's expectations that must be met in regards to security
- B. A policy that defines authentication to the network.
- C. A policy that focuses on ensuring a secure posture and expresses management approval. It explains in detail how to implement the requirements.
- D. A statement that focuses on the authorization process for a system

Answer: A

Explanation: A statement on the expectations that must be met to be considered compliant. This is because a policy is a broad statement that management has approved of and stands behind to express the security expectations for the organization.

The following answers are incorrect:

A statement that focuses on the authorization process for a system is incorrect because although authorization might be an important element for meeting security policies, it is not the only focus. A policy that defines authentication to the network is incorrect because authentication to the network is only one aspect of an entire security concern. The policy must also focus on more than the network and more than on authentication.

A policy that focuses on ensuring a secure posture and expresses management approval. It explains in detail how to implement the requirements is incorrect due to the "explain in detail" portion. A policy is a statement, it does not deal with specifics.

The following reference(s) were/was used to create this question:

Shon Harris, Latest All in Once CISSP Exam Prep p227; also ISC2 Official Guide to the CISSP Exam, p82

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### QUESTION 209

Legacy single sign on (SSO) is:

- A. Technology to allow users to authenticate to every application by entering the same user ID and password each time, thus having to remember only a single password.
- B. Technology to manage passwords consistently across multiple platforms, enforcing policies such as password change intervals.
- C. A mechanism where users can authenticate themselves once, and then a central repository of

- 
- their credentials is used to launch various legacy applications.
- D. Another way of referring to SESAME and KryptoKnight, now that Kerberos is the de-facto industry standard single sign on mechanism.

Answer: C

Explanation: A mechanism where users can authenticate themselves once, and then a central repository of their credentials is used to launch various legacy applications.

The following answers are incorrect:

Technology to allow users to authenticate to every application by entering the same user ID and password each time, thus having to remember only a single password.

This is a detractor. Note that it is not even a descriptor of SSO, because the user is entering user ID and password for EACH access attempt.

Technology to manage passwords consistently across multiple platforms, enforcing policies such as password change intervals.

This is a good description for Identity Management Password Management system, but not for Legacy SSO.

Another way of referring to SESAME and KryptoKnight, now that Kerberos is the de-facto industry standard single sign on mechanism. This is a detractor.

The following reference(s) were/was used to create this question:

Official (ISC)2 Guide to the CISSP CBK 2007, pg 176:

"many legacy systems do not support an external means to identify and authenticate users.

Therefore, it is possible to store the credentials outside of the various applications and have them automatically entered on behalf of the user when an application is launched."

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## QUESTION 210

Identity Management solutions include such technologies as Directories services, Single Sign-On and Web Access management. There are many reasons for management to choose an identity management solution.

Which of the following is a key management challenge regarding identity management solutions?

- A. Increasing the number of points of failures.
- B. Users will no longer be able to "recycle" their password for different applications.
- C. Costs increase as identity management technologies require significant resources.
- D. It must be able to scale to support high volumes of data and peak transaction rates.

Answer: D

Explanation: Any identity management system used in an environment where there are tens of thousands of users must be able to scale to support the volumes of data and peak transaction rates.

The following answers are incorrect:

Increasing number of points of failures.

This is actually a potential negative impact of not implementing an identity management solution. Identity management is meant to decrease cost and inefficiencies that organizations struggle with so that failures can be managed more efficiently.

Users will no longer be able to “recycle” their password for different applications. This is actually a function of an effective password management system. Consistency and efficiency are maintained by minimizing unique user authentication requirements. Costs increase as identity management technologies require significant resources. On the contrary, "When users access multiple systems, they may be presented with multiple log-in IDs, multiple passwords, and multiple sign-on screens. This complexity is burdensome to users, who consequently have problems accessing systems and incur productivity and support costs. The following reference(s) were/was used to create this question:

ISC2 Official Guide to the CISSP CBK 2007, pg 173

"Key management challenges regarding identity management solutions are:" [consistency, efficiency, usability, reliability and scalability.] "Scalability: Enterprises manage user profile data for large numbers of people. There are typically tens of thousands of internal users, and hundreds or thousands of partners or clients."

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### QUESTION 211

Which of the following describes the sequence of steps required for a Kerberos session to be established between a user (Principal P1), and an application server (Principal P2)?

- A. Principals P1 and Principals P2 authenticate to the Key Distribution Center (KDC),
- B. Principal P1 receives a Ticket Granting Ticket (TGT), and then Principal P2 requests a service ticket from the KDC.
- C. Principal P1 authenticates to the Key Distribution Center(KDC), Principal P1 receives a Ticket Granting Ticket (TGT), and Principal P1 requests a service ticket from the Ticket Granting Service (TGS) in order to access the application server P2
- D. Principal P1 authenticates to the Key Distribution Center (KDC),
- E. Principal P1 requests a Ticket Granting Ticket (TGT) from the authentication server, and then Principal P1 requests a service ticket from the application server P2
- F. Principals P1 and P2 authenticate to the Key Distribution Center (KDC), Principal P1 requests a Ticket Granting Ticket (TGT) from the authentication server, and application server P2 requests a service ticket from P1

Answer: C

Explanation: Principles P1 and P2 authenticate to the Key Distribution Center (KDC), principle P1 receives a Ticket Granting Ticket (TGT), and principle P2 requests a service ticket from the KDC. The principle P2 does not request a service ticket. P1 would request a service ticket.

Principles P1 and P2 authenticate to the Key Distribution Center (KDC), principle P1 requests a Ticket Granting Ticket (TGT) from the authentication server, and application server P2 requests a service ticket from P1

A request by P1 to access P2 will fail without a service ticket, but this is not the best answer.

Principle P1 authenticates to the Key Distribution Center (KDC), principle P1 requests a Ticket Granting Ticket (TGT) from the authentication server, and principle P1 requests a service ticket from the application server P2

The request for a service ticket is made to the KDC, not to P2 P2 does not proxy authentication requests for the principle P1

The following reference(s) were/was used to create this question:

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Sybex CISSP Study Guide, Third Edition. pg 21

Kerberos logon process: User types in username and password, a symmetric key is derived from the password, the user sends a Kerberos Authentication request to KDC, which returns a TGT showing the user was identified.

"1) The client sends its TGT back to Ticket Granting Service (TGS) on the KDC with request for access to a server or service"

"3) A service ticket (ST) is granted and sent to the client. The service ticket includes a session key encrypted with the client symmetric key and also encrypted with the service or server symmetric key"

"4) The client sends the ST to the server or service host."

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### QUESTION 212

Which type of security control is also known as "Logical" control?

- A. Physical
- B. Technical
- C. Administrative
- D. Risk

Answer: B

Explanation: Physical: This is a type of security control, but does not have an alternate name.

Administrative: This is a type of security control, but does not have an alternate name.

Risk: This is not a type of security control.

The following reference(s) were/was used to create this question:

Shon Harris AIO 4th Edition, Chapter 3, Page 57

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### QUESTION 213

Which of the following term best describes a weakness that could potentially be exploited?

- A. Vulnerability
- B. Risk
- C. Threat
- D. Target of evaluation (TOE)

Answer: A

Explanation: A vulnerability is mostly a weakness, it could be a weakness in a piece of software, it could be a weakness in your physical security, it could take many forms. It is a weakness that could be exploited by a Threat. For example an open firewall port, a password that is never changed, or a flammable carpet. A missing Control is also considered to be a Vulnerability.

The following answers are incorrect:

Risk:

It is the combination of a threat exploiting some vulnerability that could cause harm to some asset. Management is concerned with many types of risk. Information Technology (IT) security risk management addresses risks that arise from an organization's use of information technology.

Usually a threat agent will give rise to the threat which will attempt to take advantage of one of your vulnerability.

Risk is a function of the likelihood that a threat scenario will materialize, its resulting impact (consequences) and the existence/effectiveness of safeguards. If the evaluation of the risk meets the risk deemed acceptable by management, nothing needs to be done. Situations where evaluation of the risk exceeds the accepted risk (target risk) will necessitate a risk management decision such as implementing a safeguard to bring the risk down to an acceptable level.

Threat:

Possibility that vulnerability may be exploited to cause harm to a system, environment, or personnel. Any potential danger. The risk level associated with a threat is evaluated by looking at the likelihood which is how often it could happen and the impact (which is how much exposure or lost you would suffer) it would have on the asset. A low impact threat that repeats itself multiple times would have to be addressed. A high impact threat that happens not very often would have to be addressed as well.

Target of evaluation:

The term Target of evaluation is a term used under the common criteria evaluation scheme. It defines the product being evaluated. It was only a detractor in this case and it is not directly related to risk management.

Risk management info

Risk Management is an iterative process, which ensures that reasonable and cost-effective steps are taken to protect the:

Confidentiality of information stored, processed, or transmitted electronically

Integrity of the information and related processes

Availability of the information, systems and services against accidental and deliberate threats

Value of the asset and the cost of its replacement if it is compromised

You can manage risk by:

Confirming the appropriateness of minimum standards

Supplementing the standards when necessary

Eliminating unnecessary expenditures and administrative barriers

Managing risk therefore, means defining:

What is at risk

Magnitude of the risk

Causal factors

What to do about the risk

The following reference(s) were/was used to create this question:

[http://www.cse-cst.gc.ca/tutorials/english/section2/m2/index\\_e.htm](http://www.cse-cst.gc.ca/tutorials/english/section2/m2/index_e.htm)

and

The official CEH courseware Version 6 Module 1

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## QUESTION 214

Which of the following best describes an exploit?

- A. An intentional hidden message or feature in an object such as a piece of software or a movie.
- B. A chunk of data, or sequence of commands that take advantage of a bug, glitch or vulnerability in order to cause unintended or unanticipated behavior to occur on computer software
- C. An anomalous condition where a process attempts to store data beyond the boundaries of a

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fixed-length buffer

D. A condition where a program (either an application or part of the operating system) stops performing its expected function and also stops responding to other parts of the system

Answer: B

Explanation: The following answers are incorrect:

An intentional hidden message or feature in an object such as a piece of software or a movie.

This is the definition of an "Easter Egg" which is code within code. A good example of this was a small flight simulator that was hidden within Microsoft Excel. If you know which cell to go to on your spreadsheet and the special code to type in that cell, you were able to run the flight simulator.

An anomalous condition where a process attempts to store data beyond the boundaries of a fixedlength buffer

This is the definition of a "Buffer Overflow". Many pieces of exploit code may contain some buffer overflow code but considering all the choices presented this was not the best choice. It is one of the vulnerability that the exploit would take care of if no data input validation is taking place within the software that you are targeting.

A condition where a program (either an application or part of the operating system) stops performing its expected function and also stops responding to other parts of the system

This is the definition of a "System Crash". Such behavior might be the result of exploit code being launched against the target.

The following reference(s) were/was used to create this question:

[http://en.wikipedia.org/wiki/Main\\_Page](http://en.wikipedia.org/wiki/Main_Page)

and

The official CEH courseware Version 6 Module 1

The Official CEH Courseware Version 7 Module 1

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### QUESTION 215

A smart Card that has two chips with the Capability of utilizing both Contact and Contactless formats is called:

- A. Contact Smart Cards
- B. Contactless Smart Cards
- C. Hybrid Cards
- D. Combi Cards

Answer: C

Explanation: This is a contactless smart card that has two chips with the capability of utilizing both contact and contactless formats.

Two additional categories of cards are dual-interface cards and hybrid cards which is mentioned above.

Hybrid Card

A hybrid card has two chips, one with a contact interface and one with a contactless interface. The two chips are not interconnected.

Dual-Interface card

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Do not confuse this card with the Hybrid Card. This one has only one chip. A dual-interface card has a single chip with both contact and contactless interfaces. With dual-interface cards, it is possible to access the same chip using either a contact or contactless interface with a very high level of security.

#### Inner working of the cards

The chips used in all of these cards fall into two categories as well: microcontroller chips and memory chips. A memory chip is like a small floppy disk with optional security. Memory chips are less expensive than microcontrollers but with a corresponding decrease in data management security. Cards that use memory chips depend on the security of the card reader for processing and are ideal for situations that require low or medium security.

A microcontroller chip can add, delete, and otherwise manipulate information in its memory. A microcontroller is like a miniature computer, with an input/output port, operating system, and hard disk. Smart cards with an embedded microcontroller have the unique ability to store large amounts of data, carry out their own on-card functions (e.g., encryption and digital signatures) and interact intelligently with a smart card reader.

The selection of a particular card technology is driven by a variety of issues, including:

Application dynamics

Prevailing market infrastructure

Economics of the business model

Strategy for shared application cards

Smart cards are used in many applications worldwide, including:

Secure identity applications - employee ID badges, citizen ID documents, electronic passports, driver's licenses, online authentication devices

Healthcare applications - citizen health ID cards, physician ID cards, portable medical records cards

Payment applications - contact and contactless credit/debit cards, transit payment cards

Telecommunications applications - GSM Subscriber Identity Modules, pay telephone payment cards

The following answers are incorrect:

Contact Smart Cards

A contact smart card must be inserted into a smart card reader with a direct connection to a conductive contact plate on the surface of the card (typically gold plated). Transmission of commands, data, and card status takes place over these physical contact points.

Contactless Smart Cards

A contactless card requires only close proximity to a reader. Both the reader and the card have antennae, and the two communicate using radio frequencies (RF) over this contactless link. Most contactless cards also derive power for the internal chip from this electromagnetic signal. The range is typically one-half to three inches for non-battery-powered cards, ideal for applications such as building entry and payment that require a very fast card interface.

Combi Card

Are similar to Hybrid cards only they contain only one set of circuitry as opposed to two.

The following reference(s) were/was used to create this question:

Smart Card Primer at: <http://www.smartcardalliance.org/pages/smart-cards-intro-primer>

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## QUESTION 216

An employee ensures all cables are shielded, builds concrete walls that extend from the true floor

to the true ceiling and installs a white noise generator. What attack is the employee trying to protect against?

- A. Emanation Attacks
- B. Social Engineering
- C. Object reuse
- D. Wiretapping

Answer: A

Explanation: :

Emanation attacks are the act of intercepting electrical signals that radiate from computing equipment. There are several countermeasures including shielding cabling, white noise, control zones, and TEMPEST equipment (this is a Faraday cage around the equipment)

The following answers were incorrect:

Social Engineering: Social Engineering does not involve hardware. A person make use of his/her social skills in order to trick someone into revealing information they should not disclose.

Object Reuse: It is related to the reuse of storage medias. One must ensure that the storage media has been sanitized properly before it would be reuse for other usage. This is very important when computer equipment is discarded or given to a local charity organization. Ensure there is no sensitive data left by degaussing the device or overwriting it multiple times.

Wiretapping: It consist of legally or illegally taping into someone else phone line to eavesdrop on their communication.

The following reference(s) were/was used to create this question:

Shon Harris AIO 4th Edition

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## QUESTION 217

The best technique to authenticate to a system is to:

- A. Establish biometric access through a secured server or Web site.
- B. Ensure the person is authenticated by something he knows and something he has.
- C. Maintain correct and accurate ACLs (access control lists) to allow access to applications.
- D. Allow access only through user ID and password.

Answer: B

Explanation: Something you know and something you have is two authentication factors and is better than a single authentication factor. Strong Authentication or Two Factor Authentication is widely accepted as the best practice for authentication.

There are three type of authentication factors:

Type 1 - Something you know (password, pin)

Type 2 - Something you have (token, smart card, magnetic card)

Type 3 - Something you are (biometrics)

Whenever two of the three types of factors are used together, this is called strong authentication or two factors authentication

The following answers are incorrect:

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Establish biometric access through a secured server or Web site:

This is a single factor authentication and it could be weaker than two factors, in most cases it is .

Biometric devices can be tricked or circumvented in some cases, this is why they MUST be supplemented with a second factor of authentication. Multiple attacks have been done on different types of biometric devices. Two factors is always the best to authenticate a user.

Maintain correct and accurate ACLs (access control lists) to allow access to applications:

ACL are attached to objects. They are used within the access control matrix to define what level of access each of the subjects have on the object. It is a column within the Access Control matrix.

This is related to authorization and not authentication.

Allow access only through user ID and password:

This is once again a single factor of authentication because both are something the person knows.

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### QUESTION 218

Business Impact Analysis (BIA) is about

- A. Technology
- B. Supporting the mission of the organization
- C. Due Care
- D. Risk Assessment

Answer: B

Explanation: Business impact analysis is not about technology ; it is about supporting the mission of the organization.

The following answers are incorrect:

Technology

Due Care

Risk Assessment

The following reference(s) were/was used to create this question:

Information Security Management Handbook , Sixth Edition by Tipton & Al page 321

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### QUESTION 219

You wish to make use of "port knocking" technologies. How can you BEST explain this?

- A. Port knocking is where the client will attempt to connect to a predefined set of ports to identify him as an authorized client.
- B. Port knocking is where the user calls the server operator to have him start the service he wants to connect to.
- C. This is where all the ports are open on the server and the connecting client scans the open port to which he wants to connect to see if it's open and running.
- D. Port knocking is where the port sequence is encrypted with 3DES and only the server has the other key to decrypt the port sequence.

Answer: A

Explanation: The other answers are incorrect

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The following reference(s) were/was used to create this question:  
<http://www.portknocking.org/>

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### QUESTION 220

Tim is a network administrator of Acme inc. He is responsible for configuring the network devices. John the new security manager reviews the configuration of the Firewall configured by Tim and identifies an issue. This specific firewall is configured in failover mode with another firewall. A sniffer on a PC connected to the same switch as the firewalls can decipher the credentials, used by Tim while configuring the firewalls. Which of the following should be used by Tim to ensure that no one can eavesdrop on the communication?

- A. SSH
- B. SFTP
- C. SCP
- D. RSH

Answer: A

Explanation: The SSH protocol provides an encrypted terminal session to the remote firewalls. By encrypting the data, it prevents sniffing attacks using a protocol analyzer also called a sniffer. With more and more computers installed in networked environments, it often becomes necessary to access hosts from a remote location. This normally means that a user sends login and password strings for authentication purposes. As long as these strings are transmitted as plain text, they could be intercepted and misused to gain access to that user account without the authorized user even knowing about it.

Apart from the fact that this would open all the user's files to an attacker, the illegal account could be used to obtain administrator or root access or to penetrate other systems. In the past, remote connections were established with telnet, which offers no guards against eavesdropping in the form of encryption or other security mechanisms. There are other unprotected communication channels, like the traditional FTP protocol and some remote copying programs.

The SSH suite provides the necessary protection by encrypting the authentication strings (usually a login name and a password) and all the other data exchanged between the hosts. With SSH, the data flow could still be recorded by a third party, but the contents are encrypted and cannot be reverted to plain text unless the encryption key is known. So SSH enables secure communications over insecure networks such as the Internet.

The following answers are incorrect:

SCP and SFTP

The SCP protocol is a network protocol that supports file transfers. The SCP protocol, which runs on port 22, is based on the BSD RCP protocol which is tunneled through the Secure Shell (SSH) protocol to provide encryption and authentication. SCP might not even be considered a protocol itself, but merely a combination of RCP and SSH. The RCP protocol performs the file transfer and the SSH protocol performs authentication and encryption. SCP protects the authenticity and confidentiality of the data in transit. It hinders the ability for packet sniffers to extract usable information from the data packets.

The SCP protocol has been superseded by the more comprehensive SFTP protocol, which is also based on SSH.

## RSH

RSH© allows a user to execute commands on a remote system without having to log in to the system. For example, RSH can be used to remotely examine the status of a number of access servers without connecting to each communication server, executing the command, and then disconnecting from the communication server.

As described in the rlogin article, the rsh protocol is not secure for network use, because it sends unencrypted information over the network, among other things. Some implementations also authenticate by sending unencrypted passwords over the network. rsh has largely been replaced by the very similar SSH (secure shell) program on untrusted networks like the internet.

As an example of RSH use, the following executes the command mkdir testdir as user remote user on the computer remote computer:

```
rsh -l remote user remote computer "mkdir testdir"
```

After the command has finished RSH terminates. If no command is specified then rsh will log in on the remote system using rlogin.

The following reference(s) were/was used to create this question:

<http://www.novell.com/documentation/suse91/suselinux-adminguide/html/ch19s02html>

and

[http://en.wikipedia.org/wiki/Remote\\_Shell](http://en.wikipedia.org/wiki/Remote_Shell)

and

[http://en.wikipedia.org/wiki/Secure\\_copy](http://en.wikipedia.org/wiki/Secure_copy)

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## QUESTION 221

Tim's day to day responsibilities include monitoring health of devices on the network. He uses a Network Monitoring System supporting SNMP to monitor the devices for any anomalies or high traffic passing through the interfaces. Which of the protocols would be BEST to use if some of the requirements are to prevent easy disclosure of the SNMP strings and authentication of the source of the packets?

- A. UDP
- B. SNMP V1
- C. SNMP V3
- D. SNMP V2

Answer: C

Explanation: Simple Network Management Protocol (SNMP) is an Internet-standard protocol for managing devices on IP networks. Devices that typically support SNMP include routers, switches, servers, workstations, printers, modem racks, and more. It is used mostly in network management systems to monitor network-attached devices for conditions that warrant administrative attention. SNMP is a component of the Internet Protocol Suite as defined by the Internet Engineering Task Force (IETF).

### SNMP V3

Although SNMPv3 makes no changes to the protocol aside from the addition of cryptographic security, it looks much different due to new textual conventions, concepts, and terminology.

SNMPv3 primarily added security and remote configuration enhancements to SNMP.

Security has been the biggest weakness of SNMP since the beginning. Authentication in SNMP

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Versions 1 and 2 amounts to nothing more than a password (community string) sent in clear text between a manager and agent. Each SNMPv3 message contains security parameters which are encoded as an octet string. The meaning of these security parameters depends on the security model being used.

SNMPv3 provides important security features:

Confidentiality - Encryption of packets to prevent snooping by an unauthorized source.

Integrity - Message integrity to ensure that a packet has not been tampered with in transit including an optional packet replay protection mechanism.

Authentication - to verify that the message is from a valid source.

The following answers are incorrect:

UDP

SNMP can make use of the User Datagram Protocol (UDP) protocol but the UDP protocol by itself is not use for network monitoring.

SNMP V1

SNMP version 1 (SNMPv1) is the initial implementation of the SNMP protocol. SNMPv1 operates over protocols such as User Datagram Protocol (UDP), Internet Protocol (IP), OSI Connectionless Network Service (CLNS), AppleTalk Datagram-Delivery Protocol (DDP), and Novell Internet Packet Exchange (IPX). SNMPv1 is widely used and is the de facto network-management protocol in the Internet community.

SNMP V2

SNMPv2 (RFC 1441–RFC 1452), revises version 1 and includes improvements in the areas of performance, security, confidentiality, and manager-to-manager communications. It introduced GetBulkRequest, an alternative to iterative GetNextRequests for retrieving large amounts of management data in a single request. However, the new party-based security system in SNMPv2, viewed by many as overly complex, was not widely accepted.

The following reference(s) were/was used to create this question:

[http://en.wikipedia.org/wiki/Simple\\_Network\\_Management\\_Protocol](http://en.wikipedia.org/wiki/Simple_Network_Management_Protocol)

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 587). McGraw-Hill. Kindle Edition.

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 7434-7436). Auerbach Publications. Kindle Edition.

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## QUESTION 222

You have been approached by one of your clients . They are interested in doing some security reengineering . The client is looking at various information security models. It is a highly secure environment where data at high classifications cannot be leaked to subjects at lower classifications . Of primary concern to them, is the identification of potential covert channel. As an Information Security Professional , which model would you recommend to the client?

- A. Information Flow Model combined with Bell Lapadula
- B. Bell Lapadula
- C. Biba
- D. Information Flow Model

Answer: A

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Explanation: Securing the data manipulated by computing systems has been a challenge in the past years. Several methods to limit the information disclosure exist today, such as access control lists, firewalls, and cryptography. However, although these methods do impose limits on the information that is released by a system, they provide no guarantees about information propagation. For example, access control lists of file systems prevent unauthorized file access, but they do not control how the data is used afterwards. Similarly, cryptography provides a means to exchange information privately across a non-secure channel, but no guarantees about the confidentiality of the data are given once it is decrypted.

In low level information flow analysis, each variable is usually assigned a security level. The basic model comprises two distinct levels: low and high, meaning, respectively, publicly observable information, and secret information. To ensure confidentiality, flowing information from high to low variables should not be allowed. On the other hand, to ensure integrity, flows to high variables should be restricted.

More generally, the security levels can be viewed as a lattice with information flowing only upwards in the lattice.

#### Noninterference Models

This could have been another good answer as it would help in minimizing the damage from covert channels.

The goal of a noninterference model is to help ensure that high-level actions (inputs) do not determine what low-level user s can see (outputs ). Most of the security models presented are secured by permitting restricted ows between high- and low-level users. The noninterference model maintains activities at different security levels to separate these levels from each other. In this way, it minimizes leakages that may happen through covert channels, because there is complete separation (noninterference) between security levels. Because a user at a higher security level has no way to interfere with the activities at a lower level, the lower-level user cannot get any information from the higher leve.

The following answers are incorrect:

#### Bell Lapadula

The Bell-LaPadula Model (abbreviated BLP) is a state machine model used for enforcing access control in government and military applications. It was developed by David Elliott Bell and Leonard J. LaPadula, subsequent to strong guidance from Roger R. Schell to formalize the U.S.

Department of Defense (DoD) multilevel security (MLS) policy. The model is a formal state transition model of computer security policy that describes a set of access control rules which use security labels on objects and clearances for subjects. Security labels range from the most sensitive (e.g. "Top Secret"), down to the least sensitive (e.g., "Unclassified" or "Public").

The Bell–LaPadula model focuses on data confidentiality and controlled access to classified information, in contrast to the Biba Integrity Model which describes rules for the protection of data integrity. In this formal model, the entities in an information system are divided into subjects and objects. The notion of a "secure state" is defined, and it is proven that each state transition preserves security by moving from secure state to secure state, thereby inductively proving that the system satisfies the security objectives of the model. The Bell–LaPadula model is built on the concept of a state machine with a set of allowable states in a computer network system. The transition from one state to another state is defined by transition functions.

A system state is defined to be "secure" if the only permitted access modes of subjects to objects are in accordance with a security policy. To determine whether a specific access mode is allowed, the clearance of a subject is compared to the classification of the object (more precisely, to the

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combination of classification and set of compartments, making up the security level) to determine if the subject is authorized for the specific access mode. The clearance/classification scheme is expressed in terms of a lattice. The model defines two mandatory access control (MAC) rules and one discretionary access control (DAC) rule with three security properties:

The Simple Security Property - a subject at a given security level may not read an object at a higher security level (no read-up).

The *-property* (read "star"-property) - a subject at a given security level must not write to any object at a lower security level (no write-down). The *-property* is also known as the Confinement property.

The Discretionary Security Property - use of an access matrix to specify the discretionary access control.

The transfer of information from a high-sensitivity document to a lower-sensitivity document may happen in the Bell–LaPadula model via the concept of trusted subjects. Trusted Subjects are not restricted by the *-property*. Untrusted subjects are. Trusted Subjects must be shown to be trustworthy with regard to the security policy. This security model is directed toward access control and is characterized by the phrase: "no read up, no write down."

With Bell-LaPadula, users can create content only at or above their own security level (i.e. secret researchers can create secret or top-secret files but may not create public files; no write-down).

Conversely, users can view content only at or below their own security level (i.e. secret researchers can view public or secret files, but may not view top-secret files; no read-up).

The Bell–LaPadula model explicitly defined its scope. It did not treat the following extensively: Covert channels. Passing information via pre-arranged actions was described briefly.

Networks of systems. Later modeling work did address this topic.

Policies outside multilevel security. Work in the early 1990s showed that MLS is one version of boolean policies, as are all other published policies.

#### Biba

The Biba Model or Biba Integrity Model developed by Kenneth J. Biba in 1977, is a formal state transition system of computer security policy that describes a set of access control rules designed to ensure data integrity. Data and subjects are grouped into ordered levels of integrity. The model is designed so that subjects may not corrupt objects in a level ranked higher than the subject, or be corrupted by objects from a lower level than the subject.

In general the model was developed to circumvent a weakness in the Bell–LaPadula model which only addresses data confidentiality.

In general, preservation of data integrity has three goals:

Prevent data modification by unauthorized parties

Prevent unauthorized data modification by authorized parties

Maintain internal and external consistency (i.e. data reflects the real world)

Note: Biba address only the first goal of integrity while Clark-Wilson addresses all three

This security model is directed toward data integrity (rather than confidentiality) and is characterized by the phrase: "no read down, no write up". This is in contrast to the Bell-LaPadula model which is characterized by the phrase "no write down, no read up".

In the Biba model, users can only create content at or below their own integrity level (a monk may write a prayer book that can be read by commoners, but not one to be read by a high priest).

Conversely, users can only view content at or above their own integrity level (a monk may read a book written by the high priest, but may not read a pamphlet written by a lowly commoner).

Another analogy to consider is that of the military chain of command. A General may write orders

to a Colonel, who can issue these orders to a Major. In this fashion, the General's original orders are kept intact and the mission of the military is protected (thus, "no read down" integrity).

Conversely, a Private can never issue orders to his Sergeant, who may never issue orders to a Lieutenant, also protecting the integrity of the mission ("no write up").

The Biba model defines a set of security rules similar to the Bell-LaPadula model. These rules are the reverse of the Bell-LaPadula rules:

The Simple Integrity Axiom states that a subject at a given level of integrity must not read an object at a lower integrity level (no read down).

The \* (star) Integrity Axiom states that a subject at a given level of integrity must not write to any object at a higher level of integrity (no write up).

#### Lattice Model

In computer security, lattice-based access control (LBAC) is a complex access control model based on the interaction between any combination of objects (such as resources, computers, and applications) and subjects (such as individuals, groups or organizations).

In this type of label-based mandatory access control model, a lattice is used to define the levels of security that an object may have and that a subject may have access to. The subject is only allowed to access an object if the security level of the subject is greater than or equal to that of the object.

Mathematically, the security level access may also be expressed in terms of the lattice (a partial order set) where each object and subject have a greatest lower bound (meet) and least upper bound (join) of access rights. For example, if two subjects A and B need access to an object, the security level is defined as the meet of the levels of A and B. In another example, if two objects X and Y are combined, they form another object Z, which is assigned the security level formed by the join of the levels of X and Y.

The following reference(s) were/was used to create this question:

ISC2 Review Seminar Student Manual V800 page 255

Dorothy Denning developed the information flow model to address convert channels .

and

The ISC2 Official Study Guide, Second Edition, on page 683-685

and

[https://secure.wikimedia.org/wikipedia/en/wiki/Biba\\_security\\_model](https://secure.wikimedia.org/wikipedia/en/wiki/Biba_security_model)

and

[https://secure.wikimedia.org/wikipedia/en/wiki/Bell%20LaPadula\\_model](https://secure.wikimedia.org/wikipedia/en/wiki/Bell%20LaPadula_model)

and

[https://secure.wikimedia.org/wikipedia/en/wiki/Lattice-based\\_access\\_control](https://secure.wikimedia.org/wikipedia/en/wiki/Lattice-based_access_control)

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### QUESTION 223

Which of the following is a reasonable response from the Intrusion Detection System (IDS) when it detects Internet Protocol (IP) packets where the IP source address and port is the same as the destination IP address and port?

- A. Allow the packet to be processed by the network and record the event
- B. Record selected information about the packets and drop the packets
- C. Resolve the destination address and process the packet
- D. Translate the source address and resend the packet

Answer: B

Explanation: This question refers specifically to the LAND Attack. This question is testing your ability to recognize common attacks such as the Land Attack and also your understanding of what would be an acceptable action taken by your Intrusion Detection System.

You must remember what is a LAND ATTACK for the purpose of the exam.

You must also remember that an IDS is not only a passive device. In the context of the exam it is considered an active device that is MOSTLY passive. It can take some blocking actions such as changing a rule on a router or firewall for example.

In the case of the Land Attack and this specific question. It must be understood that most Operating System TCP/IP stack today would not be vulnerable to such attack. Many of the common firewall could also drop any traffic with same Source IP/Port as the Destination IP/Port as well. So there is multiple layers where such an attack could be stopped.

The downfall of IDS compared with IPS is the fact they are usually reacting after the packets have been sent over the network. A single packet attack such as the Land Attack could be detected but would still complete and affect the destination target. This is where IPS could come into play and stop the attack before it completes.

Techtarget on their SearchSecurity website has the following definition for this type of attack:  
A land attack is a remote denial-of-service (DOS) attack caused by sending a packet to a machine with the source host/port the same as the destination host/port. This is a rather old attack and current patches should stop them for most systems. This is one of the attacks you are expected to know within the CBK.

This question mentions specifically what would the reaction of the IDS be? The choices presented and the question itself DOES NOT talk about IPS, WIDS, or other monitoring tools. It only mentions IDS. Restrict yourself to the context of the question.

#### MISCONCEPTIONS

Many people have the misconception that an IDS can only record events and has no ability to take active response. This is NOT true. An IDS could reset a connection when an attack is detected. An IDS could change a rule on the firewall to block the attacker. An IDS could change a rule on a router to block offending traffic. IDS do have the ability to take active response and this is not reserved only for IPS.

The second misconception is that within the ISC2 CBK an IDS is always a passive only system and does not take any blocking actions, this is not true. The IDS is a lot more limited than IPS as we are mentioning below but they do have the ability to block some of the attacks or traffic.

Here is a quote from the latest ISC2 on this subject:

Intrusion detection and prevention systems are used to identify and respond to suspected security-related events in real-time or near-real-time. Intrusion Detection Systems (IDS) will use available information to determine if an attack is underway, send alerts, and provide limited response capabilities. Intrusion Prevention Systems (IPS) will use available information to determine if an attack is underway, send alerts but also block the attack from reaching its intended target.

#### SANS GIAC HAS A GREAT PAPER ON THIS TOPIC

What does Limited response mean? It usually means active response in the context of IDS. There is a nice paper in the SANS library on this topic, you can find it at <http://www.sans.org/security-resources/idfaq/active.php>

See a small extract below:

Active Response is a mechanism in intrusion detection systems (IDS) that provides the IDS with

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capability to respond to an attack when it has been detected. There are two methods that the IDS can take to circumvent an attack. The first method of circumventing attacks would be Session disruption, and the second is Filter rule manipulation. The specific feature varies with each IDS product and each countermeasure method possesses its own strengths and weaknesses. (See paper above for more details of these techniques)

See reference below for more info if your into this type of stuff, else just keep it simple as described below.

Do not get too deep into this topic

The discussion about what is an IDS and what is an IPS has been ongoing for the past decade at least. Just do a quick Google search of "IDS versus IPS" and you will see what I mean. Old timers like me will remember doing blocking with their IDS when such tool just came out. At that time the term IPS did not even exist.

For the purpose of the exam, keep it simple. If the Instrusion Detection system is inline doing blocking of attacks it is an IPS. If the Instrusion Detection System only monitors traffic and activity without blocking it is an IDS.

An IPS could be configure to act like an IDS where it will not block anything if the administrator of the device did not configure any blocking rules on the IPS. However, the opposite is not true, you cannot configure an IDS to act as an IPS, it does not have the smarts that an IPS would have.

IPS are usually deployed inline and IDS are not deployed inline.

The following answers are incorrect:

Allow the packet to be processed by the network and record the event

A spoofed packet is almost sure to be malicious and should be dropped. Note that some students may argue that an IDS itself does not drop the packets but it could terminate the connection by sending Reset (RST) packets to the sender pretending to be the target. The IDS could also change an ACL or Rule on the router or firewall to block the connections from the source IP.

Resolve the destination address and process the packet

The 'correct' destination address could not be determined by the IDS

Translate the source address and resend the packet

The 'correct' source address could not be reliably determined by the IDS

The following reference(s) were/was used to create this question:

Official (ISC)2 Guide to the CISSP CBK , Second Edition, Network Intrusion Detection, Page 129 and

Corporate; (Isc)<sup>2</sup> (2010-04-20). Official (ISC)2 Guide to the CISSP CBK , Second Edition ((ISC)2 Press) (Kindle Locations 12545-12548). Taylor & Francis. Kindle Edition.

and

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Security Operations (Kindle Locations 704-707). . Kindle Edition.

and

<http://searchsecurity.techtarget.com/answer/What-is-a-land-attack>

and

<http://www.symantec.com/connect/articles/understanding-ids-active-response-mechanisms>

and

<http://www.sans.org/security-resources/idfaq/active.php>

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## QUESTION 224

What is the BEST definition of SQL injection.

- A. SQL injection is a database problem.
- B. SQL injection is a web Server problem.
- C. SQL injection is a windows and Linux website problem that could be corrected by applying a website vendors patch.
- D. SQL injection is an input validation problem.

Answer: D

Explanation: SQL injection is execution of unexpected SQL in the database as a result of unsanitized user input being accepted and used in the application code to form the SQL statement. It is a coding problem which affects inhouse, open source and commercial software.

The following answers are incorrect:

SQL injection is a database problem.

SQL injection is a web Server problem.

SQL injection is a windows and Linux website problem that could be corrected by applying a website vendors patch.

The following reference(s) were/was used to create this question:

[https://security.berkeley.edu/sites/default/files/uploads/SQLi\\_Prevention.pdf](https://security.berkeley.edu/sites/default/files/uploads/SQLi_Prevention.pdf) (page 9 and 10)

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### QUESTION 225

You are a security consultant who is required to perform penetration testing on a client's network. During penetration testing, you are required to use a compromised system to attack other systems on the network to avoid network restrictions like firewalls. Which method would you use in this scenario:

- A. Black box Method
- B. Pivoting method
- C. White Box Method.
- D. Grey Box Method

Answer: B

Explanation: Pivoting refers to method used by penetration testers that uses compromised system to attack other systems on the same network to avoid restrictions such as firewall configurations, which may prohibit direct access to all machines. For example, an attacker compromises a web server on a corporate network, the attacker can then use the compromised web server to attack other systems on the network. These types of attacks are often called multilayered attacks. Pivoting is also known as island hopping.

Pivoting can further be distinguished into proxy pivoting and VPN pivoting:

Proxy pivoting generally describes the practice channeling traffic through a compromised target using a proxy payload on the machine and launching attacks from this computer.<sup>[1]</sup> This type of pivoting is restricted to certain TCP and UDP ports that are supported by the proxy.

VPN pivoting enables the attacker to create an encrypted layer 2 tunnel into the compromised machine to route any network traffic through that target machine, for example to run a vulnerability scan on the internal network through the compromised machine, effectively giving the attacker full

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network access as if they were behind the firewall.

Typically, the proxy or VPN applications enabling pivoting are executed on the target computer as the payload (software) of an exploit.

The following answers are incorrect:

#### Black Box Method

Black-box testing is a method of software testing that tests the functionality of an application as opposed to its internal structures or workings (see white-box testing). Specific knowledge of the application's code/internal structure and programming knowledge in general is not required. The tester is only aware of what the software is supposed to do, but not how i.e. when he enters a certain input, he gets a certain output; without being aware of how the output was produced in the first place. Test cases are built around specifications and requirements, i.e., what the application is supposed to do. It uses external descriptions of the software, including specifications, requirements, and designs to derive test cases. These tests can be functional or non-functional, though usually functional. The test designer selects valid and invalid inputs and determines the correct output. There is no knowledge of the test object's internal structure.

For Penetration testing it means that you have no knowledge of the target. You may only get an IP address or a Domain Name and from that very limited amount of knowledge you must attempt to find all that you can.

#### White Box Method

In penetration testing, white-box testing refers to a methodology where a white hat hacker has full knowledge of the system being attacked. The goal of a white-box penetration test is to simulate a malicious insider who has some knowledge and possibly basic credentials to the target system.

#### Grey Box Method

Gray-box testing is a combination of white-box testing and black-box testing. Aim of this testing is to search for the defects if any due to improper structure or improper usage of applications.

In the context of the CEH this also means an internal test of company networks.

The following reference(s) were/was used to create this question:

[https://en.wikipedia.org/wiki/Exploit\\_%28computer\\_security%29#Pivoting](https://en.wikipedia.org/wiki/Exploit_%28computer_security%29#Pivoting)

[https://en.wikipedia.org/wiki/Black-box\\_testing](https://en.wikipedia.org/wiki/Black-box_testing)

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 4656-4657). Auerbach Publications. Kindle Edition.

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### QUESTION 226

Which answer best describes a computer software attack that takes advantage of a previously unpublished vulnerability?

- A. Zero-Day Attack
- B. Exploit Attack
- C. Vulnerability Attack
- D. Software Crack

Answer: A

Explanation: A zero-day (or zero-hour, or Oday, or day zero) attack or threat is a computer threat that tries to exploit computer application vulnerabilities that are unknown to others or the software developer. Zero-day exploits (actual software that uses a security hole to carry out an attack) are

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used or shared by attackers before the developer of the target software knows about the vulnerability.

The term derives from the age of the exploit. A "zero day" attack occurs on or before the first or "zeroth" day of developer awareness, meaning the developer has not had any opportunity to distribute a security fix to users of the software.

Zero-day attacks occur during the vulnerability window that exists in the time between when a vulnerability is first exploited and when software developers start to develop a counter to that threat.

For viruses, Trojans and other zero-day attacks, the vulnerability window follows this time line:  
The developer creates software containing an unknown vulnerability

The attacker finds the vulnerability before the developer does

The attacker writes and distributes an exploit while the vulnerability is not known to the developer

The developer becomes aware of the vulnerability and starts developing a fix.

The following answers are incorrect:

#### Exploit Attack

An exploit (from the verb to exploit, in the meaning of using something to one's own advantage) is a piece of software, a chunk of data, or sequence of commands that takes advantage of a bug, glitch or vulnerability in order to cause unintended or unanticipated behavior to occur on computer software, hardware, or something electronic (usually computerised). This frequently includes such things as gaining control of a computer system or allowing privilege escalation or a denial-of-service attack.

#### Vulnerability Attack

There is no such thing as the term Vulnerability Attack. However a vulnerability is synonymous with a weakness, it could be bad quality of software, a weakness within your physical security, or a weakness in your policies and procedures. An attacker will take advantage of a weakness and usually use an exploit to gain access to your systems without proper authorization or privilege.

#### Software Crack

Software cracking is the modification of software to remove or disable features which are considered undesirable by the person cracking the software, usually related to protection methods: copy protection, trial/demo version, serial number, hardware key, date checks, CD check or software annoyances like nag screens and adware.

A crack is the software tool used to remove the need to insert a serial number or activation key.

The following reference(s) were/was used to create this question:

2011, Ethical Hacking and Countermeasures, EC-Council Official Curriculum, Book 1, Page 9

[https://en.wikipedia.org/wiki/Zero\\_day\\_attack](https://en.wikipedia.org/wiki/Zero_day_attack)

[https://en.wikipedia.org/wiki/Exploit\\_%28computer\\_security%29](https://en.wikipedia.org/wiki/Exploit_%28computer_security%29)

[https://en.wikipedia.org/wiki/Software\\_cracking](https://en.wikipedia.org/wiki/Software_cracking)

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### QUESTION 227

Data which is properly secured and can be described with terms like genuine or not corrupted from the original refers to data that has a high level of what?

- A. Authenticity
- B. Authorization
- C. Availability
- D. Non-Repudiation

Answer: A

Explanation: Authenticity refers to the characteristic of a communication, document or any data that ensures the quality of being genuine or not corrupted from the original.

The following answers are incorrect:

Authorization is wrong because this refers to a users ability to access data based upon a set of credentials.

Availability is wrong because this refers to systems which deliver data are accessible when and where required by users.

Non-Repudiation is wrong because this is where a user cannot deny their actions on data they processed. Classic example is a legal document you signed either manually with a pen or digitally with a signing certificate. If it is signed then you cannot proclaim you did not send the document or do a transaction.

The following reference(s) were/was used to create this question:

2011 EC-COUNCIL Official Curriculum, Ethical Hacking and Countermeasures, Volume 1, Module 1, Page. 11

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### QUESTION 228

Which of the following is most appropriate to notify an internal user that session monitoring is being conducted?

- A. Logon Banners
- B. Wall poster
- C. Employee Handbook
- D. Written agreement

Answer: D

Explanation: This is a tricky question, the keyword in the question is Internal users.

There are two possible answers based on how the question is presented, this question could either apply to internal users or ANY anonymous/external users.

Internal users should always have a written agreement first, then logon banners serve as a constant reminder.

Banners at the log-on time should be used to notify external users of any monitoring that is being conducted. A good banner will give you a better legal stand and also makes it obvious the user was warned about who should access the system, who is authorized and unauthorized, and if it is an unauthorized user then he is fully aware of trespassing. Anonymous/External users, such as those logging into a web site, ftp server or even a mail server; their only notification system is the use of a logon banner.

References used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 50  
and

Shon Harris, CISSP All-in-one, 5th edition, pg 873

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**QUESTION 229**

A Differential backup process will:

- A. Backs up data labeled with archive bit 1 and leaves the data labeled as archive bit 1
- B. Backs up data labeled with archive bit 1 and changes the data label to archive bit 0
- C. Backs up data labeled with archive bit 0 and leaves the data labeled as archive bit 0
- D. Backs up data labeled with archive bit 0 and changes the data label to archive bit 1

Answer: A

Explanation: Archive bit 1 = On (the archive bit is set).

Archive bit 0 = Off (the archive bit is NOT set).

When the archive bit is set to ON, it indicates a file that has changed and needs to be backed up. Differential backups backup all files changed since the last full. To do this, they don't change the archive bit value when they backup a file. Instead the differential let's the full backup make that change. An incremental only backs up data since the last incremental backup. Thus it does change the archive bit from 1 (On) to 0 (Off).

The following answers are incorrect:

Backs up data labeled with archive bit 1 and changes the data label to archive bit 0 - This is the behavior of an incremental backup, not a differential backup.

Backs up data labeled with archive bit 0 and leaves the data labeled as archive bit 0 - If the archive bit is set to 0 (Off), it will only be backed up via a Full backup. Everything else will ignore it.

Backs up data labeled with archive bit 0 and changes the data label to archive bit 1 - If the archive bit is set to 0 (Off), it will only be backed up via a Full backup. Everything else will ignore it.

The following reference(s) were/was used to create this question:

[https://en.wikipedia.org/wiki/Archive\\_bit](https://en.wikipedia.org/wiki/Archive_bit)

**QUESTION 230**

When considering all the reasons that buffer overflow vulnerabilities exist what is the real reason?

- A. Human error
- B. The Windows Operating system
- C. Insecure programming languages
- D. Insecure Transport Protocols

Answer: A

Explanation: Discussion: Since computer program code is written by humans and there are proper and improper ways of writing software code it is clear that human errors create the conditions for buffer overflows to exist.

Unfortunately as secure as any operating system is it becomes insecure when people install insecure code that can be host to buffer overflow attacks so it is human error that really causes these vulnerabilities.

Mitigation: The best mitigation against buffer overflow attacks is to:

- Be sure you keep your software updated with any patches released by the vendors.
- Have sensible configurations for your software. (e.g., lock it down)

- Control access to your sensitive systems with network traffic normalizing systems like a filtering firewall or other devices that drops inappropriate network packets.

- If you don't need the software or service on a system, remove it. If it is useless it can only be a threat.

The following answers are incorrect:

The Windows Operating system: This isn't the intended answer.

Insecure programming languages: This isn't correct. Modern programming languages are capable of being used securely. It's only when humans make mistakes that any programming language becomes a threat.

Insecure Transport Protocols: This is partially correct. If you send logon ID and passwords over the network in clear text, no programming language will protect you from sniffers.

The following reference(s) were/was used to create this question:

2011 EC-COUNCIL Official Curriculum, Ethical Hacking and Countermeasures, v71, Module 17, Page 806

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### QUESTION 231

Layer 2 of the OSI model has two sublayers. What are those sublayers, and what are two IEEE standards that describe technologies at that layer?

- A. LCL and MAC; IEEE 8022 and 8023
- B. LCL and MAC; IEEE 8021 and 8023
- C. Network and MAC; IEEE 8021 and 8023

Answer: A

Explanation: The data link layer, or Layer 2, of the OSI model is responsible for adding a header and a trailer to a packet to prepare the packet for the local area network or wide area network technology binary format for proper line transmission.

Layer 2 is divided into two functional sublayers.

The upper sublayer is the Logical Link Control (LLC) and is defined in the IEEE 8022 specification. It communicates with the network layer, which is immediately above the data link layer.

Below the LLC is the Media Access Control (MAC) sublayer, which specifies the interface with the protocol requirements of the physical layer.

Thus, the specification for this layer depends on the technology of the physical layer.

The IEEE MAC specification for Ethernet is 8023, Token Ring is 8025, wireless LAN is 80211, and so on. When you see a reference to an IEEE standard, such as 80211 or 80216, it refers to the protocol working at the MAC sublayer of the data link layer of the protocol stack.

The following answers are incorrect:

LCL and MAC; IEEE 8022 and 8023 is incorrect because LCL is a distracter. The correct acronym for the upper sublayer of the data link layer is LLC. It stands for the Logical Link Control. By providing multiplexing and flow control mechanisms, the LLC enables the coexistence of network protocols within a multipoint network and their transportation over the same network media.

LCL and MAC; IEEE 8021 and 8023 is incorrect because LCL is a distracter. The sublayers of the data link layer are the Logical Link Control (LLC) and the Media Access Control (MAC).

Furthermore, the LLC is defined in the IEEE 8022 specification, not 8021. The IEEE 8021 specifications are concerned with protocol layers above the MAC and LLC layers. It addresses

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LAN/MAN architecture, network management, internetworking between LANs and WANs, and link security, etc.

Network and MAC; IEEE 8021 and 8023 is incorrect because network is not a sublayer of the data link layer. The sublayers of the data link layer are the Logical Link Control (LLC) and the Media Access Control (MAC). The LLC sits between the network layer (the layer immediately above the data link layer) and the MAC sublayer. Also, the LLC is defined in the IEEE 8022 specification, not IEEE 8021. As just explained, 8021 standards address areas of LAN/MAN architecture, network management, internetworking between LANs and WANs, and link security. The IEEE 8021 group's four active task groups are Internetworking, Security, Audio/Video Bridging, and Data Center Bridging.

The following reference(s) were/was used to create this question:

[http://en.wikipedia.org/wiki/OSI\\_model](http://en.wikipedia.org/wiki/OSI_model)

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### QUESTION 232

Which of the following is NOT part of user provisioning?

- A. Creation and deactivation of user accounts
- B. Business process implementation
- C. Maintenance and deactivation of user objects and attributes
- D. Delegating user administration

Answer: B

Explanation: User provisioning refers to the creation, maintenance, and deactivation of user objects and attributes as they exist in one or more systems, directories, or applications, in response to business processes.

User provisioning software may include one or more of the following components: change propagation, self-service workflow, consolidated user administration, delegated user administration, and federated change control.

User objects may represent employees, contractors, vendors, partners, customers, or other recipients of a service.

Services may include electronic mail, access to a database, access to a file server or mainframe, and so on

The following answers are all incorrect answers:

Creation and deactivation of user accounts

Maintenance and deactivation of user objects and attributes

Delegating user administration

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 179). McGraw-Hill . Kindle Edition.

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### QUESTION 233

Which of the following answers best describes the type of penetration testing where the analyst has full knowledge of the network on which he is going to perform his test?

- A. White-Box Penetration Testing

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- B. Black-Box Pen Testing
  - C. Penetration Testing
  - D. Gray-Box Pen Testing

Answer: A

Explanation: In general there are three ways a pen tester can test a target system.

- White-Box: The tester has full access and is testing from inside the system.
- Gray-Box: The tester has some knowledge of the system he's testing.
- Black-Box: The tester has no knowledge of the system.

Each of these forms of testing has different benefits and can test different aspects of the system from different approaches.

The following answers are incorrect:

- Black-Box Pen Testing: This is where no prior knowledge is given about the target network. Only a domain name or business name may be given to the analyst.
- Penetration Testing: This is half correct but more specifically it is white-box testing because the tester has full access.
- Gray-Box Pen Testing: This answer is not right because Gray-Box testing you are given a little information about the target network.

The following reference(s) was used to create this question:

2013 Official Security+ Curriculum.

and

tester is provided no information about the target's network or environment. The tester is simply left to his abilities

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 4742-4743). Auerbach Publications. Kindle Edition.

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### QUESTION 234

Which access control method allows the data owner (the person who created the file) to control access to the information they own?

- A. DAC - Discretionary Access Control
- B. MAC - Mandatory Access Control
- C. RBAC - Role-Based Access Control
- D. NDAC - Non-Discretionary Access Control

Answer: A

Explanation: DAC - Discretionary Access Control is where the user controls access to the data they create or manage.

It is the least secure method of access control because of a few factors:

- Employee changeover can lead to confusion of data ownership or abandoned data.
- Employees are not traditionally experienced enough to manage data permissions and maintain them in a reliable fashion.
- People in general are the least reliable component of any organization

The following answers are incorrect:

- MAC - Mandatory Access Control: This is incorrect because in the MAC model of access control, labels are used to identify the level of sensitivity of the data. If the user does not have privileges to such data he or she is denied access.

- RBAC - Role-Based Access Control: Sorry, RBAC is Role-Based Access Control where the users' Role determines the access level to data they are given.

- NDAC - Non-Discretionary Access Control: Sorry, this isn't a common term associated with access control methodologies.

The following reference(s) was used to create this question:

2013 Official Security+ Curriculum.

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### QUESTION 235

Suppose you are a domain administrator and are choosing an employee to carry out backups. Which access control method do you think would be best for this scenario?

- A. RBAC - Role-Based Access Control
- B. MAC - Mandatory Access Control
- C. DAC - Discretionary Access Control
- D. RBAC - Rule-Based Access Control

Answer: A

Explanation: RBAC - Role-Based Access Control permissions would fit best for a backup job for the employee because the permissions correlate tightly with permissions granted to a backup operator.

A role-based access control (RBAC) model, bases the access control authorizations on the roles (or functions) that the user is assigned within an organization. The determination of what roles have access to a resource can be governed by the owner of the data, as with DACs, or applied based on policy, as with MACs. Access control decisions are based on job function, previously defined and governed by policy, and each role (job function) will have its own access capabilities. Objects associated with a role will inherit privileges assigned to that role. This is also true for groups of users, allowing administrators to simplify access control strategies by assigning users to groups and groups to roles.

Specifically, in the Microsoft Windows world there is a security group called "Backup Operators" in which you can place the users to carry out the duties. This way you could assign the backup privilege without the need to grant the Restore privilege. This would prevent errors or a malicious person from overwriting the current data with an old copy for example.

The following answers are incorrect:

- MAC - Mandatory Access Control: This isn't the right answer. The role of Backup administrator fits perfectly with the access control Role-Based access control.

- DAC - Discretionary Access Control: This isn't the correct answer because DAC relies on data owner/creators to determine who has access to information.

- RBAC - Rule-Based Access Control: If you got this wrong it may be because you didn't read past the RBAC part. Be very careful to read the entire question and answers before proceeding.

The following reference(s) was used to create this question:

2013 Official Security+ Curriculum.

and

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Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 1936-1943). Auerbach Publications. Kindle Edition.

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### QUESTION 236

Of the seven types of Access Control Categories, which is described as such?

Designed to specify rules of acceptable behavior in the organization.

Example: Policy stating that employees may not spend time on social media websites

- A. Directive Access Control
- B. Deterrent Access Control
- C. Preventive Access Control
- D. Detective Access Control

Answer: A

Explanation: There are seven access control categories. Below you have the Access Control Types and Categories.

- Access Control Types:

- Administrative
- Policies, data classification and labeling and security awareness training
- Technical
- Hardware - MAC Filtering or perimeter devices like
- Software controls like account logons and encryption, file perms
- Physical
- Guard, fences and locks

- Access Control Categories:

Directive: specify rules of acceptable behavior

- Policy stating users may not use facebook

Deterrent:

- Designed to discourage people from violating security directives
- Logon banner reminding users about being subject to monitoring

Preventive:

- Implemented to prevent a security incident or information breach
- Like a fence or file permissions

Detective:

- Used to mitigate the loss.
- Example: Logging, IDS with a Firewall

Compensating:

- To substitute for the loss of a primary control or add additional mitigation
- Example: Logging, IDS inline with firewall

Corrective:

- To remedy circumstance, mitigate damage or restore control
- Example: Fire extinguisher, firing an employee

Recovery:

- To restore conditions to normal after a security incident
- Restore files from backup

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All these are designed to shape employee behavior to better maintain an environment that supports the business objectives and protects corporate assets.

The following answers are incorrect:

- Deterrent Access Control: This is not right because a deterrent access control discourages people from violating security directives.
- Preventive Access Control: This is incorrect because a preventive access control category is used to simply stop or block unwanted behavior. Users don't have a choice about whether to violate the behavior rules.
- Detective Access Control: Sorry, this isn't a access control category.

The following reference(s) was used to create this question:

2013 Official Security+ Curriculum.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Location 1162). Auerbach Publications. Kindle Edition.

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### QUESTION 237

Which of the following is NOT a disadvantage of Single Sign On (SSO)?

- A. Support for all major operating system environment is difficult
- B. The cost associated with SSO development can be significant
- C. SSO could be single point of failure and total compromise of an organization asset
- D. SSO improves an administrator's ability to manage user's account and authorization to all associated system

Answer: D

Explanation: Single sign-on (SSO) is a Session/user authentication process that permits a user to enter one name and password in order to access multiple applications. The process authenticates the user for all the applications they have been given rights to and eliminates further prompts when they switch applications during a particular session.

SSO Advantages include

- Multiple passwords are no longer required
- It improves an administrator's ability to manage user's accounts and authorization to all associated systems
- It reduces administrative overhead in resetting forgotten password over multiple platforms and applications
- It reduces time taken by users to logon into multiple application and platform

SSO Disadvantages include

- Support for all major operating system is difficult
- The cost associated with SSO development can be significant when considering the nature and extent of interface development and maintenance that may be necessary
- The centralize nature of SSO presents the possibility of a single point of failure and total compromise of an organization's information asset.

The following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 332

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**QUESTION 238**

You are a manager for a large international bank and periodically move employees between positions in your department. What is this process called?

- A. Job Rotation
- B. Separation of Duties
- C. Mandatory Rotations
- D. Dual Control

Answer: A

Explanation: Discussion: If a single employee were permitted to stay in one critical position for an extended period of time without close oversight he or she could carry out fraud undetected.

For this reason it is important to rotate employees between jobs. Another good reason is to get employees experienced on their colleagues' jobs. This way, if an employee were for some reason unavailable to work, their position could be covered.

The following answers are incorrect:

Separation of Duties: This is similar to Job Rotation because critical functions are divided up between employees to avoid and detect fraud. It is incorrect because with Job Rotation, people move between positions to detect fraud or even get better at each position to provide some resiliency for the organization. Separation of Duties is more a preventative measure.

Mandatory Rotations: This is incorrect because of the terminology. There are terms called Mandatory Vacations and Job Rotation but not mandatory rotations. Be familiar with these terms before trying to pass the exam.

Dual Control: This term describes how a manager would require employees to work together (two or more) on critical actions so that no single employee can cause catastrophic damage. This isn't the correct answer but it is very similar to Job Rotation where an employee rotates between job duties. Dual Control requires employees to work together on critical tasks in hopes of limiting collusion to commit fraud.

The following reference(s) was used to create this question:

Gregg, Michael; Haines, Billy (2012-02-16). CASP: CompTIA Advanced Security Practitioner Study Guide Authorized Courseware: Exam CAS-001 (p. 245). Wiley. Kindle Edition.

**QUESTION 239**

Which of the following control is intended to discourage a potential attacker?

- A. Deterrent
- B. Preventive
- C. Corrective
- D. Recovery

Answer: A

Explanation: Deterrent Control are intended to discourage a potential attacker

For your exam you should know below information about different security controls

Deterrent Controls

Deterrent Controls are intended to discourage a potential attacker. Access controls act as a deterrent to threats and attacks by the simple fact that the existence of the control is enough to keep some potential attackers from attempting to circumvent the control. This is often because the effort required to circumvent the control is far greater than the potential reward if the attacker is successful, or, conversely, the negative implications of a failed attack (or getting caught) outweigh the benefits of success. For example, by forcing the identification and authentication of a user, service, or application, and all that it implies, the potential for incidents associated with the system is significantly reduced because an attacker will fear association with the incident. If there are no controls for a given access path, the number of incidents and the potential impact become infinite. Controls inherently reduce exposure to risk by applying oversight for a process. This oversight acts as a deterrent, curbing an attacker's appetite in the face of probable repercussions.

The best example of a deterrent control is demonstrated by employees and their propensity to intentionally perform unauthorized functions, leading to unwanted events.

When users begin to understand that by authenticating into a system to perform a function, their activities are logged and monitored, and it reduces the likelihood they will attempt such an action. Many threats are based on the anonymity of the threat agent, and any potential for identification and association with their actions is avoided at all costs.

It is this fundamental reason why access controls are the key target of circumvention by attackers. Deterrents also take the form of potential punishment if users do something unauthorized. For example, if the organization policy specifies that an employee installing an unauthorized wireless access point will be fired, that will determine most employees from installing wireless access points.

### Preventative Controls

Preventive controls are intended to avoid an incident from occurring. Preventative access controls keep a user from performing some activity or function. Preventative controls differ from deterrent controls in that the control is not optional and cannot (easily) be bypassed. Deterrent controls work on the theory that it is easier to obey the control

rather than to risk the consequences of bypassing the control. In other words, the power for action resides with the user (or the attacker). Preventative controls place the power of action with the system, obeying the control is not optional. The only way to bypass the control is to find a flaw in the control's implementation.

### Compensating Controls

Compensating controls are introduced when the existing capabilities of a system do not support the requirement of a policy. Compensating controls can be technical, procedural, or managerial. Although an existing system may not support the required controls, there may exist other technology or processes that can supplement the existing environment, closing the gap in controls, meeting policy requirements, and reducing overall risk.

For example, the access control policy may state that the authentication process must be encrypted when performed over the Internet. Adjusting an application to natively support encryption for authentication purposes may be too costly. Secure Socket Layer (SSL), an encryption protocol, can be employed and layered on top of the authentication process to support the policy statement.

Other examples include a separation of duties environment, which offers the capability to isolate certain tasks to compensate for technical limitations in the system and ensure the security of transactions. In addition, management processes, such as authorization, supervision, and administration, can be used to compensate for gaps in the access control environment.

## Detective Controls

Detective controls warn when something has happened, and are the earliest point in the postincident timeline. Access controls are a deterrent to threats and can be aggressively utilized to prevent harmful incidents through the application of least privilege. However, the detective nature of access controls can provide significant visibility into the access environment and help organizations manage their access strategy and related security risk.

As mentioned previously, strongly managed access privileges provided to an authenticated user offer the ability to reduce the risk exposure of the enterprise's assets by limiting the capabilities that authenticated user has. However, there are few options to control what a user can perform once privileges are provided. For example, if a user is provided write access to a file and that file is damaged, altered, or otherwise negatively impacted (either deliberately or unintentionally), the use of applied access controls will offer visibility into the transaction. The control environment can be established to log activity regarding the identification, authentication, authorization, and use of privileges on a system.

This can be used to detect the occurrence of errors, the attempts to perform an unauthorized action, or to validate when provided credentials were exercised. The logging system as a detective device provides evidence of actions (both successful and unsuccessful) and tasks that were executed by authorized users.

## Corrective Controls

When a security incident occurs, elements within the security infrastructure may require corrective actions. Corrective controls are actions that seek to alter the security posture of an environment to correct any deficiencies and return the environment to a secure state. A security incident signals the failure of one or more directive, deterrent, preventative, or compensating controls. The detective controls may have triggered an alarm or notification, but now the corrective controls must work to stop the incident in its tracks. Corrective controls can take many forms, all depending on the particular situation at hand or the particular security failure that needs to be dealt with.

## Recovery Controls

Any changes to the access control environment, whether in the face of a security incident or to offer temporary compensating controls, need to be accurately reinstated and returned to normal operations. There are several situations that may affect access controls, their applicability, status, or management.

Events can include system outages, attacks, project changes, technical demands, administrative gaps, and full-blown disaster situations. For example, if an application is not correctly installed or deployed, it may adversely affect controls placed on system files or even have default administrative accounts unknowingly implemented upon install.

Additionally, an employee may be transferred, quit, or be on temporary leave that may affect policy requirements regarding separation of duties. An attack on systems may have resulted in the implantation of a Trojan horse program, potentially exposing private user information, such as credit card information and financial data. In all of these cases, an undesirable situation must be rectified as quickly as possible and controls returned to normal operations.

The following answers are incorrect:

Preventive - Preventive controls are intended to avoid an incident from occurring

Corrective - Corrective control fixes components or systems after an incident has occurred

Recovery - Recovery controls are intended to bring the environment back to regular operations

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 44

and

Official ISC2 CISSP guide 3rd edition Page number 50 and 51

### QUESTION 240

Which of the following security control is intended to avoid an incident from occurring?

- A. Deterrent
- B. Preventive
- C. Corrective
- D. Recovery

Answer: B

Explanation: Preventive controls are intended to avoid an incident from occurring  
For your exam you should know below information about different security controls

#### Deterrent Controls

Deterrent Controls are intended to discourage a potential attacker. Access controls act as a deterrent to threats and attacks by the simple fact that the existence of the control is enough to keep some potential attackers from attempting to circumvent the control. This is often because the effort required to circumvent the control is far greater than the potential reward if the attacker is successful, or, conversely, the negative implications of a failed attack (or getting caught) outweigh the benefits of success. For example, by forcing the identification and authentication of a user, service, or application, and all that it implies, the potential for incidents associated with the system is significantly reduced because an attacker will fear association with the incident. If there are no controls for a given access path, the number of incidents and the potential impact become infinite. Controls inherently reduce exposure to risk by applying oversight for a process. This oversight acts as a deterrent, curbing an attacker's appetite in the face of probable repercussions.

The best example of a deterrent control is demonstrated by employees and their propensity to intentionally perform unauthorized functions, leading to unwanted events.

When users begin to understand that by authenticating into a system to perform a function, their activities are logged and monitored, and it reduces the likelihood they will attempt such an action. Many threats are based on the anonymity of the threat agent, and any potential for identification and association with their actions is avoided at all costs.

It is this fundamental reason why access controls are the key target of circumvention by attackers. Deterrents also take the form of potential punishment if users do something unauthorized. For example, if the organization policy specifies that an employee installing an unauthorized wireless access point will be fired, that will determine most employees from installing wireless access points.

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the control's implementation.

#### Compensating Controls

Compensating controls are introduced when the existing capabilities of a system do not support the requirement of a policy. Compensating controls can be technical, procedural, or managerial. Although an existing system may not support the required controls, there may exist other technology or processes that can supplement the existing environment, closing the gap in controls, meeting policy requirements, and reducing overall risk.

For example, the access control policy may state that the authentication process must be encrypted when performed over the Internet. Adjusting an application to natively support encryption for authentication purposes may be too costly. Secure Socket Layer (SSL), an encryption protocol, can be employed and layered on top of the authentication process to support the policy statement.

Other examples include a separation of duties environment, which offers the capability to isolate certain tasks to compensate for technical limitations in the system and ensure the security of transactions. In addition, management processes, such as authorization, supervision, and administration, can be used to compensate for gaps in the access control environment.

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Detective controls warn when something has happened, and are the earliest point in the postincident timeline. Access controls are a deterrent to threats and can be aggressively utilized to prevent harmful incidents through the application of least privilege. However, the detective nature of access controls can provide significant visibility into the access environment and help organizations manage their access strategy and related security risk.

As mentioned previously, strongly managed access privileges provided to an authenticated user offer the ability to reduce the risk exposure of the enterprise's assets by limiting the capabilities that authenticated user has. However, there are few options to control what a user can perform once privileges are provided. For example, if a user is provided write access to a file and that file is damaged, altered, or otherwise negatively impacted (either deliberately or unintentionally), the use of applied access controls will offer visibility into the transaction. The control environment can be established to log activity regarding the identification, authentication, authorization, and use of privileges on a system.

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#### Recovery Controls

Any changes to the access control environment, whether in the face of a security incident or to offer temporary compensating controls, need to be accurately reinstated and returned to normal operations. There are several situations that may affect access controls, their applicability, status,

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Events can include system outages, attacks, project changes, technical demands, administrative gaps, and full-blown disaster situations. For example, if an application is not correctly installed or deployed, it may adversely affect controls placed on system files or even have default administrative accounts unknowingly implemented upon install.

Additionally, an employee may be transferred, quit, or be on temporary leave that may affect policy requirements regarding separation of duties. An attack on systems may have resulted in the implantation of a Trojan horse program, potentially exposing private user information, such as credit card information and financial data. In all of these cases, an undesirable situation must be rectified as quickly as possible and controls returned to normal operations.

The following answers are incorrect:

Deterrent - Deterrent controls are intended to discourage a potential attacker

Corrective - Corrective control fixes components or systems after an incident has occurred

Recovery - Recovery controls are intended to bring the environment back to regular operations

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 44

and

Official ISC2 CISSP guide 3rd edition Page number 50 and 51

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### QUESTION 241

Which of the following control helps to identify an incident's activities and potentially an intruder?

- A. Deterrent
- B. Preventive
- C. Detective
- D. Compensating

Answer: C

Explanation: Detective control helps identify an incident's activities and potentially an intruder

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#### Deterrent Controls

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The best example of a deterrent control is demonstrated by employees and their propensity to intentionally perform unauthorized functions, leading to unwanted events.

When users begin to understand that by authenticating into a system to perform a function, their

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activities are logged and monitored, and it reduces the likelihood they will attempt such an action. Many threats are based on the anonymity of the threat agent, and any potential for identification and association with their actions is avoided at all costs.

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The following answers are incorrect:

Deterrent - Deterrent controls are intended to discourage a potential attacker

Preventive - Preventive controls are intended to avoid an incident from occurring

Compensating - Compensating Controls provide an alternative measure of control

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 44

and

Official ISC2 CISSP guide 3rd edition Page number 50 and 51

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#### QUESTION 242

Which of the following is NOT an example of preventive control?

- A. Physical access control like locks and door
- B. User login screen which allows only authorized user to access website
- C. Encrypt the data so that only authorized user can view the same
- D. Duplicate checking of calculations

Answer: D

Explanation: The word NOT is used as a keyword in the question. You need to find out a security

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control from an given options which in not preventive. Duplicate checking of a calculation is a detective control and not a preventive control.

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#### Deterrent Controls

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The best example of a deterrent control is demonstrated by employees and their propensity to intentionally perform unauthorized functions, leading to unwanted events. When users begin to understand that by authenticating into a system to perform a function, their activities are logged and monitored, and it reduces the likelihood they will attempt such an action. Many threats are based on the anonymity of the threat agent, and any potential for identification and association with their actions is avoided at all costs. It is this fundamental reason why access controls are the key target of circumvention by attackers. Deterrents also take the form of potential punishment if users do something unauthorized. For example, if the organization policy specifies that an employee installing an unauthorized wireless access point will be fired, that will deter most employees from installing wireless access points.

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Additionally, an employee may be transferred, quit, or be on temporary leave that may affect policy requirements regarding separation of duties. An attack on systems may have resulted in the implantation of a Trojan horse program, potentially exposing private user information, such as credit card information and financial data. In all of these cases, an undesirable situation must be rectified as quickly as possible and controls returned to normal operations.

The following answers are incorrect:

The other examples are belongs to Preventive control.

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 44

and

Official ISC2 CISSP guide 3rd edition Page number 50 and 51

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#### QUESTION 243

Which of the following is NOT an example of corrective control?

- A. OS Upgrade
- B. Backup and restore
- C. Contingency planning
- D. System Monitoring

Answer: D

Explanation: The word NOT is used as a keyword in the question. You need to find out a security control from an given options which in not corrective control. System Monitoring is a detective control and not a corrective control.

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As mentioned previously, strongly managed access privileges provided to an authenticated user offer the ability to reduce the risk exposure of the enterprise's assets by limiting the capabilities that authenticated user has. However, there are few options to control what a user can perform once privileges are provided. For example, if a user is provided write access to a file and that file is damaged, altered, or otherwise negatively impacted (either deliberately or unintentionally), the use of applied access controls will offer visibility into the transaction. The control environment can be established to log activity regarding the identification, authentication, authorization, and use of privileges on a system.

This can be used to detect the occurrence of errors, the attempts to perform an unauthorized action, or to validate when provided credentials were exercised. The logging system as a detective device provides evidence of actions (both successful and unsuccessful) and tasks that were executed by authorized users.

#### Corrective Controls

When a security incident occurs, elements within the security infrastructure may require corrective actions. Corrective controls are actions that seek to alter the security posture of an environment to correct any deficiencies and return the environment to a secure state. A security incident signals the failure of one or more directive, deterrent, preventative, or compensating controls. The detective controls may have triggered an alarm or notification, but now the corrective controls must work to stop the incident in its tracks. Corrective controls can take many forms, all depending on the particular situation at hand or the particular security failure that needs to be dealt with.

#### Recovery Controls

Any changes to the access control environment, whether in the face of a security incident or to offer temporary compensating controls, need to be accurately reinstated and returned to normal operations. There are several situations that may affect access controls, their applicability, status, or management.

Events can include system outages, attacks, project changes, technical demands, administrative gaps, and full-blown disaster situations. For example, if an application is not correctly installed or deployed, it may adversely affect controls placed on system files or even have default administrative accounts unknowingly implemented upon install.

Additionally, an employee may be transferred, quit, or be on temporary leave that may affect policy requirements regarding separation of duties. An attack on systems may have resulted in the implantation of a Trojan horse program, potentially exposing private user information, such as credit card information and financial data. In all of these cases, an undesirable situation must be rectified as quickly as possible and controls returned to normal operations.

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The following answers are incorrect:

The other examples are belongs to corrective control.

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 44

and

Official ISC2 CISSP guide 3rd edition Page number 50 and 51

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### QUESTION 244

Which of the following is NOT an example of a detective control?

- A. System Monitor
- B. IDS
- C. Monitor detector
- D. Backup data restore

Answer: D

Explanation: The word NOT is used as a keyword in the question. You need to find out a security control from an given options which in not detective control. Backup data restore is a corrective control and not a detective control.

For your exam you should know below information about different security controls

#### Deterrent Controls

Deterrent Controls are intended to discourage a potential attacker. Access controls act as a deterrent to threats and attacks by the simple fact that the existence of the control is enough to keep some potential attackers from attempting to circumvent the control. This is often because the effort required to circumvent the control is far greater than the potential reward if the attacker is successful, or, conversely, the negative implications of a failed attack (or getting caught) outweigh the benefits of success. For example, by forcing the identification and authentication of a user, service, or application, and all that it implies, the potential for incidents associated with the system is significantly reduced because an attacker will fear association with the incident. If there are no controls for a given access path, the number of incidents and the potential impact become infinite. Controls inherently reduce exposure to risk by applying oversight for a process. This oversight acts as a deterrent, curbing an attacker's appetite in the face of probable repercussions.

The best example of a deterrent control is demonstrated by employees and their propensity to intentionally perform unauthorized functions, leading to unwanted events. When users begin to understand that by authenticating into a system to perform a function, their activities are logged and monitored, and it reduces the likelihood they will attempt such an action. Many threats are based on the anonymity of the threat agent, and any potential for identification and association with their actions is avoided at all costs. It is this fundamental reason why access controls are the key target of circumvention by attackers. Deterrents also take the form of potential punishment if users do something unauthorized. For example, if the organization policy specifies that an employee installing an unauthorized wireless access point will be fired, that will deter most employees from installing wireless access points.

#### Preventative Controls

Preventive controls are intended to avoid an incident from occurring. Preventative access controls keep a user from performing some activity or function. Preventative controls differ from deterrent

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controls in that the control is not optional and cannot (easily) be bypassed. Deterrent controls work on the theory that it is easier to obey the control

rather than to risk the consequences of bypassing the control. In other words, the power for action resides with the user (or the attacker). Preventative controls place the power of action with the system, obeying the control is not optional. The only way to bypass the control is to find a flaw in the control's implementation.

#### Compensating Controls

Compensating controls are introduced when the existing capabilities of a system do not support the requirement of a policy. Compensating controls can be technical, procedural, or managerial. Although an existing system may not support the required controls, there may exist other technology or processes that can supplement the existing environment, closing the gap in controls, meeting policy requirements, and reducing overall risk. For example, the access control policy may state that the authentication process must be encrypted when performed over the Internet. Adjusting an application to natively support encryption for authentication purposes may be too costly. Secure Socket Layer (SSL), an encryption protocol, can be employed and layered on top of the authentication process to support the policy statement. Other examples include a separation of duties environment, which offers the capability to isolate certain tasks to compensate for technical limitations in the system and ensure the security of transactions. In addition, management processes, such as authorization, supervision, and administration, can be used to compensate for gaps in the access control environment.

#### Detective Controls

Detective controls warn when something has happened, and are the earliest point in the postincident timeline. Access controls are a deterrent to threats and can be aggressively utilized to prevent harmful incidents through the application of least privilege. However, the detective nature of access controls can provide significant visibility into the access environment and help organizations manage their access strategy and related security risk. As mentioned previously, strongly managed access privileges provided to an authenticated user offer the ability to reduce the risk exposure of the enterprise's assets by limiting the capabilities that authenticated user has. However, there are few options to control what a user can perform once privileges are provided. For example, if a user is provided write access to a file and that file is damaged, altered, or otherwise negatively impacted (either deliberately or unintentionally), the use of applied access controls will offer visibility into the transaction. The control environment can be established to log activity regarding the identification, authentication, authorization, and use of privileges on a system. This can be used to detect the occurrence of errors, the attempts to perform an unauthorized action, or to validate when provided credentials were exercised. The logging system as a detective device provides evidence of actions (both successful and unsuccessful) and tasks that were executed by authorized users.

#### Corrective Controls

When a security incident occurs, elements within the security infrastructure may require corrective actions. Corrective controls are actions that seek to alter the security posture of an environment to correct any deficiencies and return the environment to a secure state. A security incident signals the failure of one or more directive, deterrent, preventative, or compensating controls. The detective controls may have triggered an alarm or notification, but now the corrective controls must work to stop the incident in its tracks. Corrective controls can take many forms, all depending on the particular situation at hand or the particular security failure that needs to be dealt with.

## Recovery Controls

Any changes to the access control environment, whether in the face of a security incident or to offer temporary compensating controls, need to be accurately reinstated and returned to normal operations. There are several situations that may affect access controls, their applicability, status, or management. Events can include system outages, attacks, project changes, technical demands, administrative gaps, and full-blown disaster situations. For example, if an application is not correctly installed or deployed, it may adversely affect controls placed on system files or even have default administrative accounts unknowingly implemented upon install. Additionally, an employee may be transferred, quit, or be on temporary leave that may affect policy requirements regarding separation of duties. An attack on systems may have resulted in the implantation of a Trojan horse program, potentially exposing private user information, such as credit card information and financial data. In all of these cases, an undesirable situation must be rectified as quickly as possible and controls returned to normal operations.

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For example, the access control policy may state that the authentication process must be encrypted when performed over the Internet. Adjusting an application to natively support encryption for authentication purposes may be too costly. Secure Socket Layer (SSL), an encryption protocol, can be employed and layered on top of the authentication process to support the policy statement.

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The following answers are incorrect:

The other examples are belongs to detective control.

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 44

and

Official ISC2 CISSP guide 3rd edition Page number 50 and 51

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### QUESTION 245

During an IS audit, auditor has observed that authentication and authorization steps are split into two functions and there is a possibility to force the authorization step to be completed before the authentication step. Which of the following technique an attacker could user to force authorization step before authentication?

- A. Eavesdropping
- B. Traffic analysis
- C. Masquerading
- D. Race Condition

Answer: D

Explanation: A race condition is when processes carry out their tasks on a shared resource in an incorrect order. A race condition is possible when two or more processes use a shared resource, as in data within a variable. It is important that the processes carry out their functionality in the correct sequence. If process 2 carried out its task on the data before process 1, the result will be much different than if process1 carried out its tasks on the data before process 2

In software, when the authentication and authorization steps are split into two functions, there is a possibility an attacker could use a race condition to force the authorization step to be completed before the authentication step. This would be a flaw in the software that the attacker has figured out how to exploit. A race condition occurs when two or more processes use the same resource and the sequences of steps within the software can be carried out in an improper order, something that can drastically affect the output. So, an attacker can force the authorization step to take place before the authentication step and gain unauthorized access to a resource.

The following answers are incorrect:

Eavesdropping - is the act of secretly listening to the private conversation of others without their consent, as defined by Black's Law Dictionary. This is commonly thought to be unethical and there is an old adage that "eavesdroppers seldom hear anything good of themselves...eavesdroppers always try to listen to matters that concern them."

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Traffic analysis - is the process of intercepting and examining messages in order to deduce information from patterns in communication. It can be performed even when the messages are encrypted and cannot be decrypted. In general, the greater the number of messages observed, or even intercepted and stored, the more can be inferred from the traffic. Traffic analysis can be performed in the context of military intelligence, counter-intelligence, or pattern-of-life analysis, and is a concern in computer security.

Masquerading - A masquerade attack is an attack that uses a fake identity, such as a network identity, to gain unauthorized access to personal computer information through legitimate access identification. If an authorization process is not fully protected, it can become extremely vulnerable to a masquerade attack. Masquerade attacks can be perpetrated using stolen passwords and logons, by locating gaps in programs, or by finding a way around the authentication process. The attack can be triggered either by someone within the organization or by an outsider if the organization is connected to a public network. The amount of access masquerade attackers get depends on the level of authorization they've managed to attain. As such, masquerade attackers can have a full smorgasbord of cyber crime opportunities if they've gained the highest access authority to a business organization. Personal attacks, although less common, can also be harmful.

Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 324

Official ISC2 guide to CISSP CBK 3rd Edition Page number 66

CISSP All-In-One Exam guide 6th Edition Page Number 161

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### QUESTION 246

Which of the following attack is also known as Time of Check(TOC)/Time of Use(TOU)?

- A. Eavesdropping
- B. Traffic analysis
- C. Masquerading
- D. Race Condition

Answer: D

Explanation: A Race Condition attack is also known as Time of Check(TOC)/Time of Use(TOU). A race condition is when processes carry out their tasks on a shared resource in an incorrect order. A race condition is possible when two or more processes use a shared resource, as in data within a variable. It is important that the processes carry out their functionality in the correct sequence. If process 2 carried out its task on the data before process 1, the result will be much different than if process1 carried out its tasks on the data before process 2

In software, when the authentication and authorization steps are split into two functions, there is a possibility an attacker could use a race condition to force the authorization step to be completed before the authentication step. This would be a flaw in the software that the attacker has figured out how to exploit. A race condition occurs when two or more processes use the same resource and the sequences of steps within the software can be carried out in an improper order, something that can drastically affect the output. So, an attacker can force the authorization step to take place before the authentication step and gain unauthorized access to a resource.

The following answers are incorrect:

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Eavesdropping - is the act of secretly listening to the private conversation of others without their consent, as defined by Black's Law Dictionary. This is commonly thought to be unethical and there is an old adage that "eavesdroppers seldom hear anything good of themselves...eavesdroppers always try to listen to matters that concern them."

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CISA review manual 2014 Page number 324

Official ISC2 guide to CISSP CBK 3rd Edition Page number 66

CISSP All-In-One Exam guide 6th Edition Page Number 161

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### QUESTION 247

Which of the following biometrics methods provides the HIGHEST accuracy and is LEAST accepted by users?

- A. Palm Scan
- B. Hand Geometry
- C. Fingerprint
- D. Retina scan

Answer: D

Explanation: Retina based biometric involves analyzing the layer of blood vessels situated at the back of the eye.

An established technology, this technique involves using a low-intensity light source through an optical coupler to scan the unique patterns of the retina. Retinal scanning can be quite accurate but does require the user to look into a receptacle and focus on a given point. This is not particularly convenient if you wear glasses or are concerned about having close contact with the reading device. For these reasons, retinal scanning is not warmly accepted by all users, even though the technology itself can work well.

For your exam you should know the information below:

## Biometrics

Biometrics verifies an individual's identity by analyzing a unique personal attribute or behavior, which is one of the most effective and accurate methods of verifying identification and not well received by society. Biometrics is a very sophisticated technology; thus, it is much more expensive and complex than the other types of identity verification processes. A biometric system can make authentication decisions based on an individual's behavior, as in signature dynamics, but these can change over time and possibly be forged. Biometric systems that base authentication decisions on physical attributes (such as iris, retina, or fingerprint) provide more accuracy because physical attributes typically don't change, absent some disfiguring injury, and are harder to impersonate.

Biometrics is typically broken up into two different categories. The first is the physiological. These are traits that are physical attributes unique to a specific individual. Fingerprints are a common example of a physiological trait used in biometric systems. The second category of biometrics is known as behavioral. The behavioral authentication is also known as continuous authentication. The behavioral/continuous authentication prevents session hijacking attack. This is based on a characteristic of an individual to confirm his identity. An example is signature Dynamics.

Physiological is "what you are" and behavioral is "what you do."

When a biometric system rejects an authorized individual, it is called a Type I error (false rejection rate). When the system accepts impostors who should be rejected, it is called a Type II error (false acceptance rate). The goal is to obtain low numbers for each type of error, but Type II errors are the most dangerous and thus the most important to avoid.

When comparing different biometric systems, many different variables are used, but one of the most important metrics is the crossover error rate (CER). This rating is stated as a percentage and represents the point at which the false rejection rate equals the false acceptance rate. This rating is the most important measurement when determining the system's accuracy. A biometric system that delivers a CER of 3 will be more accurate than a system that delivers a CER of 4. Crossover error rate (CER) is also called equal error rate (EER).

Throughput describes the process of authenticating to a biometric system. This is also referred to as the biometric system response time. The primary consideration that should be put into the purchasing and implementation of biometric access control are user acceptance, accuracy and processing speed.

## Biometric Considerations

In addition to the access control elements of a biometric system, there are several other considerations that are important to the integrity of the control environment. These are:

Resistance to counterfeiting

Data storage requirements

User acceptance

Reliability and

Target User and approach

Fingerprint

Fingerprints are made up of ridge endings and bifurcations exhibited by friction ridges and other detailed characteristics called minutiae. It is the distinctiveness of these minutiae that gives each individual a unique fingerprint. An individual places his finger on a device that reads the details of the fingerprint and compares this to a reference file. If the two match, the individual's identity has been verified.

Palm Scan

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The palm holds a wealth of information and has many aspects that are used to identify an individual. The palm has creases, ridges, and grooves throughout that are unique to a specific person. The palm scan also includes the fingerprints of each finger. An individual places his hand on the biometric device, which scans and captures this information. This information is compared to a reference file, and the identity is either verified or rejected.

#### Hand Geometry

The shape of a person's hand (the shape, length, and width of the hand and fingers) defines hand geometry. This trait differs significantly between people and is used in some biometric systems to verify identity. A person places her hand on a device that has grooves for each finger. The system compares the geometry of each finger, and the hand as a whole, to the information in a reference file to verify that person's identity.

#### Retina Scan

A system that reads a person's retina scans the blood-vessel pattern of the retina on the backside of the eyeball. This pattern has shown to be extremely unique between different people. A camera is used to project a beam inside the eye and capture the pattern and compare it to a reference file recorded previously.

#### Iris Scan

An iris scan is a passive biometric control

The iris is the colored portion of the eye that surrounds the pupil. The iris has unique patterns, rifts, colors, rings, coronas, and furrows. The uniqueness of each of these characteristics within the iris is captured by a camera and compared with the information gathered during the enrollment phase. When using an iris pattern biometric system, the optical unit must be positioned so the sun does not shine into the aperture; thus, when implemented, it must have proper placement within the facility.

#### Signature Dynamics

When a person signs a signature, usually they do so in the same manner and speed each time. Signing a signature produces electrical signals that can be captured by a biometric system. The physical motions performed when someone is signing a document create these electrical signals. The signals provide unique characteristics that can be used to distinguish one individual from another. Signature dynamics provides more information than a static signature, so there are more variables to verify when confirming an individual's identity and more assurance that this person is who he claims to be.

#### Keystroke Dynamics

Whereas signature dynamics is a method that captures the electrical signals when a person signs a name, keystroke dynamics captures electrical signals when a person types a certain phrase. As a person types a specified phrase, the biometric system captures the speed and motions of this action. Each individual has a certain style and speed, which translate into unique signals. This type of authentication is more effective than typing in a password, because a password is easily obtainable. It is much harder to repeat a person's typing style than it is to acquire a password.

#### Voice Print

People's speech sounds and patterns have many subtle distinguishing differences. A biometric system that is programmed to capture a voice print and compare it to the information held in a reference file can differentiate one individual from another. During the enrollment process, an individual is asked to say several different words.

#### Facial Scan

A system that scans a person's face takes many attributes and characteristics into account.

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People have different bone structures, nose ridges, eye widths, forehead sizes, and chin shapes. These are all captured during a facial scan and compared to an earlier captured scan held within a reference record. If the information is a match, the person is positively identified.

#### Hand Topography

Whereas hand geometry looks at the size and width of an individual's hand and fingers, hand topology looks at the different peaks and valleys of the hand, along with its overall shape and curvature. When an individual wants to be authenticated, she places her hand on the system. Off to one side of the system, a camera snaps a side-view picture of the hand from a different view and angle than that of systems that target hand geometry, and thus captures different data. This attribute is not unique enough to authenticate individuals by itself and is commonly used in conjunction with hand geometry.

#### Vascular Scan

Valcular Scan uses the blood vessel under the first layer of skin.

The following answers are incorrect:

Fingerprint - Fingerprints are made up of ridge endings and bifurcations exhibited by friction ridges and other detailed characteristics called minutiae. It is the distinctiveness of these minutiae that gives each individual a unique fingerprint. An individual places his finger on a device that reads the details of the fingerprint and compares this to a reference file. If the two match, the individual's identity has been verified.

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Palm Scan - The palm holds a wealth of information and has many aspects that are used to identify an individual. The palm has creases, ridges, and grooves throughout that are unique to a specific person. The palm scan also includes the fingerprints of each finger. An individual places his hand on the biometric device, which scans and captures this information. This information is compared to a reference file, and the identity is either verified or rejected.

Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 330 and 331

Official ISC2 guide to CISSP CBK 3rd Edition Page number 924

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### QUESTION 248

During an IS audit, one of your auditor has observed that some of the critical servers in your organization can be accessed ONLY by using shared/common user name and password. What should be the auditor's PRIMARY concern be with this approach?

- A. Password sharing
- B. Accountability
- C. Shared account management
- D. Difficulty in auditing shared account

Answer: B

Explanation: The keyword PRIMARY is used in the question. Accountability should be the

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primary concern if critical servers can be accessed only by using shared user id and password. It would be very difficult to track the changes done by employee on critical server.

For your exam you should know the information below:

#### Accountability

Ultimately one of the drivers behind strong identification, authentication, auditing and session management is accountability. Accountability is fundamentally about being able to determine who or what is responsible for an action and can be held responsible. A closely related information assurance topic is non-repudiation. Repudiation is the ability to deny an action, event, impact or result. Non-repudiation is the process of ensuring a user may not deny an action. Accountability relies heavily on non-repudiation to ensure users, processes and actions may be held responsible for impacts.

The following contribute to ensuring accountability of actions:

Strong identification

Strong authentication

User training and awareness

Comprehensive, timely and thorough monitoring

Accurate and consistent audit logs

Independent audits

Policies enforcing accountability

Organizational behaviour supporting accountability

The following answers are incorrect:

The other options are also valid concern. But the primary concern should be accountability.

Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 328 and 329

Official ISC2 guide to CISSP CBK 3rd Edition Page number 114

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#### QUESTION 249

Which of the following testing method examines the functionality of an application without peering into its internal structure or knowing the details of it's internals?

- A. Black-box testing
- B. Parallel Test
- C. Regression Testing
- D. Pilot Testing

Answer: A

Explanation: Black-box testing is a method of software testing that examines the functionality of an application (e.g. what the software does) without peering into its internal structures or workings (see white-box testing). This method of test can be applied to virtually every level of software testing: unit, integration, system and acceptance. It typically comprises most if not all higher level testing, but can also dominate unit testing as well.

For your exam you should know the information below:

Alpha and Beta Testing - An alpha version is early version is an early version of the application system submitted to the internal user for testing. The alpha version may not contain all the features planned for the final version. Typically software goes to two stages testing before it

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consider finished. The first stage is called alpha testing is often performed only by the user within the organization developing the software. The second stage is called beta testing, a form of user acceptance testing, generally involves a limited number of external users. Beta testing is the last stage of testing, and normally involves real world exposure, sending the beta version of the product to independent beta test sites or offering it free to interested user.

Pilot Testing - A preliminary test that focuses on specific and predefined aspect of a system. It is not meant to replace other testing methods, but rather to provide a limited evaluation of the system. Proof of concept are early pilot tests – usually over interim platform and with only basic functionalities.

White box testing - Assess the effectiveness of a software program logic. Specifically, test data are used in determining procedural accuracy or conditions of a program's specific logic path. However testing all possible logical path in large information system is not feasible and would be cost prohibitive, and therefore is used on selective basis only.

Black Box Testing - An integrity based form of testing associated with testing components of an information system's "functional" operating effectiveness without regards to any specific internal program structure. Applicable to integration and user acceptance testing.

Function/validation testing – It is similar to system testing but it is often used to test the functionality of the system against the detailed requirements to ensure that the software that has been built is traceable to customer requirements.

Regression Testing - The process of rerunning a portion of a test scenario or test plan to ensure that changes or corrections have not introduced new errors. The data used in regression testing should be same as original data.

Parallel Testing - This is the process of feeding test data into two systems – the modified system and an alternative system and comparing the result.

Sociability Testing - The purpose of these tests is to confirm that new or modified system can operate in its target environment without adversely impacting existing system. This should cover not only platform that will perform primary application processing and interface with other system but , in a client server and web development, changes to the desktop environment. Multiple application may run on the users desktop, potentially simultaneously , so it is important to test the impact of installing new dynamic link libraries (DLLs), making operating system registry or configuration file modification, and possibly extra memory utilization.

The following answers are incorrect:

Parallel Testing - This is the process of feeding test data into two systems – the modified system and an alternative system and comparing the result.

Regression Testing - The process of rerunning a portion of a test scenario or test plan to ensure that changes or corrections have not introduced new errors. The data used in regression testing should be same as original data.

Pilot Testing - A preliminary test that focuses on specific and predefined aspect of a system. It is not meant to replace other testing methods, but rather to provide a limited evaluation of the system. Proof of concept are early pilot tests – usually over interim platform and with only basic functionalities

The following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 167

Official ISC2 guide to CISSP CBK 3rd Edition Page number 176

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**QUESTION 250**

Which of the following testing method examines internal structure or working of an application?

- A. White-box testing
- B. Parallel Test
- C. Regression Testing
- D. Pilot Testing

Answer: A

Explanation: White-box testing (also known as clear box testing, glass box testing, transparent box testing, and structural testing) is a method of testing software that tests internal structures or workings of an application, as opposed to its functionality (i.e. black-box testing). In white-box testing an internal perspective of the system, as well as programming skills, are used to design test cases. The tester chooses inputs to exercise paths through the code and determine the appropriate outputs. This is analogous to testing nodes in a circuit, e.g. in-circuit testing (ICT). White-box testing can be applied at the unit, integration and system levels of the software testing process. Although traditional testers tended to think of white-box testing as being done at the unit level, it is used for integration and system testing more frequently today. It can test paths within a unit, paths between units during integration, and between subsystems during a system-level test. Though this method of test design can uncover many errors or problems, it has the potential to miss unimplemented parts of the specification or missing requirements.

For your exam you should know the information below:

**Alpha and Beta Testing** - An alpha version is early version is an early version of the application system submitted to the internal user for testing. The alpha version may not contain all the features planned for the final version. Typically software goes to two stages testing before it consider finished. The first stage is called alpha testing is often performed only by the user within the organization developing the software. The second stage is called beta testing, a form of user acceptance testing, generally involves a limited number of external users. Beta testing is the last stage of testing, and normally involves real world exposure, sending the beta version of the product to independent beta test sites or offering it free to interested user.

**Pilot Testing** - A preliminary test that focuses on specific and predefined aspect of a system. It is not meant to replace other testing methods, but rather to provide a limited evaluation of the system. Proof of concept are early pilot tests – usually over interim platform and with only basic functionalities.

**White box testing** - Assess the effectiveness of a software program logic. Specifically, test data are used in determining procedural accuracy or conditions of a program's specific logic path. However testing all possible logical path in large information system is not feasible and would be cost prohibitive, and therefore is used on selective basis only.

**Black Box Testing** - An integrity based form of testing associated with testing components of an information system's "functional" operating effectiveness without regards to any specific internal program structure. Applicable to integration and user acceptance testing.

**Function/validation testing** – It is similar to system testing but it is often used to test the functionality of the system against the detailed requirements to ensure that the software that has been built is traceable to customer requirements.

**Regression Testing** - The process of rerunning a portion of a test scenario or test plan to ensure

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that changes or corrections have not introduced new errors. The data used in regression testing should be same as original data.

Parallel Testing - This is the process of feeding test data into two systems – the modified system and an alternative system and comparing the result.

Sociability Testing - The purpose of these tests is to confirm that new or modified system can operate in its target environment without adversely impacting existing system. This should cover not only platform that will perform primary application processing and interface with other system but , in a client server and web development, changes to the desktop environment. Multiple application may run on the users desktop, potentially simultaneously , so it is important to test the impact of installing new dynamic link libraries (DLLs), making operating system registry or configuration file modification, and possibly extra memory utilization.

The following answers are incorrect:

Parallel Testing - This is the process of feeding test data into two systems – the modified system and an alternative system and comparing the result.

Regression Testing - The process of rerunning a portion of a test scenario or test plan to ensure that changes or corrections have not introduced new errors. The data used in regression testing should be same as original data.

Pilot Testing - A preliminary test that focuses on specific and predefined aspect of a system. It is not meant to replace other testing methods, but rather to provide a limited evaluation of the system. Proof of concept are early pilot tests – usually over interim platform and with only basic functionalities

The following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 167

Official ISC2 guide to CISSP CBK 3rd Edition Page number 176

(Telecommunication and Network Security)

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## QUESTION 251

Which of the following type of traffic can easily be filtered with a stateful packet filter by enforcing the context or state of the request?

- A. ICMP
- B. TCP
- C. UDP
- D. IP

Answer: B

Explanation: The question is explicit in asking \*easily\*. With TCP connection establishment there is a distinct state or sequence that can be expected. Consult the references for further details.

ICMP, IP and UDP don't have any concept of a session; i.e. each packet or datagram is handled individually, with no reference to the contents of the previous one. With no sessions, these protocols usually cannot be filtered on the state of the session.

Some newer firewalls, however, simulate the concept of state for these protocols, and filter out unexpected packets based upon normal usage. Although these are commonly treated like normal stateful filters, they are more complex to program, and hence more prone to errors.

A stateful packet filter or stateful inspection inspects each packet and only allows known

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connection states through. So, if a SYN/ACK packet was received and there was not a prior SYN packet sent it would filter that packet and not let it in. The correct sequence of steps are known and if the sequence or state is incorrect then it is dropped.

The incorrect answers are:

ICMP. ICMP is basically stateless so you could not \*easily\* filter them based on the state or sequence.

UDP. UDP has no real state so you could only partially filter them based on the state or sequence. The question was explicit in asking \*easily\*. While it is possible, UDP is not the best answer.

IP. IP would refer to the Internet Protocol and as such is stateless so you would not be able to filter it out \*easily\*.

The following reference(s) were used for this question:

<http://www.nwo.net/ipf/ipf-howto.pdf>

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### QUESTION 252

When referring to the data structures of a packet, the term Protocol Data Unit (PDU) is used, what is the proper term to refer to a single unit of TCP data at the transport layer?

- A. TCP segment.
- B. TCP datagram.
- C. TCP frame.
- D. TCP packet.

Answer: A

Explanation: A TCP Segment is the group of TCP data transmitted at the Transport Layer. TCP is segment based network technology.

The message is sent to the transport layer, where TCP does its magic on the data. The bundle of data is now a segment. If the message is being transmitted over TCP, it is referred to as a “segment.”

#### Protocol Data Unit Layers

The following answers are incorrect:

TCP datagram. Is incorrect because a TCP datagram is only a distractor, IP datagram would be the proper terminology. TCP is segment based network technology.

TCP frame. Is incorrect because a TCP frame is only a distractor, Ethernet Frame would be the proper terminology. TCP is segment based network technology.

TCP packet. Is incorrect because a TCP packet is only a distractor. TCP is segment based network technology.

References(s) used for this question:

Wikipedia [http://en.wikipedia.org/wiki/Transport\\_layer](http://en.wikipedia.org/wiki/Transport_layer)

Wikipedia [http://en.wikipedia.org/wiki/Transmission\\_Control\\_Protocol#TCP\\_segment\\_structure](http://en.wikipedia.org/wiki/Transmission_Control_Protocol#TCP_segment_structure)

TCP/IP Illustrated, Volume 1: The Protocols, Addison-Wesley, 1994, ISBN 0-201-63346-9.

<http://www.infocellar.com/networks/osi-model.htm>

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### QUESTION 253

How do you distinguish between a bridge and a router?

- 
- A. A bridge simply connects multiple networks, a router examines each packet to determine which network to forward it to.
  - B. "Bridge" and "router" are synonyms for equipment used to join two networks.
  - C. The bridge is a specific type of router used to connect a LAN to the global Internet.
  - D. The bridge connects multiple networks at the data link layer, while router connects multiple networks at the network layer.

Answer: D

Explanation: The following answers are incorrect:

A bridge simply connects multiple networks, a router examines each packet to determine which network to forward it to. Is incorrect because both forward packets this is not distinctive enough.  
"Bridge" and "router" are synonyms for equipment used to join two networks. Is incorrect because the two are unique and operate at different layers of the OSI model.  
The bridge is a specific type of router used to connect a LAN to the global Internet. Is incorrect because a bridge does not connect a LAN to the global internet, but connects networks together creating a LAN.

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#### QUESTION 254

ICMP and IGMP belong to which layer of the OSI model?

- A. Datagram Layer.
- B. Network Layer.
- C. Transport Layer.
- D. Data Link Layer.

Answer: B

Explanation: The network layer contains the Internet Protocol (IP), the Internet Control Message Protocol (ICMP), and the Internet Group Management Protocol (IGMP)

The following answers are incorrect:

Datagram Layer. Is incorrect as a distractor as there is no Datagram Layer.  
Transport Layer. Is incorrect because it is used to data between applications and uses the TCP and UDP protocols.  
Data Link Layer. Is incorrect because this layer deals with addressing hardware.

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#### QUESTION 255

What is a limitation of TCP Wrappers?

- A. It cannot control access to running UDP services.
- B. It stops packets before they reach the application layer, thus confusing some proxy servers.
- C. The hosts.\* access control system requires a complicated directory tree.
- D. They are too expensive.

Answer: A

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Explanation: TCP Wrappers can control when a UDP server starts but has little control afterwards because UDP packets can be sent randomly.

The following answers are incorrect:

It stops packets before they reach the application layer, thus confusing some proxy servers. Is incorrect because the TCP Wrapper acts as an ACL restricting packets so would not confuse a proxy server because the packets would not arrive and would not be a limitation.

The hosts.\* access control system requires a complicated directory tree. Is incorrect because a simple directory tree is involved.

They are too expensive. Is incorrect because TCP Wrapper is considered open source with a BSD licensing scheme.

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### QUESTION 256

The IP header contains a protocol field. If this field contains the value of 1, what type of data is contained within the IP datagram?

- A. TCP.
- B. ICMP.
- C. UDP.
- D. IGMP.

Answer: B

Explanation: If the protocol field has a value of 1 then it would indicate it was ICMP.

The following answers are incorrect:

TCP. Is incorrect because the value for a TCP protocol would be 6.

UDP. Is incorrect because the value for an UDP protocol would be 17.

IGMP. Is incorrect because the value for an IGMP protocol would be 2.

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### QUESTION 257

The IP header contains a protocol field. If this field contains the value of 2, what type of data is contained within the IP datagram?

- A. TCP.
- B. ICMP.
- C. UDP.
- D. IGMP.

Answer: D

Explanation: If the protocol field has a value of 2 then it would indicate it was IGMP.

The following answers are incorrect:

TCP. Is incorrect because the value for a TCP protocol would be 6.

UDP. Is incorrect because the value for an UDP protocol would be 17.

ICMP. Is incorrect because the value for an ICMP protocol would be 1.

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**QUESTION 258**

What is the proper term to refer to a single unit of IP data?

- A. IP segment.
- B. IP datagram.
- C. IP frame.
- D. IP fragment.

Answer: B

Explanation: IP is a datagram based technology.

**DIFFERENCE BETWEEN PACKETS AND DATAGRAM**

As specified at: [http://en.wikipedia.org/wiki/Packet\\_\(information\\_technology\)](http://en.wikipedia.org/wiki/Packet_(information_technology))

In general, the term packet applies to any message formatted as a packet, while the term datagram is generally reserved for packets of an "unreliable" service.

A "reliable" service is one that notifies the user if delivery fails, while an "unreliable" one does not notify the user if delivery fails. For example, IP provides an unreliable service.

Together, TCP and IP provide a reliable service, whereas UDP and IP provide an unreliable one.

All these protocols use packets, but UDP packets are generally called datagrams.

If a network does not guarantee packet delivery, then it becomes the host's responsibility to provide reliability by detecting and retransmitting lost packets. Subsequent experience on the ARPANET indicated that the network itself could not reliably detect all packet delivery failures, and this pushed responsibility for error detection onto the sending host in any case. This led to the development of the end-to-end principle, which is one of the Internet's fundamental design assumptions.

The following answers are incorrect:

IP segment. Is incorrect because IP segment is a detractor, the correct terminology is TCP segment. IP is a datagram based technology.

IP frame. Is incorrect because IP frame is a detractor, the correct terminology is Ethernet frame. IP is a datagram based technology.

IP fragment. Is incorrect because IP fragment is a detractor.

References:

Wikipedia [http://en.wikipedia.org/wiki/Internet\\_Protocol](http://en.wikipedia.org/wiki/Internet_Protocol)

**QUESTION 259**

A packet containing a long string of NOP's followed by a command is usually indicative of what?

- A. A syn scan.
- B. A half-port scan.
- C. A buffer overflow attack.
- D. A packet destined for the network's broadcast address.

Answer: C

Explanation: A series of the same control, hexadecimal, characters imbedded in the string is usually an indicator of a buffer overflow attack. A NOP is a instruction which does nothing (No

Operation - the hexadecimal equivalent is 0x90)

The following answers are incorrect:

A syn scan. This is incorrect because a SYN scan is when a SYN packet is sent to a specific port and the results are then analyzed.

A half-port scan. This is incorrect because the port scanner generates a SYN packet. If the target port is open, it will respond with a SYN-ACK packet. The scanner host responds with a RST packet, closing the connection before the handshake is completed. Also known as a Half Open Port scan.

A packet destined for the network's broadcast address. This is incorrect because this type of packet would not contain a long string of NOP characters.

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### QUESTION 260

In the days before CIDR (Classless Internet Domain Routing), networks were commonly organized by classes. Which of the following would have been true of a Class C network?

- A. The first bit of the IP address would be set to zero.
- B. The first bit of the IP address would be set to one and the second bit set to zero.
- C. The first two bits of the IP address would be set to one, and the third bit set to zero.
- D. The first three bits of the IP address would be set to one.

Answer: C

Explanation: Each Class C network address has a 24-bit network prefix, with the three highest order bits set to 1-1-0

The following answers are incorrect:

The first bit of the IP address would be set to zero. Is incorrect because, this would be a Class A network address.

The first bit of the IP address would be set to one and the second bit set to zero. Is incorrect because, this would be a Class B network address .

The first three bits of the IP address would be set to one. Is incorrect because, this is a distractor. Class D & E have the first three bits set to 1. Class D the 4th bit is 0 and for Class E the 4th bit to 1.

### Classless Internet Domain Routing (CIDR)

High Order bits are shown in bold below.

For Class A, the addresses are 0.0.0.0 - 127.255.255.255

The lowest Class A address is represented in binary as 00000000.00000000.0000000.00000000

For Class B networks, the addresses are 128.0.0.0 - 191.255.255.255.

The lowest Class B address is represented in binary as 10000000.00000000.00000000.00000000

For Class C, the addresses are 192.0.0.0 - 223.255.255.255

The lowest Class C address is represented in binary as 11000000.00000000.00000000.00000000

For Class D, the addresses are 224.0.0.0 - 239.255.255.255 (Multicast)

The lowest Class D address is represented in binary as 11100000.00000000.00000000.00000000

For Class E, the addresses are 240.0.0.0 - 255.255.255.255 (Reserved for future usage)

The lowest Class E address is represented in binary as 11110000.00000000.00000000.00000000

### Classful IP Address Format

References:

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3Com [http://www.3com.com/other/pdfs/infra/corpinfo/en\\_US/501302.pdf](http://www.3com.com/other/pdfs/infra/corpinfo/en_US/501302.pdf)  
AIOv3 Telecommunications and Networking Security (page 438)

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**QUESTION 261**

Which of the following is an IP address that is private (i.e. reserved for internal networks, and not a valid address to use on the Internet)?

- A. 192.168.42.5
- B. 192.166.42.5
- C. 192.175.42.5
- D. 192.1.42.5

Answer: A

Explanation: This is a valid Class C reserved address. For Class C, the reserved addresses are 192.168.0.0 - 192.168.255.255.

The private IP address ranges are defined within RFC 1918:

RFC 1918 private ip address range

The following answers are incorrect:

- 192.166.42.5 Is incorrect because it is not a Class C reserved address.
- 192.175.42.5 Is incorrect because it is not a Class C reserved address.
- 192.1.42.5 Is incorrect because it is not a Class C reserved address.

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**QUESTION 262**

In the days before CIDR (Classless Internet Domain Routing), networks were commonly organized by classes. Which of the following would have been true of a Class A network?

- A. The first bit of the IP address would be set to zero.
- B. The first bit of the IP address would be set to one and the second bit set to zero.
- C. The first two bits of the IP address would be set to one, and the third bit set to zero.
- D. The first three bits of the IP address would be set to one.

Answer: A

Explanation: Each Class A network address has a 8-bit network prefix, with the first bit of the ipaddress set to zero. See the diagram below for more details.

The following answers are incorrect:

The first bit of the IP address would be set to one and the second bit set to zero. Is incorrect because this would be a Class B network address.

The first two bits of the IP address would be set to one, and the third bit set to zero. Is incorrect because, this would be a Class C network address.

The first three bits of the ipaddress would be set to one. Is incorrect because, this is a distractor.

Class D & E have the first three bits set to 1.

Class D the 4th bit is 0 and for

Class E the 4th bit to 1.

See diagram below from the 3COM tutorial on everything you ever wanted to know about IP

addressing:

Classful IP addressing format

Classless Internet Domain Routing (CIDR)

Classless Inter-Domain Routing (CIDR) is a method for allocating IP addresses and routing Internet Protocol packets. The Internet Engineering Task Force introduced CIDR in 1993 to replace the previous addressing architecture of classful network design in the Internet. Their goal was to slow the growth of routing tables on routers across the Internet, and to help slow the rapid exhaustion of IPv4 addresses.

For Class A, the addresses are 0.0.0.0 - 127.255.255.255.

For Class B networks, the addresses are 128.0.0.0 - 191.255.255.255.

For Class C, the addresses are 192.0.0.0 - 223.255.255.255.

For Class D, the addresses are 224.0.0.0 - 239.255.255.255.

For Class E, the addresses are 240.0.0.0 - 255.255.255.255.

References:

3Com [http://www.3com.com/other/pdfs/infra/corpinfo/en\\_US/501302.pdf](http://www.3com.com/other/pdfs/infra/corpinfo/en_US/501302.pdf)

and

AIOv3 Telecommunications and Networking Security (page 438)

and

[https://secure.wikimedia.org/wikipedia/en/wiki/Classless\\_Inter-Domain\\_Routing](https://secure.wikimedia.org/wikipedia/en/wiki/Classless_Inter-Domain_Routing)

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### QUESTION 263

Which of the following is an IP address that is private (i.e. reserved for internal networks, and not a valid address to use on the Internet)?

- A. 10.0.42.5
- B. 11.0.42.5
- C. 12.0.42.5
- D. 13.0.42.5

Answer: A

Explanation: This is a valid Class A reserved address. For Class A, the reserved addresses are 10.0.0.0 - 10.255.255.255.

The following answers are incorrect:

11.0.42.5 Is incorrect because it is not a Class A reserved address.

12.0.42.5 Is incorrect because it is not a Class A reserved address.

13.0.42.5 Is incorrect because it is not a Class A reserved address.

The private IP address ranges are defined within RFC 1918:

RFC 1918 private ip address range

References:

3Com [http://www.3com.com/other/pdfs/infra/corpinfo/en\\_US/501302.pdf](http://www.3com.com/other/pdfs/infra/corpinfo/en_US/501302.pdf)

AIOv3 Telecommunications and Networking Security (page 438)

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### QUESTION 264

Which one of the following authentication mechanisms creates a problem for mobile users?

- 
- A. Mechanisms based on IP addresses
  - B. Mechanism with reusable passwords
  - C. one-time password mechanism.
  - D. challenge response mechanism.

Answer: A

Explanation: Anything based on a fixed IP address would be a problem for mobile users because their location and its associated IP address can change from one time to the next. Many providers will assign a new IP every time the device would be restarted. For example an insurance adjuster using a laptop to file claims online. He goes to a different client each time and the address changes every time he connects to the ISP.

**NOTE FROM CLEMENT:**

The term MOBILE in this case is synonymous with Road Warriors where a user is constantly traveling and changing location. With smartphone today that may not be an issue but it would be an issue for laptops or WIFI tablets. Within a carrier network the IP will tend to be the same and would change rarely. So this question is more applicable to devices that are not cellular devices but in some cases this issue could affect cellular devices as well.

The following answers are incorrect:

mechanism with reusable password. This is incorrect because reusable password mechanism would not present a problem for mobile users. They are the least secure and change only at specific interval.

one-time password mechanism. This is incorrect because a one-time password mechanism would not present a problem for mobile users. Many are based on a clock and not on the IP address of the user.

challenge response mechanism. This is incorrect because challenge response mechanism would not present a problem for mobile users.

---

**QUESTION 265**

Which of the following media is MOST resistant to tapping?

- A. microwave.
- B. twisted pair.
- C. coaxial cable.
- D. fiber optic.

Answer: D

Explanation: Fiber Optic is the most resistant to tapping because Fiber Optic uses a light to transmit the signal. While there are some technologies that will allow to monitor the line passively, it is very difficult to tap into without detection so this technology would be the MOST resistant to tapping.

The following answers are incorrect:

microwave. Is incorrect because microwave transmissions can be intercepted if in the path of the broadcast without detection.

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twisted pair. Is incorrect because it is easy to tap into a twisted pair line.  
coaxial cable. Is incorrect because it is easy to tap into a coaxial cable line.

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**QUESTION 266**

Which of the following is a tool often used to reduce the risk to a local area network (LAN) that has external connections by filtering Ingress and Egress traffic?

- A. a firewall.
- B. dial-up.
- C. passwords.
- D. fiber optics.

Answer: A

Explanation: The use of a firewall is a requirement to protect a local area network (LAN) that has external connections without that you have no real protection from fraudsters.

The following answers are incorrect:

dial-up. This is incorrect because this offers little protection once the connection has been established.

passwords. This is incorrect because there are tools to crack passwords and once a user has been authenticated and connects to the external connections, passwords do not offer protection against incoming TCP packets.

fiber optics. This is incorrect because this offers no protection from the external connection.

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**QUESTION 267**

Which one of the following is usually not a benefit resulting from the use of firewalls?

- A. reduces the risks of external threats from malicious hackers.
- B. prevents the spread of viruses.
- C. reduces the threat level on internal system.
- D. allows centralized management and control of services.

Answer: B

Explanation: This is not a benefit of a firewall. Most firewalls are limited when it comes to preventing the spread of viruses.

This question is testing your knowledge of Malware and Firewalls. The keywords within the questions are "usually" and "virus". Once again to come up with the correct answer, you must stay within the context of the question and really ask yourself which of the 4 choices is NOT usually done by a firewall.

Some of the latest Appliances such as Unified Threat Management (UTM) devices does have the ability to do virus scanning but most first and second generation firewalls would not have such ability. Remember, the questions is not asking about all possible scenarios that could exist but only about which of the 4 choices presented is the BEST.

For the exam you must know your general classes of Malware. There are generally four major classes of malicious code that fall under the general definition of malware:

- 
1. Virus: Parasitic code that requires human action or insertion, or which attaches itself to another program to facilitate replication and distribution. Virus-infected containers can range from e-mail, documents, and data file macros to boot sectors, partitions, and memory fobs. Viruses were the first iteration of malware and were typically transferred by floppy disks (also known as “sneakernet”) and injected into memory when the disk was accessed or infected files were transferred from system to system.
  2. Worm: Self-propagating code that exploits system or application vulnerabilities to replicate. Once on a system, it may execute embedded routines to alter, destroy, or monitor the system on which it is running, then move on to the next system. A worm is effectively a virus that does not require human interaction or other programs to infect systems.
  3. Trojan Horse: Named after the Trojan horse of Greek mythology (and serving a very similar function), a Trojan horse is a general term referring to programs that appear desirable, but actually contain something harmful. A Trojan horse purports to do one thing that the user wants while secretly performing other potentially malicious actions. For example, a user may download a game file, install it, and begin playing the game. Unbeknownst to the user, the application may also install a virus, launch a worm, or install a utility allowing an attacker to gain unauthorized access to the system remotely, all without the user’s knowledge.
  4. Spyware: Prior to its use in malicious activity, spyware was typically a hidden application injected through poor browser security by companies seeking to gain more information about a user’s Internet activity. Today, those methods are used to deploy other malware, collect private data, send advertising or commercial messages to a system, or monitor system input, such as keystrokes or mouse clicks.

The following answers are incorrect:

reduces the risks of external threats from malicious hackers. This is incorrect because a firewall can reduce the risks of external threats from malicious hackers.

reduces the threat level on internal system. This is incorrect because a firewall can reduce the threat level on internal system.

allows centralized management and control of services. This is incorrect because a firewall can allow centralize management and control of services.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press (Kindle Locations 3989-4009). Auerbach Publications. Kindle Edition.

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## QUESTION 268

Which of the following DoD Model layer provides non-repudiation services?

- A. network layer.
- B. application layer.
- C. transport layer.
- D. data link layer.

Answer: B

Explanation: The Application Layer determines the identity of the communication partners and this is where Non-Repudiation service would be provided as well. See the layers below:

DOD Model DoD Model

The following answers are incorrect:

network layer. Is incorrect because the Network Layer mostly has routing protocols, ICMP, IP, and IPSEC. It is not a layer in the DoD Model. It is called the Internet Layer within the DoD model.

transport layer. Is incorrect because the Transport layer provides transparent transfer of data between end users. This is called Host-to-Host on the DoD model but sometimes some books will call it Transport as well on the DoD model.

data link layer. Is incorrect because the Data Link Layer defines the protocols that computers must follow to access the network for transmitting and receiving messages. It is part of the OSI Model. This does not exist on the DoD model, it is called the Link Layer on the DoD model.

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## QUESTION 269

What is the 802.11 standard related to?

- A. Public Key Infrastructure (PKI)
- B. Wireless network communications
- C. Packet-switching technology
- D. The OSI/ISO model

Answer: B

Explanation: The 802.11 standard outlines how wireless clients and APs communicate, lays out the specifications of their interfaces, dictates how signal transmission should take place, and describes how authentication, association, and security should be implemented.

The following answers are incorrect:

Public Key Infrastructure (PKI) Public Key Infrastructure is a supporting infrastructure to manage public keys. It is not part of the IEEE 802 Working Group standard.

Packet-switching technology A packet-switching technology is not included in the IEEE 802 Working Group standard. It is a technology where-in messages are broken up into packets, which then travel along different routes to the destination.

The OSI/ISO model The Open System Interconnect model is a seven-layer model defined as an international standard describing network communications.

The following reference(s) were/was used to create this question:

Source: Shon Harris - "All-in-One CISSP Exam Guide" Fourth Edition; Chapter 7 - Telecommunications and Network Security: pg. 624.

802.11 refers to a family of specifications developed by the IEEE for Wireless LAN technology. 802.11 specifies an over-the-air interface between a wireless client and a base station or between two wireless clients. The IEEE accepted the specification in 1997. There are several specifications in the 802.11 family:

802.11 # applies to wireless LANs and provides 1 or 2 Mbps transmission in the 2.4 GHz band using either frequency hopping spread spectrum (FHSS) or direct sequence spread spectrum (DSSS).

802.11a # an extension to 802.11 that applies to wireless LANs and provides up to 54 Mbps in the 5GHz band. 802.11a uses an orthogonal frequency division multiplexing encoding scheme rather than FHSS or DSSS.

802.11b (also referred to as 802.11 High Rate or Wi-Fi) # an extension to 802.11 that applies to wireless LANs and provides 11 Mbps transmission (with a fallback to 5.5, 2 and 1 Mbps) in the 2.4

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GHz band. 802.11b uses only DSSS. 802.11b was a 1999 ratification to the original 802.11 standard, allowing wireless functionality comparable to Ethernet.

802.11g # applies to wireless LANs and provides 20+ Mbps in the 2.4 GHz band.

Source: 802.11 Planet's web site.

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**QUESTION 270**

Remote Procedure Call (RPC) is a protocol that one program can use to request a service from a program located in another computer in a network. Within which OSI/ISO layer is RPC implemented?

- A. Session layer
- B. Transport layer
- C. Data link layer
- D. Network layer

Answer: A

Explanation: The following answers are incorrect:

Transport layer: The Transport layer handles computer-to-computer communications, rather than application-to-application communications like RPC.

Data link Layer: The Data Link layer protocols can be divided into either Logical Link Control (LLC) or Media Access Control (MAC) sublayers. Protocols like SLIP, PPP, RARP and L2TP are at this layer. An application-to-application protocol like RPC would not be addressed at this layer.

Network layer: The Network Layer is mostly concerned with routing and addressing of information, not application-to-application communication calls such as an RPC call.

The following reference(s) were/was used to create this question:

The Remote Procedure Call (RPC) protocol is implemented at the Session layer, which establishes, maintains and manages sessions as well as synchronization of the data flow.

Source: Jason Robinett's CISSP Cram Sheet: domain2.

Source: Shon Harris AIO v3 pg. 423

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**QUESTION 271**

Frame relay and X.25 networks are part of which of the following?

- A. Circuit-switched services
- B. Cell-switched services
- C. Packet-switched services
- D. Dedicated digital services

Answer: C

Explanation: Frame relay and X.25 are both examples of packet-switching technologies. In packet-switched networks there are no dedicated connections between endpoints, and data is divided into packets and reassembled on the receiving end.

Frame Relay is an example of a packet-switched technology. Packet-switched networks enable end stations to dynamically share the network medium and the available bandwidth. The following

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two techniques are used in packet-switching technology:

Variable-length packets

Statistical multiplexing

Variable-length packets are used for more efficient and flexible data transfers. These packets are switched between the various segments in the network until the destination is reached.

Statistical multiplexing techniques control network access in a packet-switched network. The advantage of this technique is that it accommodates more flexibility and more efficient use of bandwidth. Most of today's popular LANs, such as Ethernet and Token Ring, are packet-switched networks.

Frame Relay often is described as a streamlined version of X.25, offering fewer of the robust capabilities, such as windowing and retransmission of lost data that are offered in X.25. This is because Frame Relay typically operates over WAN facilities that offer more reliable connection services and a higher degree of reliability than the facilities available during the late 1970s and early 1980s that served as the common platforms for X.25 WANs. As mentioned earlier, Frame Relay is strictly a Layer 2 protocol suite, whereas X.25 provides services at Layer 3 (the network layer) as well. This enables Frame Relay to offer higher performance and greater transmission efficiency than X.25, and makes Frame Relay suitable for current WAN applications, such as LAN interconnection.

The following answers are incorrect:

Circuit-switched services. An example of a circuit-switched service are Integrated Services Digital Network (ISDN) and Point-to-Point Protocol (PPP). Frame Relay and X.25 do not use circuit switching technology.

Cell-switched services. This is a distractor.

Dedicated digital services. A packet switched network is commonly via a digital method, but is not dedicated. Examples of a Dedicated digital service might be a Permanent Virtual Circuit (PVC), which does not use packet switching.

The following reference(s) were/was used to create this question:

The CISCO Wiki on Frame Relay

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## QUESTION 272

Within the OSI model, at what layer are some of the SLIP, CSLIP, PPP control functions provided?

- A. Data Link
- B. Transport
- C. Presentation
- D. Application

Answer: A

Explanation: RFC 1661 - The Point-to-Point Protocol (PPP) specifies that the Point-to-Point Protocol (PPP) provides a standard method for transporting multi-protocol datagrams over point-to-point links. PPP is comprised of three main components:

- 1 A method for encapsulating multi-protocol datagrams.
- 2 A Link Control Protocol (LCP) for establishing, configuring, and testing the data-link connection.
- 3 A family of Network Control Protocols (NCPs) for establishing and configuring different network layer protocols.

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**QUESTION 273**

In the Open Systems Interconnect (OSI) Reference Model, at what level are TCP and UDP provided?

- A. Transport
- B. Network
- C. Presentation
- D. Application

Answer: A

Explanation: The following answers are incorrect:

Network. The Network layer moves information between hosts that are not physically connected. It deals with routing of information. IP is a protocol that is used in Network Layer. TCP and UDP do not reside at the Layer 3 Network Layer in the OSI Reference Model.

Presentation. The Presentation Layer is concerned with the formatting of data into a standard presentation such as

ASCII. TCP and UDP do not reside at the Layer 6 Presentation Layer in the OSI Reference Model.

Application. The Application Layer is a service for applications and Operating Systems data transmission, for example HTTP, FTP and SMTP. TCP and UDP do not reside at the Layer 7 Application Layer in the OSI Reference Model.

The following reference(s) were/was used to create this question:

ISC2 OIG, 2007 p. 411

Shon Harris AIO v.3 p. 424

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**QUESTION 274**

Which of the following is TRUE regarding Transmission Control Protocol (TCP) and User Datagram Protocol (UDP)?

- A. TCP is connection-oriented, UDP is not.
- B. UDP provides for Error Correction, TCP does not.
- C. UDP is useful for longer messages, rather than TCP.
- D. TCP does not guarantee delivery of data, while UDP does guarantee data delivery.

Answer: A

Explanation: TCP is a reliable connection-oriented transport for guaranteed delivery of data. Protocols represent certain rules and regulations that are essential in order to have data communication between two entities. Internet Protocols work in sending and receiving data packets. This type of communication may be either connection-less or connection-oriented.

In a connection-oriented scenario, an acknowledgement is being received by the sender from the receiver in support of a perfect transfer. Transmission Control Protocol or TCP is such a protocol. On the other hand, UDP or User Datagram Protocol is of the connection-less type where no feedback is being forwarded to the sender after delivery and the data transfer have taken place or not. Though, it's not a guaranteed method, but, once a connection is established, UDP works

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much faster than TCP as TCP has to rely on a feedback and accordingly, the entire 3-way handshaking takes place.

The following answers are incorrect:

UDP provides for Error Correction, TCP does not: UDP does not provide for error correction, while TCP does.

UDP is useful for longer messages, rather than TCP: UDP is useful for shorter messages due to its connectionless nature.

TCP does not guarantee delivery of data, while UDP does guarantee data delivery: The opposite is true.

References Used for this question:

<http://www.cyberciti.biz/faq/key-differences-between-tcp-and-udp-protocols/>

<http://www.skullbox.net/tcpudp.php>

James's TCP-IP FAQ - Understanding Port Numbers.

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### QUESTION 275

The standard server port number for HTTP is which of the following?

- A. 81
- B. 80
- C. 8080
- D. 8180

Answer: B

Explanation: HTTP is Port 80.

Reference: MAIWALD, Eric, Network Security: A Beginner's Guide, McGraw-Hill/Osborne Media, 2001, page 135.

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### QUESTION 276

Looking at the choices below, which ones would be the most suitable protocols/tools for securing e-mail?

- A. PGP and S/MIME
- B. IPsec and IKE
- C. TLS and SSL
- D. SSH

Answer: A

Explanation: Both PGP and S/MIME are protocol/tool used to secure internet emails. Today the de facto standard within email client is mostly S/MIME. Around year 1999 many people were using PGP to secure their emails.

PGP was developed by Phil Zimmerman as a free product for noncommercial use that would enable all people to have access to state-of-the-art cryptographic algorithms to protect their privacy. PGP is also available as a commercial product that has received widespread acceptance by many organizations looking for a user-friendly, simple system of encryption of files, documents,

and e-mail and the ability to wipe out old files through a process of overwriting them to protect old data from recovery. PGP also compresses data to save on bandwidth and storage needs.

The Secure/Multipurpose Internet Mail Extension S/MIME is the security enhancement for the MIME Internet e-mail standard format. S/MIME provides several features, including signed and encrypted mail messages. As a hybrid cryptographic application, S/MIME, similar to IPSec and SSL, uses hash functions, symmetric and asymmetric cryptographies. There are a variety of bulk encryption algorithms defined the most popular being AES. Asymmetric encryption, such as RSA, is used for digital signatures. Secure hash algorithms, such as SHA-1, are used to provide data integrity of the message body and message attributes.

The following are incorrect answers:

IPSEC, TLS, SSL, SSH are all tunneling or VPN tools that could be used to secure email traffic over a public network but they were not built specifically to address and provide Email Security.

IKE is a key exchange mechanism. Not an email encryption tool

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Location 16663). Auerbach Publications. Kindle Edition.

OPPLIGER, Rolf, Secure Messaging with PGP and S/MIME, 2000, Artech House; The international PGP homepage, online at <http://www.pgp.org>

IETF S/MIME working group, online at <http://www.ietf.org/html.charters/smime-charter.html>

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 2001, McGraw-Hill/Osborne, page 563; SMITH, Richard E., Internet Cryptography, 1997, Addison-Wesley Pub Co.

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### QUESTION 277

Which of the following are suitable protocols for securing VPN connections at the lower layers of the OSI model?

- A. S/MIME and SSH
- B. TLS and SSL
- C. IPsec and L2TP
- D. PKCS#10 and X.509

Answer: C

Reference: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 2001, McGraw-Hill/Osborne, page 467; SMITH, Richard E., Internet Cryptography, 1997, Addison-Wesley Pub Co.

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### QUESTION 278

What is the role of IKE within the IPsec protocol?

- A. peer authentication and key exchange
- B. data encryption
- C. data signature
- D. enforcing quality of service

Answer: A

Reference: RFC 2409: The Internet Key Exchange (IKE); DORASWAMY, Naganand & HARKINS,

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Dan, Ipsec: The New Security Standard for the Internet, Intranets, and Virtual Private Networks, 1999, Prentice Hall PTR; SMITH, Richard E., Internet Cryptography, 1997, Addison-Wesley Pub Co.

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### QUESTION 279

What is NOT an authentication method within IKE and IPsec?

- A. CHAP
- B. Pre shared key
- C. certificate based authentication
- D. Public key authentication

Answer: A

Explanation: CHAP is not used within IPSEC or IKE. CHAP is an authentication scheme used by Point to Point Protocol (PPP) servers to validate the identity of remote clients. CHAP periodically verifies the identity of the client by using a three-way handshake. This happens at the time of establishing the initial link (LCP), and may happen again at any time afterwards. The verification is based on a shared secret (such as the client user's password).

After the completion of the link establishment phase, the authenticator sends a "challenge" message to the peer.

The peer responds with a value calculated using a one-way hash function on the challenge and the secret combined.

The authenticator checks the response against its own calculation of the expected hash value. If the values match, the authenticator acknowledges the authentication; otherwise it should terminate the connection.

At random intervals the authenticator sends a new challenge to the peer and repeats steps 1 through 3.

The following were incorrect answers:

#### Pre Shared Keys

In cryptography, a pre-shared key or PSK is a shared secret which was previously shared between the two parties using some secure channel before it needs to be used. To build a key from shared secret, the key derivation function should be used. Such systems almost always use symmetric key cryptographic algorithms. The term PSK is used in WiFi encryption such as WEP or WPA, where both the wireless access points (AP) and all clients share the same key.

The characteristics of this secret or key are determined by the system which uses it; some system designs require that such keys be in a particular format. It can be a password like 'bret13i', a passphrase like 'Idaho hung gear id gene', or a hexadecimal string like '65E4 E556 8622 EEE1'.

The secret is used by all systems involved in the cryptographic processes used to secure the traffic between the systems.

#### Certificat Based Authentication

The most common form of trusted authentication between parties in the wide world of Web commerce is the exchange of certificates. A certificate is a digital document that at a minimum includes a Distinguished Name (DN) and an associated public key.

The certificate is digitally signed by a trusted third party known as the Certificate Authority (CA). The CA vouches for the authenticity of the certificate holder. Each principal in the transaction

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presents certificate as its credentials. The recipient then validates the certificate's signature against its cache of known and trusted CA certificates. A "personal certificate" identifies an end user in a transaction; a "server certificate" identifies the service provider.

Generally, certificate formats follow the X.509 Version 3 standard. X.509 is part of the Open Systems Interconnect (OSI) X.500 specification.

#### Public Key Authentication

Public key authentication is an alternative means of identifying yourself to a login server, instead of typing a password. It is more secure and more flexible, but more difficult to set up.

In conventional password authentication, you prove you are who you claim to be by proving that you know the correct password. The only way to prove you know the password is to tell the server what you think the password is. This means that if the server has been hacked, or spoofed an attacker can learn your password.

Public key authentication solves this problem. You generate a key pair, consisting of a public key (which everybody is allowed to know) and a private key (which you keep secret and do not give to anybody). The private key is able to generate signatures. A signature created using your private key cannot be forged by anybody who does not have a copy of that private key; but anybody who has your public key can verify that a particular signature is genuine.

So you generate a key pair on your own computer, and you copy the public key to the server.

Then, when the server asks you to prove who you are, you can generate a signature using your private key. The server can verify that signature (since it has your public key) and allow you to log in. Now if the server is hacked or spoofed, the attacker does not gain your private key or password; they only gain one signature. And signatures cannot be re-used, so they have gained nothing.

There is a problem with this: if your private key is stored unprotected on your own computer, then anybody who gains access to your computer will be able to generate signatures as if they were you. So they will be able to log in to your server under your account. For this reason, your private key is usually encrypted when it is stored on your local machine, using a passphrase of your choice. In order to generate a signature, you must decrypt the key, so you have to type your passphrase.

#### References:

RFC 2409: The Internet Key Exchange (IKE); DORASWAMY, Naganand & HARKINS, Dan  
Ipsec: The New Security Standard for the Internet, Intranets, and Virtual Private Networks, 1999,  
Prentice Hall PTR; SMITH, Richard E.

Internet Cryptography, 1997, Addison-Wesley Pub Co.; HARRIS, Shon, All-In-One CISSP  
Certification Exam Guide, 2001, McGraw-Hill/Osborne, page 467.

[http://en.wikipedia.org/wiki/Pre-shared\\_key](http://en.wikipedia.org/wiki/Pre-shared_key)

<http://www.home.umk.pl/~mgw/LDAP/RS.C4.JUN.97.pdf>

<http://the.earth.li/~sgtatham/putty/0.55/html/doc/Chapter8.html#S8.1>

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## QUESTION 280

What is NOT true with pre shared key authentication within IKE / IPsec protocol?

- A. Pre shared key authentication is normally based on simple passwords
- B. Needs a Public Key Infrastructure (PKI) to work

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- C. IKE is used to setup Security Associations
  - D. IKE builds upon the Oakley protocol and the ISAKMP protocol.

Answer: B

Explanation: Internet Key Exchange (IKE or IKEv2) is the protocol used to set up a security association (SA) in the IPsec protocol suite. IKE builds upon the Oakley protocol and ISAKMP. IKE uses X.509 certificates for authentication which are either pre-shared or distributed using DNS (preferably with DNSSEC) and a Diffie–Hellman key exchange to set up a shared session secret from which cryptographic keys are derived.

Internet Key Exchange (IKE) Internet key exchange allows communicating partners to prove their identity to each other and establish a secure communication channel, and is applied as an authentication component of IPSec.

IKE uses two phases:

Phase 1: In this phase, the partners authenticate with each other, using one of the following:

Shared Secret: A key that is exchanged by humans via telephone, fax, encrypted e-mail, etc.

Public Key Encryption: Digital certificates are exchanged.

Revised mode of Public Key Encryption: To reduce the overhead of public key encryption, a nonce (a Cryptographic function that refers to a number or bit string used only once, in security engineering) is encrypted with the communicating partner's public key, and the peer's identity is encrypted with symmetric encryption using the nonce as the key. Next, IKE establishes a temporary security association and secure tunnel to protect the rest of the key exchange. Phase 2: The peers' security associations are established, using the secure tunnel and temporary SA created at the end of phase 1.

The following reference(s) were used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 7032-7048). Auerbach Publications. Kindle Edition.

and

RFC 2409 at <http://tools.ietf.org/html/rfc2409>

and

[http://en.wikipedia.org/wiki/Internet\\_Key\\_Exchange](http://en.wikipedia.org/wiki/Internet_Key_Exchange)

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## QUESTION 281

In SSL/TLS protocol, what kind of authentication is supported when you establish a secure session between a client and a server?

- A. Peer-to-peer authentication
- B. Only server authentication (optional)
- C. Server authentication (mandatory) and client authentication (optional)
- D. Role based authentication scheme

Answer: C

Reference:

RESCORLA, Eric, SSL and TLS: Designing and Building Secure Systems, 2000, Addison Wesley Professional; SMITH, Richard E., Internet Cryptography, 1997, Addison-Wesley Pub Co.

**QUESTION 282**

What kind of encryption is realized in the S/MIME-standard?

- A. Asymmetric encryption scheme
- B. Password based encryption scheme
- C. Public key based, hybrid encryption scheme
- D. Elliptic curve based encryption

Answer: C

Explanation: S/MIME (for Secure MIME, or Secure Multipurpose Mail Extension) is a security process used for e-mail exchanges that makes it possible to guarantee the confidentiality and nonrepudiation of electronic messages.

S/MIME is based on the MIME standard, the goal of which is to let users attach files other than ASCII text files to electronic messages. The MIME standard therefore makes it possible to attach all types of files to e-mails.

S/MIME was originally developed by the company RSA Data Security. Ratified in July 1999 by the IETF, S/MIME has become a standard, whose specifications are contained in RFCs 2630 to 2633.

How S/MIME works

The S/MIME standard is based on the principle of public-key encryption. S/MIME therefore makes it possible to encrypt the content of messages but does not encrypt the communication.

The various sections of an electronic message, encoded according to the MIME standard, are each encrypted using a session key.

The session key is inserted in each section's header, and is encrypted using the recipient's public key. Only the recipient can open the message's body, using his private key, which guarantees the confidentiality and integrity of the received message.

In addition, the message's signature is encrypted with the sender's private key. Anyone intercepting the communication can read the content of the message's signature, but this ensures the recipient of the sender's identity, since only the sender is capable of encrypting a message (with his private key) that can be decrypted with his public key.

Reference(s) used for this question:

<http://en.kioskea.net/contents/139-cryptography-s-mime>

RFC 2630: Cryptographic Message Syntax;

OPPLIGER, Rolf, Secure Messaging with PGP and S/MIME, 2000, Artech House;

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 2001, McGraw-Hill/Osborne, page 570;

SMITH, Richard E., Internet Cryptography, 1997, Addison-Wesley Pub Co.

**QUESTION 283**

Which of the following is true of network security?

- A. A firewall is not a necessity in today's connected world.
- B. A firewall is a necessity in today's connected world.
- C. A whitewall is a necessity in today's connected world.
- D. A black firewall is a necessity in today's connected world.

Answer: B

Explanation: Commercial firewalls are a dime-a-dozen in today's world. Black firewall and whitewall are just distractors.

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### QUESTION 284

Which of the following best describes signature-based detection?

- A. Compare source code, looking for events or sets of events that could cause damage to a system or network.
- B. Compare system activity for the behaviour patterns of new attacks.
- C. Compare system activity, looking for events or sets of events that match a predefined pattern of events that describe a known attack.
- D. Compare network nodes looking for objects or sets of objects that match a predefined pattern of objects that may describe a known attack.

Answer: C

Explanation: Misuse detectors compare system activity, looking for events or sets of events that match a predefined pattern of events that describe a known attack. As the patterns corresponding to known attacks are called signatures, misuse detection is sometimes called "signature-based detection."

The most common form of misuse detection used in commercial products specifies each pattern of events corresponding to an attack as a separate signature. However, there are more sophisticated approaches to doing misuse detection (called "state-based" analysis techniques) that can leverage a single signature to detect groups of attacks.

Reference:

Old Document:

BACE, Rebecca & MELL, Peter, NIST Special Publication 800-31 on Intrusion Detection Systems, Page 16.

The publication above has been replaced by 800-94 on page 2-4

The Updated URL is: <http://csrc.nist.gov/publications/nistpubs/800-94/SP800-94.pdf>

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### QUESTION 285

Which layer deals with Media Access Control (MAC) addresses?

- A. Data link layer
- B. Physical layer
- C. Transport layer
- D. Network layer

Answer: A

Explanation: Layer 2 (Data Link layer) transfers information to the other end of the physical link. It handles physical addressing, network topology, error notification, delivery of frames and flow control.

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**QUESTION 286**

What is a decrease in amplitude as a signal propagates along a transmission medium best known as?

- A. Crosstalk
- B. Noise
- C. Delay distortion
- D. Attenuation

Answer: D

Explanation: Attenuation is the loss of signal strength as it travels. The longer a cable, the more attenuation occurs, which causes the signal carrying the data to deteriorate. This is why standards include suggested cable-run lengths. If a networking cable is too long, attenuation may occur. Basically, the data are in the form of electrons, and these electrons have to “swim” through a copper wire. However, this is more like swimming upstream, because there is a lot of resistance on the electrons working in this media. After a certain distance, the electrons start to slow down and their encoding format loses form. If the form gets too degraded, the receiving system cannot interpret them any longer. If a network administrator needs to run a cable longer than its recommended segment length, she needs to insert a repeater or some type of device that will amplify the signal and ensure it gets to its destination in the right encoding format.

Attenuation can also be caused by cable breaks and malfunctions. This is why cables should be tested. If a cable is suspected of attenuation problems, cable testers can inject signals into the cable and read the results at the end of the cable.

The following answers are incorrect:

Crosstalk - Crosstalk is one example of noise where unwanted electrical coupling between adjacent lines causes the signal in one wire to be picked up by the signal in an adjacent wire.

Noise - Noise is also a signal degradation but it refers to a large amount of electrical fluctuation that can interfere with the interpretation of the signal by the receiver.

Delay distortion - Delay distortion can result in a misinterpretation of a signal that results from transmitting a digital signal with varying frequency components. The various components arrive at the receiver with varying delays.

Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 265

Official ISC2 guide to CISSP CBK 3rd Edition Page number 229 &

CISSP All-In-One Exam guide 6th Edition Page Number 561

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**QUESTION 287**

Which device acting as a translator is used to connect two networks or applications from layer 4 up to layer 7 of the ISO/OSI Model?

- A. Bridge
- B. Repeater
- C. Router
- D. Gateway

Answer: D

Explanation: A gateway is used to connect two networks using dissimilar protocols at the lower layers or it could also be at the highest level of the protocol stack.

Important Note:

For the purpose of the exam, you have to remember that a gateway is not synonymous to the term firewall.

The second thing you must remember is the fact that a gateway acts as a translation device. It could be used to translate from IPX to TCP/IP for example. It could be used to convert different types of applications protocols and allow them to communicate together. A gateway could be at any of the OSI layers but usually tends to be higher up in the stack.

For your exam you should know the information below:

Repeaters

A repeater provides the simplest type of connectivity, because it only repeats electrical signals between cable segments, which enables it to extend a network. Repeaters work at the physical layer and are add-on devices for extending a network connection over a greater distance. The device amplifies signals because signals attenuate the farther they have to travel.

Repeaters can also work as line conditioners by actually cleaning up the signals. This works much better when amplifying digital signals than when amplifying analog signals, because digital signals are discrete units, which makes extraction of background noise from them much easier for the amplifier. If the device is amplifying analog signals, any accompanying noise often is amplified as well, which may further distort the signal.

A hub is a multi-port repeater. A hub is often referred to as a concentrator because it is the physical communication device that allows several computers and devices to communicate with each other. A hub does not understand or work with IP or MAC addresses. When one system sends a signal to go to another system connected to it, the signal is broadcast to all the ports, and thus to all the systems connected to the concentrator.

Repeater

Image Reference- <http://www.erg.abdn.ac.uk/~gorry/course/images/repeater.gif>

Bridges

A bridge is a LAN device used to connect LAN segments. It works at the data link layer and therefore works with MAC addresses. A repeater does not work with addresses; it just forwards all signals it receives. When a frame arrives at a bridge, the bridge determines whether or not the MAC address is on the local network segment. If the MAC address is not on the local network segment, the bridge forwards the frame to the necessary network segment.

Bridge

Image Reference- <http://www.oreillynet.com/network/2001/01/30/graphics/bridge.jpg>

Routers

Routers are layer 3, or network layer, devices that are used to connect similar or different networks. (For example, they can connect two Ethernet LANs or an Ethernet LAN to a Token Ring LAN.) A router is a device that has two or more interfaces and a routing table so it knows how to get packets to their destinations. It can filter traffic based on access control lists (ACLs), and it fragments packets when necessary. Because routers have more network-level knowledge, they can perform higher-level functions, such as calculating the shortest and most economical path between the sending and receiving hosts.

## Router and Switch

Image Reference- <http://www.computer-networking-success.com/images/router-switch.jpg>

### Switches

Switches combine the functionality of a repeater and the functionality of a bridge. A switch amplifies the electrical signal, like a repeater, and has the built-in circuitry and intelligence of a bridge. It is a multi-port connection device that provides connections for individual computers or other hubs and switches.

### Gateways

Gateway is a general term for software running on a device that connects two different environments and that many times acts as a translator for them or somehow restricts their interactions. Usually a gateway is needed when one environment speaks a different language, meaning it uses a certain protocol that the other environment does not understand. The gateway can translate Internetwork Packet Exchange (IPX) protocol packets to IP packets, accept mail from one type of mail server and format it so another type of mail server can accept and understand it, or connect and translate different data link technologies such as FDDI to Ethernet.

### Gateway Server

Image Reference <http://static.howtoforge.com/images/screenshots/556af08d5e43aa768260f9e589dc547f-3024.jpg>

The following answers are incorrect:

Repeater - A repeater provides the simplest type of connectivity, because it only repeats electrical signals between cable segments, which enables it to extend a network. Repeaters work at the physical layer and are add-on devices for extending a network connection over a greater distance. The device amplifies signals because signals attenuate the farther they have to travel.

Bridges - A bridge is a LAN device used to connect LAN segments. It works at the data link layer and therefore works with MAC addresses. A repeater does not work with addresses; it just forwards all signals it receives. When a frame arrives at a bridge, the bridge determines whether or not the MAC address is on the local network segment. If the MAC address is not on the local network segment, the bridge forwards the frame to the necessary network segment.

Routers - Routers are layer 3, or network layer, devices that are used to connect similar or different networks. (For example, they can connect two Ethernet LANs or an Ethernet LAN to a Token Ring LAN.) A router is a device that has two or more interfaces and a routing table so it knows how to get packets to their destinations. It can filter traffic based on access control lists (ACLs), and it fragments packets when necessary.

Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 263

Official ISC2 guide to CISSP CBK 3rd Edition Page number 229 and 230

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## QUESTION 288

In which layer of the OSI Model are connection-oriented protocols located in the TCP/IP suite of protocols?

- A. Transport layer
- B. Application layer
- C. Physical layer
- D. Network layer

Answer: A

Explanation: Connection-oriented protocols such as TCP provides reliability.

It is the responsibility of such protocols in the transport layer to ensure every byte is accounted for. The network layer does not provide reliability. It only provides the best route to get the traffic to the final destination address.

For your exam you should know the information below about OSI model:

The Open Systems Interconnection model (OSI) is a conceptual model that characterizes and standardizes the internal functions of a communication system by partitioning it into abstraction layers. The model is a product of the Open Systems Interconnection project at the International Organization for Standardization (ISO), maintained by the identification ISO/IEC 7498-1.

The model groups communication functions into seven logical layers. A layer serves the layer above it and is served by the layer below it. For example, a layer that provides error-free communications across a network provides the path needed by applications above it, while it calls the next lower layer to send and receive packets that make up the contents of that path. Two instances at one layer are connected by a horizontal.

#### OSI Model

Image source: [http://www.petri.co.il/images/osi\\_model.JPG](http://www.petri.co.il/images/osi_model.JPG)

#### PHYSICAL LAYER

The physical layer, the lowest layer of the OSI model, is concerned with the transmission and reception of the unstructured raw bit stream over a physical medium. It describes the electrical/optical, mechanical, and functional interfaces to the physical medium, and carries the signals for all of the higher layers. It provides:

Data encoding: modifies the simple digital signal pattern (1s and 0s) used by the PC to better accommodate the characteristics of the physical medium, and to aid in bit and frame synchronization. It determines:

What signal state represents a binary 1

How the receiving station knows when a "bit-time" starts

How the receiving station delimits a frame

#### DATA LINK LAYER

The data link layer provides error-free transfer of data frames from one node to another over the physical layer, allowing layers above it to assume virtually error-free transmission over the link. To do this, the data link layer provides:

Link establishment and termination: establishes and terminates the logical link between two nodes.

Frame traffic control: tells the transmitting node to "back-off" when no frame buffers are available.

Frame sequencing: transmits/receives frames sequentially.

Frame acknowledgment: provides/expects frame acknowledgments. Detects and recovers from errors that occur in the physical layer by retransmitting non-acknowledged frames and handling duplicate frame receipt.

Frame delimiting: creates and recognizes frame boundaries.

Frame error checking: checks received frames for integrity.

Media access management: determines when the node "has the right" to use the physical medium.

#### NETWORK LAYER

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The network layer controls the operation of the subnet, deciding which physical path the data should take based on network conditions, priority of service, and other factors. It provides:

Routing: routes frames among networks.

Subnet traffic control: routers (network layer intermediate systems) can instruct a sending station to "throttle back" its frame transmission when the router's buffer fills up.

Frame fragmentation: if it determines that a downstream router's maximum transmission unit (MTU) size is less than the frame size, a router can fragment a frame for transmission and reassembly at the destination station.

Logical-physical address mapping: translates logical addresses, or names, into physical addresses.

Subnet usage accounting: has accounting functions to keep track of frames forwarded by subnet intermediate systems, to produce billing information.

#### Communications Subnet

The network layer software must build headers so that the network layer software residing in the subnet intermediate systems can recognize them and use them to route data to the destination address.

This layer relieves the upper layers of the need to know anything about the data transmission and intermediate switching technologies used to connect systems. It establishes, maintains and terminates connections across the intervening communications facility (one or several intermediate systems in the communication subnet).

In the network layer and the layers below, peer protocols exist between a node and its immediate neighbor, but the neighbor may be a node through which data is routed, not the destination station. The source and destination stations may be separated by many intermediate systems.

#### TRANSPORT LAYER

The transport layer ensures that messages are delivered error-free, in sequence, and with no losses or duplications. It relieves the higher layer protocols from any concern with the transfer of data between them and their peers.

The size and complexity of a transport protocol depends on the type of service it can get from the network layer. For a reliable network layer with virtual circuit capability, a minimal transport layer is required. If the network layer is unreliable and/or only supports datagrams, the transport protocol should include extensive error detection and recovery.

The transport layer provides:

Message segmentation: accepts a message from the (session) layer above it, splits the message into smaller units (if not already small enough), and passes the smaller units down to the network layer. The transport layer at the destination station reassembles the message.

Message acknowledgment: provides reliable end-to-end message delivery with acknowledgments.

Message traffic control: tells the transmitting station to "back-off" when no message buffers are available.

Session multiplexing: multiplexes several message streams, or sessions onto one logical link and keeps track of which messages belong to which sessions (see session layer).

Typically, the transport layer can accept relatively large messages, but there are strict message size limits imposed by the network (or lower) layer. Consequently, the transport layer must break up the messages into smaller units, or frames, prepending a header to each frame.

The transport layer header information must then include control information, such as message start and message end flags, to enable the transport layer on the other end to recognize message boundaries. In addition, if the lower layers do not maintain sequence, the transport header must

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contain sequence information to enable the transport layer on the receiving end to get the pieces back together in the right order before handing the received message up to the layer above.

#### End-to-end layers

Unlike the lower "subnet" layers whose protocol is between immediately adjacent nodes, the transport layer and the layers above are true "source to destination" or end-to-end layers, and are not concerned with the details of the underlying communications facility. Transport layer software (and software above it) on the source station carries on a conversation with similar software on the destination station by using message headers and control messages.

#### SESSION LAYER

The session layer allows session establishment between processes running on different stations.

It provides:

Session establishment, maintenance and termination: allows two application processes on different machines to establish, use and terminate a connection, called a session.

Session support: performs the functions that allow these processes to communicate over the network, performing security, name recognition, logging, and so on.

#### PRESENTATION LAYER

The presentation layer formats the data to be presented to the application layer. It can be viewed as the translator for the network. This layer may translate data from a format used by the application layer into a common format at the sending station, then translate the common format to a format known to the application layer at the receiving station.

The presentation layer provides:

Character code translation: for example, ASCII to EBCDIC.

Data conversion: bit order, CR-CR/LF, integer-floating point, and so on.

Data compression: reduces the number of bits that need to be transmitted on the network.

Data encryption: encrypt data for security purposes. For example, password encryption.

#### APPLICATION LAYER

The application layer serves as the window for users and application processes to access network services. This layer contains a variety of commonly needed functions:

Resource sharing and device redirection

Remote file access

Remote printer access

Inter-process communication

Network management

Directory services

Electronic messaging (such as mail)

Network virtual terminals

The following were incorrect answers:

Application Layer - The application layer serves as the window for users and application processes to access network services.

Network layer - The network layer controls the operation of the subnet, deciding which physical path the data should take based on network conditions, priority of service, and other factors.

Physical Layer - The physical layer, the lowest layer of the OSI model, is concerned with the transmission and reception of the unstructured raw bit stream over a physical medium. It describes the electrical/optical, mechanical, and functional interfaces to the physical medium, and carries the signals for all of the higher layers.

The following reference(s) were/was used to create this question:

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CISA review manual 2014 Page number 260  
and  
Official ISC2 guide to CISSP CBK 3rd Edition Page number 287  
and  
[http://en.wikipedia.org/wiki/Tcp\\_protocol](http://en.wikipedia.org/wiki/Tcp_protocol)

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### QUESTION 289

Which of the following transmission media would NOT be affected by cross talk or interference?

- A. Copper cable
- B. Radio System
- C. Satellite radiolink
- D. Fiber optic cables

Answer: D

Explanation: Only fiber optic cables are not affected by crosstalk or interference.

For your exam you should know the information about transmission media:

#### Copper Cable

Copper cable is very simple to install and easy to tap. It is used mostly for short distance and supports voice and data.

Copper has been used in electric wiring since the invention of the electromagnet and the telegraph in the 1820s. The invention of the telephone in 1876 created further demand for copper wire as an electrical conductor.

Copper is the electrical conductor in many categories of electrical wiring. Copper wire is used in power generation, power transmission, power distribution, telecommunications, electronics circuitry, and countless types of electrical equipment. Copper and its alloys are also used to make electrical contacts. Electrical wiring in buildings is the most important market for the copper industry. Roughly half of all copper mined is used to manufacture electrical wire and cable conductors.

#### Copper Cable

Image Source - [http://i00.i.aliimg.com/photo/v0/570456138/FRLS\\_HR\\_PVC\\_Copper\\_Cable.jpg](http://i00.i.aliimg.com/photo/v0/570456138/FRLS_HR_PVC_Copper_Cable.jpg)

#### Coaxial cable

Coaxial cable, or coax (pronounced 'ko.aks), is a type of cable that has an inner conductor surrounded by a tubular insulating layer, surrounded by a tubular conducting shield. Many coaxial cables also have an insulating outer sheath or jacket. The term coaxial comes from the inner conductor and the outer shield sharing a geometric axis. Coaxial cable was invented by English engineer and mathematician Oliver Heaviside, who patented the design in 1880. Coaxial cable differs from other shielded cable used for carrying lower-frequency signals, such as audio signals, in that the dimensions of the cable are controlled to give a precise, constant conductor spacing, which is needed for it to function efficiently as a radio frequency transmission line.

Coaxial cable are expensive and does not support many LAN's. It supports data and video

#### Coaxial Cable

Image Source - [http://www.tlc-direct.co.uk/Images/Products/size\\_3/CARG59.JPG](http://www.tlc-direct.co.uk/Images/Products/size_3/CARG59.JPG)

#### Fiber optics

An optical fiber cable is a cable containing one or more optical fibers that are used to carry light.

The optical fiber elements are typically individually coated with plastic layers and contained in a protective tube suitable for the environment where the cable will be deployed. Different types of cable are used for different applications, for example long distance telecommunication, or providing a high-speed data connection between different parts of a building.

Fiber optics used for long distance, hard to splice, not vulnerable to cross talk and difficult to tap. It supports voice data, image and video.

#### Radio System

Radio systems are used for short distance, cheap and easy to tap.

Radio is the radiation (wireless transmission) of electromagnetic signals through the atmosphere or free space.

Information, such as sound, is carried by systematically changing (modulating) some property of the radiated waves, such as their amplitude, frequency, phase, or pulse width. When radio waves strike an electrical conductor, the oscillating fields induce an alternating current in the conductor. The information in the waves can be extracted and transformed back into its original form.

#### Fiber Optics

Image Source - <http://aboveinfranet.com/wp-content/uploads/2014/04/fiber-optic-cables-aboveinfranet-solutions.jpg>

#### Microwave radio system

Microwave transmission refers to the technology of transmitting information or energy by the use of radio waves whose wavelengths are conveniently measured in small numbers of centimetre; these are called microwaves.

Microwaves are widely used for point-to-point communications because their small wavelength allows conveniently-sized antennas to direct them in narrow beams, which can be pointed directly at the receiving antenna. This allows nearby microwave equipment to use the same frequencies without interfering with each other, as lower frequency radio waves do. Another advantage is that the high frequency of microwaves gives the microwave band a very large information-carrying capacity; the microwave band has a bandwidth 30 times that of all the rest of the radio spectrum below it. A disadvantage is that microwaves are limited to line of sight propagation; they cannot pass around hills or mountains as lower frequency radio waves can.

Microwave radio transmission is commonly used in point-to-point communication systems on the surface of the Earth, in satellite communications, and in deep space radio communications. Other parts of the microwave radio band are used for radars, radio navigation systems, sensor systems, and radio astronomy.

Microwave radio systems are carriers for voice data signal, cheap and easy to tap.

#### Microwave Radio System

Image Source - [http://www.valiantcom.com/images/applications/e1\\_digital\\_microwave\\_radio.gif](http://www.valiantcom.com/images/applications/e1_digital_microwave_radio.gif)

#### Satellite Radio Link

Satellite radio is a radio service broadcast from satellites primarily to cars, with the signal broadcast nationwide, across a much wider geographical area than terrestrial radio stations. It is available by subscription, mostly commercial free, and offers subscribers more stations and a wider variety of programming options than terrestrial radio.

Satellite radio link uses transponder to send information and easy to tap.

The following answers are incorrect:

Copper Cable - Copper cable is very simple to install and easy to tap. It is used mostly for short distance and supports voice and data.

Radio System - Radio systems are used for short distance, cheap and easy to tap.

Satellite Radio Link - Satellite radio link uses transponder to send information and easy to tap.

The following reference(s) were/was used to create this question:

CISA review manual 2014 page number 265 &

Official ISC2 guide to CISSP CBK 3rd Edition Page number 233

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### QUESTION 290

What is called an attack where the attacker spoofs the source IP address in an ICMP ECHO broadcast packet so it seems to have originated at the victim's system, in order to flood it with REPLY packets?

- A. SYN Flood attack
- B. Smurf attack
- C. Ping of Death attack
- D. Denial of Service (DOS) attack

Answer: B

Explanation: Although it may cause a denial of service to the victim's system, this type of attack is a Smurf attack. A SYN Flood attack uses up all of a system's resources by setting up a number of bogus communication sockets on the victim's system. A Ping of Death attack is done by sending IP packets that exceed the maximum legal length (65535 octets).

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 11: Application and System Development (page 789).

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### QUESTION 291

Why are coaxial cables called "coaxial"?

- A. it includes two physical channels that carries the signal surrounded (after a layer of insulation) by another concentric physical channel, both running along the same axis.
- B. it includes one physical channel that carries the signal surrounded (after a layer of insulation) by another concentric physical channel, both running along the same axis
- C. it includes two physical channels that carries the signal surrounded (after a layer of insulation) by another two concentric physical channels, both running along the same axis.
- D. it includes one physical channel that carries the signal surrounded (after a layer of insulation) by another concentric physical channel, both running perpendicular and along the different axis

Answer: B

Explanation: Coaxial cable is called "coaxial" because it includes one physical channel that carries the signal surrounded (after a layer of insulation) by another concentric physical channel, both running along the same axis.

The outer channel serves as a ground. Many of these cables or pairs of coaxial tubes can be placed in a single outer sheathing and, with repeaters, can carry information for a great distance.

Source: STEINER, Kurt, Telecommunications and Network Security, Version 1, May 2002, CISSP Open Study Group (Domain Leader: skottikus), Page 14.

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**QUESTION 292**

The International Organization for Standardization / Open Systems Interconnection (ISO/OSI)  
Layer 7 does NOT include which of the following?

- A. SMTP (Simple Mail Transfer Protocol)
- B. TCP (Transmission Control Protocol )
- C. SNMP (Simple Network Management Protocol)
- D. HTTP (Hypertext Transfer Protocol)

Answer: B

Explanation: Layer 7 Applications Layer Provides specific services for applications such as:

FTP (File Transfer Protocol)

TFTP (Trivial File Transfer Protocol)Used by some X-Terminal systems

HTTP (Hypertext Transfer Protocol)

SNMP (Simple Network Management Protocol Helps network managers locate and correct problems in a TCP/IP network

Used to gain information from network devices such as count of packets received and routing tables

SMTP (Simple Mail Transfer Protocol)Used by many email applications.

Source: STEINER, Kurt, Telecommunications and Network Security, Version 1, May 2002, CISSP Open Study Group (Domain Leader: skottikus), Page 12.

**QUESTION 293**

The International Standards Organization / Open Systems Interconnection (ISO/OSI) Layers does NOT have which of the following characteristics?

- A. Standard model for network communications
- B. Used to gain information from network devices such as count of packets received and routing tables
- C. Enables dissimilar networks to communicate
- D. Defines 7 protocol layers (a.k.a. protocol stack)

Answer: B

Explanation: The International Standards Organization / Open Systems Interconnection (ISO/OSI) Layers and Characteristics Standard model for network communications enables dissimilar networks to communicate, Defines 7 protocol layers (a.k.a. protocol stack) Each layer on one workstation communicates with its respective layer on another workstation using protocols (i.e. agreed-upon communication formats) "Mapping" each protocol to the model is useful for comparing protocols.

Mnemonics: Please Do Not Throw Sausage Pizza Away (bottom to top layer)

All People Seem To Need Data Processing (top to bottom layer).

Source: STEINER, Kurt, Telecommunications and Network Security, Version 1, May 2002, CISSP Open Study Group (Domain Leader: skottikus), Page 12.

**QUESTION 294**

The International Standards Organization / Open Systems Interconnection (ISO/OSI) Layers 6 is which of the following?

- A. Application Layer
- B. Presentation Layer
- C. Data Link Layer
- D. Network Layer

Answer: B

Explanation: International Standards Organization / Open Systems Interconnection (ISO/OSI) Layers and Characteristics:

Layers:

- 1. Physical Layer
- 2. Data Link Layer
- 3. Network Layer
- 4. Transport Layer
- 5. Session Layer
- 6. Presentation Layer
- 7. Applications Layer

Here's a great mnemonic for the OSI model: "Please Do Not Throw Sausage Pizza Away".

Source: STEINER, Kurt, Telecommunications and Network Security, Version 1, May 2002, CISSP Open Study Group (Domain Leader: skottikus), Page 12.

**QUESTION 295**

In telephony different types of connections are being used. The connection from the phone company's branch office to local customers is referred to as which of the following choices?

- A. new loop
- B. local loop
- C. loopback
- D. indigenous loop

Answer: B

Explanation: Transmission on fiber optic wire requires repeating at distance intervals. The glass fiber requires more protection within an outer cable than copper. For these reasons and because the installation of any new wiring is labor-intensive, few communities yet have fiber optic wires or cables from the phone company's branch office to local customers (local loop).

In telephony, a local loop is the wired connection from a telephone company's central office in a locality to its customers' telephones at homes and businesses. This connection is usually on a pair of copper wires called twisted pair. The system was originally designed for voice transmission only using analog transmission technology on a single voice channel. Today, your computer's modem makes the conversion between analog signals and digital signals. With Integrated Services Digital Network (ISDN) or Digital Subscriber Line (DSL), the local loop can carry digital signals directly

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and at a much higher bandwidth than they do for voice only.

Local Loop diagram

Image from: <http://www.thenetworkencyclopedia.com/entry/local-loop/>

The following are incorrect answers:

New loop This is only a detractor and does not exist

Loopback In telephone systems, a loopback is a test signal sent to a network destination that is returned as received to the originator. The returned signal may help diagnose a problem.

Ingenious loop This is only a detractor and does not exist

Reference(s) used for this question:

<http://searchnetworking.techtarget.com/definition/local-loop>

and

STEINER, Kurt, Telecommunications and Network Security, Version 1, May 2002, CISSP Open Study Group (Domain Leader: skottikus), Page 14.

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### QUESTION 296

Communications and network security relates to transmission of which of the following?

- A. voice
- B. voice and multimedia
- C. data and multimedia
- D. voice, data and multimedia

Answer: D

Explanation: From the published (ISC)2 goals for the Certified Information Systems Security Professional candidate:

The CISSP candidate should be familiar to communications and network security as it relates to voice, data, multimedia, and facsimile transmissions in terms of local area, wide area, and remote access.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 57.

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### QUESTION 297

One of the following assertions is NOT a characteristic of Internet Protocol Security (IPsec)

- A. Data cannot be read by unauthorized parties
- B. The identity of all IPsec endpoints are confirmed by other endpoints
- C. Data is delivered in the exact order in which it is sent
- D. The number of packets being exchanged can be counted.

Answer: C

Explanation: IPsec provide replay protection that ensures data is not delivered multiple times, however IPsec does not ensure that data is delivered in the exact order in which it is sent. IPSEC uses TCP and packets may be delivered out of order to the receiving side depending which route was taken by the packet.

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Internet Protocol Security (IPsec) has emerged as the most commonly used network layer security control for protecting communications. IPsec is a framework of open standards for ensuring private communications over IP networks. Depending on how IPsec is implemented and configured, it can provide any combination of the following types of protection:

**Confidentiality.** IPsec can ensure that data cannot be read by unauthorized parties. This is accomplished by encrypting data using a cryptographic algorithm and a secret key a value known only to the two parties exchanging data. The data can only be decrypted by someone who has the secret key.

**Integrity.** IPsec can determine if data has been changed (intentionally or unintentionally) during transit. The integrity of data can be assured by generating a message authentication code (MAC) value, which is a cryptographic checksum of the data. If the data is altered and the MAC is recalculated, the old and new MACs will differ.

**Peer Authentication.** Each IPsec endpoint confirms the identity of the other IPsec endpoint with which it wishes to communicate, ensuring that the network traffic and data is being sent from the expected host.

**Replay Protection.** The same data is not delivered multiple times, and data is not delivered grossly out of order. However, IPsec does not ensure that data is delivered in the exact order in which it is sent.

**Traffic Analysis Protection.** A person monitoring network traffic does not know which parties are communicating, how often communications are occurring, or how much data is being exchanged. However, the number of packets being exchanged can be counted.

**Access Control.** IPsec endpoints can perform filtering to ensure that only authorized IPsec users can access particular network resources. IPsec endpoints can also allow or block certain types of network traffic, such as allowing Web server access but denying file sharing.

The following are incorrect answers because they are all features provided by IPSEC:

"Data cannot be read by unauthorized parties" is wrong because IPsec provides confidentiality through the usage of the Encapsulating Security Protocol (ESP), once encrypted the data cannot be read by unauthorized parties because they have access only to the ciphertext. This is accomplished by encrypting data using a cryptographic algorithm and a session key, a value known only to the two parties exchanging data. The data can only be decrypted by someone who has a copy of the session key.

"The identity of all IPsec endpoints are confirmed by other endpoints" is wrong because IPsec provides peer authentication: Each IPsec endpoint confirms the identity of the other IPsec endpoint with which it wishes to communicate, ensuring that the network traffic and data is being sent from the expected host.

"The number of packets being exchanged can be counted" is wrong because although IPsec provides traffic protection where a person monitoring network traffic does not know which parties are communicating, how often communications are occurring, or how much data is being exchanged, the number of packets being exchanged still can be counted.

Reference(s) used for this question:

NIST 800-77 Guide to IPsec VPNs . Pages 2-3 to 2-4

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## QUESTION 298

One of these statements about the key elements of a good configuration process is NOT true

- A. Accommodate the reuse of proven standards and best practices

- B. Ensure that all requirements remain clear, concise, and valid
- C. Control modifications to system hardware in order to prevent resource changes
- D. Ensure changes, standards, and requirements are communicated promptly and precisely

Answer: C

Explanation: Configuration management isn't about preventing change but ensuring the integrity of IT resources by preventing unauthorised or improper changes.

According to the Official ISC2 guide to the CISSP exam, a good CM process is one that can:

- (1) accommodate change;
- (2) accommodate the reuse of proven standards and best practices;
- (3) ensure that all requirements remain clear, concise, and valid;
- (4) ensure changes, standards, and requirements are communicated promptly and precisely; and
- (5) ensure that the results conform to each instance of the product.

#### Configuration management

Configuration management (CM) is the detailed recording and updating of information that describes an enterprise's computer systems and networks, including all hardware and software components. Such information typically includes the versions and updates that have been applied to installed software packages and the locations and network addresses of hardware devices.

Special configuration management software is available. When a system needs a hardware or software upgrade, a computer technician can access the configuration management program and database to see what is currently installed. The technician can then make a more informed decision about the upgrade needed.

An advantage of a configuration management application is that the entire collection of systems can be reviewed to make sure any changes made to one system do not adversely affect any of the other systems.

Configuration management is also used in software development, where it is called Unified Configuration Management (UCM). Using UCM, developers can keep track of the source code, documentation, problems, changes requested, and changes made.

#### Change management

In a computer system environment, change management refers to a systematic approach to keeping track of the details of the system (for example, what operating system release is running on each computer and which fixes have been applied).

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### QUESTION 299

One of the following statements about the differences between PPTP and L2TP is NOT true

- A. PPTP can run only on top of IP networks.
- B. PPTP is an encryption protocol and L2TP is not.
- C. L2TP works well with all firewalls and network devices that perform NAT.
- D. L2TP supports AAA servers

Answer: C

Explanation: L2TP is affected by packet header modification and cannot cope with firewalls and network devices that perform NAT.

"PPTP can run only on top of IP networks." is correct as PPTP encapsulates datagrams into an IP packet, allowing PPTP to route many network protocols across an IP network.

"PPTP is an encryption protocol and L2TP is not." is correct. When using PPTP, the PPP payload is encrypted with Microsoft Point-to-Point Encryption (MPPE) using MSCHAP or EAP-TLS.

"L2TP supports AAA servers" is correct as L2TP supports TACACS+ and RADIUS.

NOTE:

L2TP does work over NAT. It is possible to use a tunneled mode that wraps every packet into a UDP packet. Port 4500 is used for this purpose. However this is not true of PPTP and it is not true as well that it works well with all firewalls and NAT devices.

References:

All in One Third Edition page 545

Official Guide to the CISSP Exam page 124-126

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### QUESTION 300

You have been tasked to develop an effective information classification program. Which one of the following steps should be performed first?

- A. Establish procedures for periodically reviewing the classification and ownership
- B. Specify the security controls required for each classification level
- C. Identify the data custodian who will be responsible for maintaining the security level of data
- D. Specify the criteria that will determine how data is classified

Answer: D

Explanation: According to the AIO 3rd edition, these are the necessary steps for a proper classification program:

1. Define classification levels.
2. Specify the criteria that will determine how data is classified.
3. Have the data owner indicate the classification of the data she is responsible for.
4. Identify the data custodian who will be responsible for maintaining data and its security level.
5. Indicate the security controls, or protection mechanisms, that are required for each classification level.
6. Document any exceptions to the previous classification issues.
7. Indicate the methods that can be used to transfer custody of the information to a different data owner.
8. Create a procedure to periodically review the classification and ownership. Communicate any changes to the data custodian.
9. Indicate termination procedures for declassifying the data.
10. Integrate these issues into the security-awareness program so that all employees understand how to handle data at different classification levels.

Domain: Information security and risk management

Reference: AIO 3rd edition page 50

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### QUESTION 301

In the course of responding to and handling an incident, you work on determining the root cause of the incident. In which step are you in?

- A. Recovery
- B. Containment
- C. Triage
- D. Analysis and tracking

Answer: D

Explanation: In this step, your main objective is to examine and analyze what has occurred and focus on determining the root cause of the incident.

Recovery is incorrect as recovery is about resuming operations or bringing affected systems back into production

Containment is incorrect as containment is about reducing the potential impact of an incident.

Triage is incorrect as triage is about determining the seriousness of the incident and filtering out false positives

Reference:

Official Guide to the CISSP CBK, pages 700-704

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### QUESTION 302

Which of the following assertions is NOT true about pattern matching and anomaly detection in intrusion detection?

- A. Anomaly detection tends to produce more data
- B. A pattern matching IDS can only identify known attacks
- C. Stateful matching scans for attack signatures by analyzing individual packets instead of traffic streams
- D. An anomaly-based engine develops baselines of normal traffic activity and throughput, and alerts on deviations from these baselines

Answer: C

Explanation: This is wrong which makes this the correct choice. This statement is not true as stateful matching scans for attack signatures by analyzing traffic streams rather than individual packets. Stateful matching intrusion detection takes pattern matching to the next level.

As networks become faster there is an emerging need for security analysis techniques that can keep up with the increased network throughput. Existing network-based intrusion detection sensors can barely keep up with bandwidths of a few hundred Mbps. Analysis tools that can deal with higher throughput are unable to maintain state between different steps of an attack or they are limited to the analysis of packet headers.

The following answers are all incorrect:

Anomaly detection tends to produce more data is true as an anomaly-based IDS produces a lot of data as any activity outside of expected behavior is recorded.

A pattern matching IDS can only identify known attacks is true as a pattern matching IDS works by comparing traffic streams against signatures. These signatures are created for known attacks.

An anomaly-based engine develops baselines of normal traffic activity and throughput, and alerts on deviations from these baselines is true as the assertion is a characteristic of a statistical

anomaly-based IDS.

Reference:

Official guide to the CISSP CBK. Pages 198 to 201

[http://cs.ucsb.edu/~vigna/publications/2003\\_vigna\\_robertson\\_kher\\_kemmerer\\_ACSAC03.pdf](http://cs.ucsb.edu/~vigna/publications/2003_vigna_robertson_kher_kemmerer_ACSAC03.pdf)

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### QUESTION 303

Which of the following is NOT a characteristic of a host-based intrusion detection system?

- A. A HIDS does not consume large amounts of system resources
- B. A HIDS can analyse system logs, processes and resources
- C. A HIDS looks for unauthorized changes to the system
- D. A HIDS can notify system administrators when unusual events are identified

Answer: A

Explanation: A HIDS does not consume large amounts of system resources is the correct choice. HIDS can consume inordinate amounts of CPU and system resources in order to function effectively, especially during an event.

All the other answers are characteristics of HIDSe

A HIDS can:

- scrutinize event logs, critical system files, and other auditable system resources;
- look for unauthorized change or suspicious patterns of behavior or activity
- can send alerts when unusual events are discovered

Reference:

Official guide to the CISSP CBK. Pages 197 to 198.

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### QUESTION 304

Which of the following is NOT a correct notation for an IPv6 address?

- A. 2001:0db8:0:0:0:1428:57ab
- B. ABCD:EF01:2345:6789:
- C. ABCD:EF01:2345:6789::1
- D. 2001:DB8::8:800::417A

Answer: D

Explanation: This is not a correct notation for an IPv6 address because the "::" can only appear once in an address. The use of "::" is a shortcut notation that indicates one or more groups of 16 bits of zeros.

1 is the loopback address using the special notation

Reference: IP Version 6 Addressing Architecture

<http://tools.ietf.org/html/rfc4291#section-2.1>

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### QUESTION 305

Another example of Computer Incident Response Team (CIRT) activities is:

- 
- A. Management of the netware logs, including collection, retention, review, and analysis of data
  - B. Management of the network logs, including collection and analysis of data
  - C. Management of the network logs, including review and analysis of data
  - D. Management of the network logs, including collection, retention, review, and analysis of data

Answer: D

Explanation: Additional examples of CIRT activities are:

- Management of the network logs, including collection, retention, review, and analysis of data
- Management of the resolution of an incident, management of the remediation of a vulnerability, and post-event reporting to the appropriate parties.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 64.

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### QUESTION 306

An area of the Telecommunications and Network Security domain that directly affects the Information Systems Security tenet of Availability can be defined as:

- A. Netware availability
- B. Network availability
- C. Network acceptability
- D. Network accountability

Answer: A

Explanation:

Details:

The

Answer: Network availability

Network availability can be defined as an area of the Telecommunications and Network Security domain that directly affects the Information Systems Security tenet of Availability.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 64.

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### QUESTION 307

Which of the following is the correct set of assurance requirements for EAL 5?

- A. Semiformally verified design and tested
- B. Semiformally tested and checked
- C. Semiformally designed and tested
- D. Semiformally verified tested and checked

Answer: C

Explanation: Under the Common Criteria model, an evaluation is carried out on a product and is assigned an Evaluation Assurance Level (EAL). The thorough and stringent testing increases in

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detailed-oriented tasks as the assurance levels increase. The Common Criteria has seven assurance levels. The range is from EAL1, where functionality testing takes place, to EAL7, where thorough testing is performed and the system design is verified.

The Orange Book and the Rainbow Series provide evaluation schemes that are too rigid and narrowly defined for the business world. ITSEC attempted to provide a more flexible approach by separating the functionality and assurance attributes and considering the evaluation of entire systems. However, this flexibility added complexity because evaluators could mix and match functionality and assurance ratings, which resulted in too many classifications to keep straight. Because we are a species that continues to try to get it right, the next attempt for an effective and usable evaluation criteria was the Common Criteria. In 1990, the International Organization for Standardization (ISO) identified the need for international standard evaluation criteria to be used globally. The Common Criteria project started in 1993 when several organizations came together to combine and align existing and emerging evaluation criteria (TCSEC, ITSEC, Canadian Trusted Computer Product Evaluation Criteria [CTCPEC], and the Federal Criteria).

The Common Criteria was developed through a collaboration among national security standards organizations within the United States, Canada, France, Germany, the United Kingdom, and the Netherlands. The benefit of having a globally recognized and accepted set of criteria is that it helps consumers by reducing the complexity of the ratings and eliminating the need to understand the definition and meaning of different ratings within various evaluation schemes. This also helps vendors, because now they can build to one specific set of requirements if they want to sell their products internationally, instead of having to meet several different ratings with varying rules and requirements.

The full list of assurance requirements for the Evaluation Assurance Levels is provided below:

EAL 1: The product is functionally tested; this is sought when some assurance in accurate operation is necessary, but the threats to security are not seen as serious.

EAL 2: Structurally tested; this is sought when developers or users need a low to moderate level of independently guaranteed security.

EAL 3: Methodically tested and checked; this is sought when there is a need for a moderate level of independently ensured security.

EAL 4: Methodically designed, tested, and reviewed; this is sought when developers or users require a moderate to high level of independently ensured security.

EAL 5: Semiformally designed and tested; this is sought when the requirement is for a high level of independently ensured security.

EAL 6: Semiformally verified, designed, and tested; this is sought when developing specialized TOEs for high-risk situations.

EAL 7: Formally verified, designed, and tested; this is sought when developing a security TOE for application in extremely high-risk situations.

EALs are frequently misunderstood to provide a simple means to compare security products with similar levels. In fact, products may be very different even if they are assigned the same EAL level, since functionality may have little in common.

Reference(s) used for this question:

Corporate; (Isc)<sup>2</sup> (2010-04-20). Official (ISC)<sup>2</sup> Guide to the CISSP CBK, Second Edition ((ISC)<sup>2</sup> Press) (Kindle Locations 15157-15169). Taylor & Francis. Kindle Edition.

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 8730-8742). McGraw-Hill. Kindle Edition.

**QUESTION 308**

Which of the following defines when RAID separates the data into multiple units and stores it on multiple disks?

- A. striping
- B. scanning
- C. screening
- D. shadowing

Answer: A

Explanation: Basically, RAID separates the data into multiple units and stores it on multiple disks by using a process called "striping".

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 65.

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**QUESTION 309**

What is the process that RAID Level 0 uses as it creates one large disk by using several disks?

- A. striping
- B. mirroring
- C. integrating
- D. clustering

Answer: A

Explanation: RAID Level 0 creates one large disk by using several disks. This process is called striping.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 65.

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**QUESTION 310**

RAID Level 1 mirrors the data from one disk or set of disks using which of the following techniques?

- A. duplicating the data onto another disk or set of disks.
- B. moving the data onto another disk or set of disks.
- C. establishing dual connectivity to another disk or set of disks.
- D. establishing dual addressing to another disk or set of disks.

Answer: A

Explanation: RAID Level 1 mirrors the data from one disk or set of disks by duplicating the data onto another disk or set of disks.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 65.

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**QUESTION 311**

Which of the following stripes the data and the parity information at the block level across all the drives in the set?

- A. RAID Level 5
- B. RAID Level 0
- C. RAID Level 2
- D. RAID Level 1

Answer: A

Explanation: RAID Level 5 stripes the data and the parity information at the block level across all the drives in the set.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 66.

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**QUESTION 312**

A group of independent servers, which are managed as a single system, that provides higher availability, easier manageability, and greater scalability is:

- A. server cluster.
- B. client cluster.
- C. guest cluster.
- D. host cluster.

Answer: A

Explanation: A server cluster is a group of independent servers, which are managed as a single system, that provides higher availability, easier manageability, and greater scalability.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 67.

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**QUESTION 313**

If any server in the cluster crashes, processing continues transparently, however, the cluster suffers some performance degradation. This implementation is sometimes called a:

- A. server farm
- B. client farm
- C. cluster farm
- D. host farm

Answer: A

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Explanation: If any server in the cluster crashes, processing continues transparently, however, the cluster suffers some performance degradation. This implementation is sometimes called a "server farm."

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 67.

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### QUESTION 314

Which of the following backup methods is primarily run when time and tape space permits, and is used for the system archive or baselined tape sets?

- A. full backup method.
- B. incremental backup method.
- C. differential backup method.
- D. tape backup method.

Answer: A

Explanation: The Full Backup Method is primarily run when time and tape space permits, and is used for the system archive or baselined tape sets.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 69.

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### QUESTION 315

Which backup method is used if backup time is critical and tape space is at an extreme premium?

- A. Incremental backup method.
- B. Differential backup method.
- C. Full backup method.
- D. Tape backup method.

Answer: A

Explanation: Full Backup/Archival Backup - Complete/Full backup of every selected file on the system regardless of whether it has been backup recently.. This is the slowest of the backup methods since it backups all the data. It's however the fastest for restoring data.

Incremental Backup - Any backup in which only the files that have been modified since last full back up are backed up. The archive attribute should be updated while backing up only modified files, which indicates that the file has been backed up. This is the fastest of the backup methods, but the slowest of the restore methods.

Differential Backup - The backup of all data files that have been modified since the last incremental backup or archival/full backup. Uses the archive bit to determine what files have changed since last incremental backup or full backup. The files grows each day until the next full backup is performed clearing the archive attributes. This enables the user to restore all files changed since the last full backup in one pass. This is a more neutral method of backing up data since it's not faster nor slower than the other two

Easy Way To Remember each of the backup type properties:

Backup Speed Restore Speed

Full 3 1

Differential 2 2

Incremental 1 3

Legend: 1 = Fastest 2 = Faster 3 = Slowest

Source:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 69.

and

[http://www.proprofs.com/mwiki/index.php/Full\\_Backup,\\_Incremental\\_%26\\_Differential\\_Backup66](http://www.proprofs.com/mwiki/index.php/Full_Backup,_Incremental_%26_Differential_Backup66).

Hierarchical Storage Management (HSM) is commonly employed in:

- A. very large data retrieval systems.
- B. very small data retrieval systems.
- C. shorter data retrieval systems.
- D. most data retrieval systems.

Answer: A

Hierarchical Storage Management (HSM) is commonly employed in very large data retrieval systems.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 71.

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### QUESTION 316

Which of the following is immune to the effects of electromagnetic interference (EMI) and therefore has a much longer effective usable length?

- A. Fiber Optic cable
- B. Coaxial cable
- C. Twisted Pair cable
- D. Axial cable

Answer: A

Explanation: Fiber Optic cable is immune to the effects of electromagnetic interference (EMI) and therefore has a much longer effective usable length (up to two kilometers in some cases).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 72.

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### QUESTION 317

Which of the following methods of providing telecommunications continuity involves the use of an alternative media?

- A. Alternative routing
- B. Diverse routing
- C. Long haul network diversity

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D. Last mile circuit protection

Answer: A

Explanation: Alternative routing is a method of routing information via an alternate medium such as copper cable or fiber optics. This involves use of different networks, circuits or end points should the normal network be unavailable. Diverse routing routes traffic through split cable facilities or duplicate cable facilities. This can be accomplished with different and/or duplicate cable sheaths. If different cable sheaths are used, the cable may be in the same conduit and therefore subject to the same interruptions as the cable it is backing up. The communication service subscriber can duplicate the facilities by having alternate routes, although the entrance to and from the customer premises may be in the same conduit. The subscriber can obtain diverse routing and alternate routing from the local carrier, including dual entrance facilities. This type of access is time-consuming and costly. Long haul network diversity is a diverse long-distance network utilizing T1 circuits among the major long-distance carriers. It ensures long-distance access should any one carrier experience a network failure. Last mile circuit protection is a redundant combination of local carrier T1s microwave and/or coaxial cable access to the local communications loop. This enables the facility to have access during a local carrier communication disaster. Alternate local carrier routing is also utilized.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 5: Disaster Recovery and Business Continuity (page 259).

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**QUESTION 318**

Which SERVICE usually runs on port 25?

- A. File Transfer Protocol (FTP)
- B. Telnet
- C. Simple Mail Transfer Protocol (SMTP)
- D. Domain Name Service (DNS)

Answer: C

Explanation: FTP - Port 21

Telnet - Port 23

SMTP - Port 25

DNS - Port 53

The port numbers are divided into three ranges: the Well Known Ports, the Registered Ports, and the Dynamic and/or Private Ports.

The Well Known Ports are those from 0 through 1023.

The Registered Ports are those from 1024 through 49151.

The Dynamic and/or Private Ports are those from 49152 through 65535.

Reference : <http://www.iana.org/assignments/port-numbers>

For the purpose of the exam you DO NOT need to know all of the 65,535 ports but you must know the ones that are very commonly used.

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**QUESTION 319**

Which port does the Post Office Protocol Version 3 (POP3) make use of?

- A. 110
- B. 109
- C. 139
- D. 119

Answer: A

Explanation: The other answers are not correct because of the following protocol/port numbers matrix:

Post Office Protocol (POP2) 109  
Network News Transfer Protocol 119  
NetBIOS 139

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**QUESTION 320**

Which of the following are WELL KNOWN PORTS assigned by the IANA?

- A. Ports 0 to 255
- B. Ports 0 to 1024
- C. Ports 0 to 1023
- D. Ports 0 to 127

Answer: C

Explanation: The port numbers are divided into three ranges: the Well Known Ports, the Registered Ports, and the Dynamic and/or Private Ports. The range for assigned "Well Known" ports managed by the IANA (Internet Assigned Numbers Authority) is 0-1023.

Source: iana.org: port assignments.

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**QUESTION 321**

What is the maximum length of cable that can be used for a twisted-pair, Category 5 10Base-T cable?

- A. 80 meters
- B. 100 meters
- C. 185 meters
- D. 500 meters

Answer: B

Explanation: As a signal travels through a medium, it attenuates (loses strength) and at some point will become indistinguishable from noise. To assure trouble-free communication, maximum cable lengths are set between nodes to assure that attenuation will not cause a problem. The maximum CAT-5 UTP cable length between two nodes for 10BASE-T is 100M.

The following answers are incorrect:

80 meters. It is only a distracter.

185 meters. Is incorrect because it is the maximum length for 10Base-2

500 meters. Is incorrect because it is the maximum length for 10Base-5

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### QUESTION 322

Secure Sockets Layer (SSL) is very heavily used for protecting which of the following?

- A. Web transactions.
- B. EDI transactions.
- C. Telnet transactions.
- D. Electronic Payment transactions.

Answer: A

Explanation: SSL was developed Netscape Communications Corporation to improve security and privacy of HTTP transactions.

SSL is one of the most common protocols used to protect Internet traffic.

It encrypts the messages using symmetric algorithms, such as IDEA, DES, 3DES, and Fortezza, and also calculates the MAC for the message using MD5 or SHA-1. The MAC is appended to the message and encrypted along with the message data.

The exchange of the symmetric keys is accomplished through various versions of Diffie–Hellmann or RS

A. TLS is the Internet standard based on SSLv3. TLSv1 is backward compatible with SSLv3.

It uses the same algorithms as SSLv3; however, it computes an HMAC instead of a MAC along with other enhancements to improve security.

The following are incorrect answers:

"EDI transactions" is incorrect. Electronic Data Interchange (EDI) is not the best answer to this question though SSL could play a part in some EDI transactions.

"Telnet transactions" is incorrect. Telnet is a character mode protocol and is more likely to be secured by Secure Telnet or replaced by the Secure Shell (SSH) protocols.

"Eletronic payment transactions" is incorrect. Electronic payment is not the best answer to this question though SSL could play a part in some electronic payment transactions.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 16615-16619). Auerbach Publications. Kindle Edition.

and

[http://en.wikipedia.org/wiki/Transport\\_Layer\\_Security](http://en.wikipedia.org/wiki/Transport_Layer_Security)

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### QUESTION 323

Transport Layer Security (TLS) is a two-layered socket layer security protocol that contains the TLS Record Protocol and the::

- A. Transport Layer Security (TLS) Internet Protocol.
- B. Transport Layer Security (TLS) Data Protocol.
- C. Transport Layer Security (TLS) Link Protocol.

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D. Transport Layer Security (TLS) Handshake Protocol.

Answer: D

Explanation:

This is the second protocol in TLS.

"Transport Layer Security (TLS) Internet Protocol" is incorrect. There is no such protocol.

"Transport Layer Security (TLS) Data Protocol" is incorrect. There is no such protocol.

"Transport Layer Security (TLS) Link Protocol" is incorrect. There is no such protocol.

References

CBK, pp. 496 - 497

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**QUESTION 324**

Similar to Secure Shell (SSH-2), Secure Sockets Layer (SSL) uses symmetric encryption for encrypting the bulk of the data being sent over the session and it uses asymmetric or public key cryptography for:

- A. Peer Authentication
- B. Peer Identification
- C. Server Authentication
- D. Name Resolution

Answer: A

Explanation: SSL provides for Peer Authentication. Though peer authentication is possible, authentication of the client is seldom used in practice when connecting to public e-commerce web sites. Once authentication is complete, confidentiality is assured over the session by the use of symmetric encryption in the interests of better performance.

The following answers were all incorrect:

"Peer identification" is incorrect. The desired attribute is assurance of the identity of the communicating parties provided by authentication and NOT identification. Identification is only who you claim to be. Authentication is proving who you claim to be.

"Server authentication" is incorrect. While server authentication only is common practice, the protocol provides for peer authentication (i.e., authentication of both client and server). This answer was not complete.

"Name resolution" is incorrect. Name resolution is commonly provided by the Domain Name System (DNS) not SSL.

Reference(s) used for this question:

CBK, pp. 496 - 497.

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**QUESTION 325**

Secure Sockets Layer (SSL) uses a Message Authentication Code (MAC) for what purpose?

- A. message non-repudiation.
- B. message confidentiality.
- C. message interleave checking.

D. message integrity.

Answer: D

Explanation: A keyed hash also called a MAC (message authentication code) is used for integrity protection and authenticity.

In cryptography, a message authentication code (MAC) is a generated value used to authenticate a message. A MAC can be generated by HMAC or CBC-MAC methods. The MAC protects both a message's integrity (by ensuring that a different MAC will be produced if the message has changed) as well as its authenticity, because only someone who knows the secret key could have modified the message.

MACs differ from digital signatures as MAC values are both generated and verified using the same secret key. This implies that the sender and receiver of a message must agree on the same key before initiating communications, as is the case with symmetric encryption. For the same reason, MACs do not provide the property of non-repudiation offered by signatures specifically in the case of a network-wide shared secret key: any user who can verify a MAC is also capable of generating MACs for other messages.

#### HMAC

When using HMAC the symmetric key of the sender would be concatenated (added at the end) with the message. The result of this process (message + secret key) would be put through a hashing algorithm, and the result would be a MAC value. This MAC value is then appended to the message being sent. If an enemy were to intercept this message and modify it, he would not have the necessary symmetric key to create a valid MAC value. The receiver would detect the tampering because the MAC value would not be valid on the receiving side.

#### CBC-MAC

If a CBC-MAC is being used, the message is encrypted with a symmetric block cipher in CBC mode, and the output of the final block of ciphertext is used as the MAC. The sender does not send the encrypted version of the message, but instead sends the plaintext version and the MAC attached to the message. The receiver receives the plaintext message and encrypts it with the same symmetric block cipher in CBC mode and calculates an independent MAC value. The receiver compares the new MAC value with the MAC value sent with the message. This method does not use a hashing algorithm as does HMAC.

#### Cipher-Based Message Authentication Code (CMAC)

Some security issues with CBC-MAC were found and they created Cipher-Based Message Authentication Code (CMAC) as a replacement. CMAC provides the same type of data origin authentication and integrity as CBC-MAC, but is more secure mathematically. CMAC is a variation of CBC-MAC. It is approved to work with AES and Triple DES. HMAC, CBC-MAC, and CMAC work higher in the network stack and can identify not only transmission errors (accidental), but also more nefarious modifications, as in an attacker messing with a message for her own benefit. This means all of these technologies can identify intentional, unauthorized modifications and accidental changes— three in one.

The following are all incorrect answers:

"Message non-repudiation" is incorrect.

Nonrepudiation is the assurance that someone cannot deny something. Typically, nonrepudiation refers to the ability to ensure that a party to a contract or a communication cannot deny the authenticity of their signature on a document or the sending of a message that they originated.

To repudiate means to deny. For many years, authorities have sought to make repudiation impossible in some situations. You might send registered mail, for example, so the recipient cannot deny that a letter was delivered. Similarly, a legal document typically requires witnesses to signing so that the person who signs cannot deny having done so.

On the Internet, a digital signature is used not only to ensure that a message or document has been electronically signed by the person that purported to sign the document, but also, since a digital signature can only be created by one person, to ensure that a person cannot later deny that they furnished the signature.

"Message confidentiality" is incorrect. The Message confidentiality is protected by encryption not by hashing algorithms.

"Message interleave checking" is incorrect. This is a nonsense term included as a distractor.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 1384). McGraw-Hill. Kindle Edition.

and

[http://csrc.nist.gov/publications/nistpubs/800-38B/SP\\_800-38B.pdf](http://csrc.nist.gov/publications/nistpubs/800-38B/SP_800-38B.pdf)

and

<http://searchsecurity.techtarget.com/definition/nonrepudiation>

and

[https://en.wikipedia.org/wiki/Message\\_authentication\\_code](https://en.wikipedia.org/wiki/Message_authentication_code)

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### QUESTION 326

Packet Filtering Firewalls can also enable access for:

- A. only authorized application port or service numbers.
- B. only unauthorized application port or service numbers.
- C. only authorized application port or ex-service numbers.
- D. only authorized application port or service integers.

Answer: A

Explanation: Firewall rules can be used to enable access for traffic to specific ports or services.

"Service numbers" is rather stilted English but you may encounter these types of wordings on the actual exam -- don't let them confuse you.

"Only unauthorized application port or service numbers" is incorrect. Unauthorized ports/services would be blocked in a properly installed firewall rather than permitting access.

"Only authorized application port or ex-service numbers" is incorrect. "Ex-service" numbers is a nonsense term meant to distract you.

"Only authorized application port or service integers." While service numbers are in fact integers, the more usual (and therefore better) answer is either service or "service number."

References

CBK, p. 464

AIO3, pp. 482 - 484

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### QUESTION 327

A packet filtering firewall looks at the data packet to get information about the source and

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destination addresses of an incoming packet, the protocol (TCP, UDP, or ICMP), and the source and destination port for the:

- A. desired service.
- B. dedicated service.
- C. delayed service.
- D. distributed service.

Answer: A

Explanation: This is the usual term to describe the destination for a TCP/UDP packet.

"Dedicated service" is incorrect. This is an "almost right sounding" term meant to confuse the unwary.

"Delayed service" is incorrect. This is a nonsense term to confuse you.

"Distributed service" is incorrect. While network services can certainly be distributed, the usual term is "desired service" or "destination service."

References:

CBK, p. 464

AIO3, pp. 482 - 484

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### QUESTION 328

A Packet Filtering Firewall system is considered a:

- A. first generation firewall.
- B. second generation firewall.
- C. third generation firewall.
- D. fourth generation firewall.

Answer: A

Explanation: The first types of firewalls were packet filtering firewalls. It is the most basic firewall making access decisions based on ACL's. It will filter traffic based on source IP and port as well as destination IP and port. It does not understand the context of the communication and inspects every single packet one by one without understanding the context of the connection.

"Second generation firewall" is incorrect. The second generation of firewall were Proxy based firewalls. Under proxy based firewall you have Application Level Proxy and also the Circuit-level proxy firewall. The application level proxy is very smart and understand the inner structure of the protocol itself. The Circuit-Level Proxy is a generic proxy that allow you to proxy protocols for which you do not have an Application Level Proxy. This is better than allowing a direct connection to the net. Today a great example of this would be the SOCKS protocol.

"Third generation firewall" is incorrect. The third generation firewall is the Stateful Inspection firewall. This type of firewall makes use of a state table to maintain the context of connections being established.

"Fourth generation firewall" is incorrect. The fourth generation firewall is the dynamic packet filtering firewall.

References:

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CBK, p. 464

AIO3, pp. 482 - 484

Neither CBK or AIO3 use the generation terminology for firewall types but you will encounter it frequently as a practicing security professional. See

<http://www.cisco.com/univercd/cc/td/doc/product/iaabu/centri4/user/scf4ch3.htm> for a general discussion of the different generations.

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### QUESTION 329

Proxies works by transferring a copy of each accepted data packet from one network to another, thereby masking the:

- A. data's payload.
- B. data's details.
- C. data's owner.
- D. data's origin.

Answer: D

Explanation: The application firewall (proxy) relays the traffic from a trusted host running a specific application to an untrusted server. It will appear to the untrusted server as if the request originated from the proxy server.

"Data's payload" is incorrect. Only the origin is changed.

"Data's details" is incorrect. Only the origin is changed.

"Data's owner" is incorrect. Only the origin is changed.

References:

CBK, p. 467

AIO3, pp. 486 - 490

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### QUESTION 330

An application layer firewall is also called a:

- A. Proxy
- B. A Presentation Layer Gateway.
- C. A Session Layer Gateway.
- D. A Transport Layer Gateway.

Answer: A

Explanation: An application layer firewall can also be called a proxy.

"A presentation layer gateway" is incorrect. A gateway connects two unlike environments and is usually required to translate between different types of applications or protocols. This is not the function of a firewall.

"A session layer gateway" is incorrect. A gateway connects two unlike environments and is usually required to translate between different types of applications or protocols. This is not the function of a firewall.

"A transport layer gateway" is incorrect. A gateway connects two unlike environments and is

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usually required to translate between different types of applications or protocols. This is not the function of a firewall.

References:

CBK, p. 467  
AIO3, pp. 486 - 490, 960

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### QUESTION 331

Application Layer Firewalls operate at the:

- A. OSI protocol Layer seven, the Application Layer.
- B. OSI protocol Layer six, the Presentation Layer.
- C. OSI protocol Layer five, the Session Layer.
- D. OSI protocol Layer four, the Transport Layer.

Answer: A

Explanation: Since the application layer firewall makes decisions based on application-layer information in the packet, it operates at the application layer of the OSI stack.

"OSI protocol layer 6, the presentation layer" is incorrect. The application layer firewall must have access to the application layer information in the packet and therefore operates at the application layer.

"OSI protocol layer 5, the session layer" is incorrect. The application layer firewall must have access to the application layer information in the packet and therefore operates at the application layer.

"OSI protocol layer 4, the transport layer" is incorrect. The application layer firewall must have access to the application layer information in the packet and therefore operates at the application layer.

References:

CBK, p. 467  
AIO3, pp.488 - 490

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### QUESTION 332

One drawback of Application Level Firewall is that it reduces network performance due to the fact that it must analyze every packet and:

- A. decide what to do with each application.
- B. decide what to do with each user.
- C. decide what to do with each port.
- D. decide what to do with each packet.

Answer: D

Explanation: Application level firewalls (proxies) must inspect the contents of each packet to make decisions on how the packet will be handled. This inspection imposes additional overhead on the proxy and can reduce the amount of traffic it can handle.

"Decide what to do with each application" is incorrect. Application firewalls are specific to a type of

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application and therefore there is no decision making based on different applications.

"Decide what to do with each user" is incorrect. This is not how an application layer firewall operates.

Decide what to do with each port" is incorrect. This is not how an application layer firewall operates.

References:

CBK, p. 467

AIO3, 488 - 490

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### QUESTION 333

A circuit level proxy is \_\_\_\_\_ when compared to an application level proxy.

- A. lower in processing overhead.
- B. more difficult to maintain.
- C. more secure.
- D. slower.

Answer: A

Explanation: Since the circuit level proxy does not analyze the application content of the packet in making its decisions, it has lower overhead than an application level proxy.

"More difficult to maintain" is incorrect. Circuit level proxies are typically easier to configure and simpler to maintain than an application level proxy.

"More secure" is incorrect. A circuit level proxy is not necessarily more secure than an application layer proxy.

"Slower" is incorrect. Because it is lower in overhead, a circuit level proxy is typically faster than an application level proxy.

References:

CBK, pp. 466 - 467

AIO3, pp.488 - 490

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### QUESTION 334

In a stateful inspection firewall, data packets are captured by an inspection engine that is operating at the:

- A. Network or Transport Layer.
- B. Application Layer.
- C. Inspection Layer.
- D. Data Link Layer.

Answer: A

Explanation: Most stateful packet inspection firewalls work at the network or transport layers. For the TCP/IP protocol, this allows the firewall to make decisions both on IP addresses, protocols and TCP/UDP port numbers

Application layer is incorrect. This is too high in the OSI stack for this type of firewall.

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Inspection layer is incorrect. There is no such layer in the OSI stack.

"Data link layer" is incorrect. This is too low in the OSI stack for this type of firewall.

References:

CBK, p. 466

AIO3, pp. 485 - 486

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### QUESTION 335

When an outgoing request is made on a port number greater than 1023, this type of firewall creates an ACL to allow the incoming reply on that port to pass:

- A. packet filtering
- B. Circuit level proxy
- C. Dynamic packet filtering
- D. Application level proxy

Answer: C

Explanation: The dynamic packet filtering firewall is able to create ACL's on the fly to allow replies on dynamic ports (higher than 1023).

Packet filtering is incorrect. The packet filtering firewall usually requires that the dynamic ports be left open as a group in order to handle this situation.

Circuit level proxy is incorrect. The circuit level proxy builds a conduit between the trusted and untrusted hosts and does not work by dynamically creating ACL's.

Application level proxy is incorrect. The application level proxy "proxies" for the trusted host in its communications with the untrusted host. It does not dynamically create ACL's to control traffic.

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### QUESTION 336

A demilitarized zone is:

- A. a part of a network perfectly safe from hackers
- B. a militarized network segment
- C. a firewall
- D. the network segment between the Internet and a private network

Answer: D

Explanation: The DMZ is a buffer between the protected and unprotected network.

"A part of a network perfectly safe from hackers" is incorrect. There is no such thing.

"A militarized network segment" is incorrect. While the term DMZ originated in the Korean War, it has nothing to do with the military.

"A firewall" is incorrect. Firewalls can play an important part in building a DMZ but a DMZ is much more than a firewall.

References:

CBK, p. 850

AIO, p. 483

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**QUESTION 337**

A DMZ is located:

- A. right behind your first Internet facing firewall
- B. right in front of your first Internet facing firewall
- C. right behind your first network active firewall
- D. right behind your first network passive Internet http firewall

Answer: A

Explanation: While the purpose of systems in the DMZ is to allow public access to certain internal network resources (EMAIL, DNS, Web), it is a good practice to restrict that access to the minimum necessary to provide those services through use of a firewall.

In computer security, a DMZ or Demilitarized Zone (sometimes referred to as a perimeter network) is a physical or logical subnetwork that contains and exposes an organization's external-facing services to a larger and untrusted network, usually the Internet. The purpose of a DMZ is to add an additional layer of security to an organization's local area network (LAN); an external attacker only has direct access to equipment in the DMZ, rather than any other part of the network. The name is derived from the term "demilitarized zone", an area between nation states in which military operation is not permitted.

The following are incorrect answers:

"Right in front of your first Internet facing firewall" While the purpose of systems in the DMZ is to allow public access to certain internal network resources (EMAIL, DNS, Web), it is a good practice to restrict that access to the minimum necessary to provide those services through use of a firewall.

"Right behind your first network active firewall" This is an almost-right-sounding answer meant to distract the unwary.

"Right behind your first network passive Internet http firewall" This is an almost-right-sounding answer meant to distract the unwary.

References:

CBK, p. 434

and

AIO3, p. 483

and

[http://en.wikipedia.org/wiki/DMZ\\_%28computing%29](http://en.wikipedia.org/wiki/DMZ_%28computing%29)

**QUESTION 338**

The DMZ does not normally contain:

- A. encryption server
- B. web server
- C. external DNS server
- D. mail relay

Answer: A

Explanation: Only servers providing public access to required services should be located in the DMZ.

"Web server" is incorrect. An organization's public web site is a very common DMZ scenario.

"External DNS server" is incorrect. An organization's external DNS servers is a very common DMZ scenario.

"Mail relay" is incorrect. An organization's mail relay is a very common DMZ scenario.

References:

CBK, p. 434

AIO3, p. 483

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### QUESTION 339

Good security is built on which of the following concept?

- A. The concept of a pass-through device that only allows certain traffic in and out
- B. The Concept of defense in depth
- C. The Concept of Preventative controls
- D. The Concept of Defensive Controls

Answer: B

Explanation: This the best of the four answers as a defense that depends on multiple layers is superior to one where all protection is embedded in a single layer (e.g., a firewall). Defense in depth would include all categories of controls.

The Following answers are incorrect:

"Concept of a pass through device that only allows certain traffic in and out" is incorrect. This is one definition of a firewall which can be a component of a defense in depth strategy in combination with other measures.

"Concept of preventative controls" is incorrect. This is a component of a defense in depth strategy but the core concept is that there must be multiple layers of defenses.

"Concept of defensive controls" is incorrect. This is a component of a defense in depth strategy but the core concept is that there must be multiple layers of defenses.

References:

[http://en.wikipedia.org/wiki/Defense\\_in\\_depth\\_\(computing\)](http://en.wikipedia.org/wiki/Defense_in_depth_(computing))

<http://www.nsa.gov/snac/support/defenseindepth.pdf>

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### QUESTION 340

A DMZ is also known as a

- A. screened subnet
- B. three legged firewall
- C. a place to attract hackers
- D. bastion host

Answer: A

Explanation: This is another name for the demilitarized zone (DMZ) of a network.

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"Three legged firewall" is incorrect. While a DMZ can be implemented on one leg of such a device, this is not the best answer.

"A place to attract hackers" is incorrect. The DMZ is a way to provide limited public access to an organization's internal resources (DNS, EMAIL, public web, etc) not as an attractant for hackers.

"Bastion host" is incorrect. A bastion host serves as a gateway between trusted and untrusted network.

References:

CBK, p. 434

AIO3, pp. 495 - 496

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### QUESTION 341

The Telecommunications Security Domain of information security is also concerned with the prevention and detection of the misuse or abuse of systems, which poses a threat to the tenets of:

- A. Confidentiality, Integrity, and Entity (C.I.E.).
- B. Confidentiality, Integrity, and Authenticity (C.I.A.).
- C. Confidentiality, Integrity, and Availability (C.I.A.).
- D. Confidentiality, Integrity, and Liability (C.I.L.).

Answer: C

Explanation: The CIA acronym stands for Confidentiality, Integrity and Availability.

"Confidentiality, Integrity and Entity (CIE)" is incorrect. "Entity" is not part of the telecommunications domain definition.

"Confidentiality, Integrity and Authenticity (CIA)" is incorrect. While authenticity is included in the telecommunications domain, CIA is the acronym for confidentiality, integrity and availability.

"Confidentiality, Integrity, and Liability (CIL)" is incorrect. Liability is not part of the telecommunications domain definition.

References:

CBK, pp. 407 - 408

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### QUESTION 342

Network-based Intrusion Detection systems:

- A. Commonly reside on a discrete network segment and monitor the traffic on that network segment.
- B. Commonly will not reside on a discrete network segment and monitor the traffic on that network segment.
- C. Commonly reside on a discrete network segment and does not monitor the traffic on that network segment.
- D. Commonly reside on a host and monitor the traffic on that specific host.

Answer: A

Explanation: Network-based ID systems:

- Commonly reside on a discrete network segment and monitor the traffic on that network segment

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- Usually consist of a network appliance with a Network Interface Card (NIC) that is operating in promiscuous mode and is intercepting and analyzing the network packets in real time

"A passive NIDS takes advantage of promiscuous mode access to the network, allowing it to gain visibility into every packet traversing the network segment. This allows the system to inspect packets and monitor sessions without impacting the network, performance, or the systems and applications utilizing the network."

NOTE FROM CLEMENT:

A discrete network is a synonym for a SINGLE network. Usually the sensor will monitor a single network segment, however there are IDS today that allow you to monitor multiple LAN's at the same time.

References used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 62.

and

Official (ISC)2 Guide to the CISSP CBK, Hal Tipton and Kevin Henry, Page 196

and

Additional information on IDS systems can be found here:

[http://en.wikipedia.org/wiki/Intrusion\\_detection\\_system](http://en.wikipedia.org/wiki/Intrusion_detection_system)

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**QUESTION 343**

Which of the following are additional terms used to describe knowledge-based IDS and behaviorbased IDS?

- A. signature-based IDS and statistical anomaly-based IDS, respectively.
- B. signature-based IDS and dynamic anomaly-based IDS, respectively.
- C. anomaly-based IDS and statistical-based IDS, respectively.
- D. signature-based IDS and motion anomaly-based IDS, respectively.

Answer: A

Explanation: The two current conceptual approaches to Intrusion Detection methodology are knowledge-based ID systems and behavior-based ID systems, sometimes referred to as signature-based ID and statistical anomaly-based ID, respectively.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 63.

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**QUESTION 344**

Knowledge-based Intrusion Detection Systems (IDS) are more common than:

- A. Network-based IDS
- B. Host-based IDS
- C. Behavior-based IDS
- D. Application-Based IDS

Answer: C

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Explanation: Knowledge-based IDS are more common than behavior-based ID systems.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 63.

Application-Based IDS - "a subset of HIDS that analyze what's going on in an application using the transaction log files of the application." Source: Official ISC2 CISSP CBK Review Seminar Student Manual Version 7.0 p. 87

Host-Based IDS - "an implementation of IDS capabilities at the host level. Its most significant difference from NIDS is intrusion detection analysis, and related processes are limited to the boundaries of the host." Source: Official ISC2 Guide to the CISSP CBK - p. 197

Network-Based IDS - "a network device, or dedicated system attached to the network, that monitors traffic traversing the network segment for which it is integrated." Source: Official ISC2 Guide to the CISSP CBK - p. 196

CISSP for dummies a book that we recommend for a quick overview of the 10 domains has nice and concise coverage of the subject:

Intrusion detection is defined as real-time monitoring and analysis of network activity and data for potential vulnerabilities and attacks in progress. One major limitation of current intrusion detection system (IDS) technologies is the requirement to filter false alarms lest the operator (system or security administrator) be overwhelmed with data. IDSSes are classified in many different ways, including active and passive, network-based and host-based, and knowledge-based and behaviorbased:

### Active and passive IDS

An active IDS (now more commonly known as an intrusion prevention system — IPS) is a system that's configured to automatically block suspected attacks in progress without any intervention required by an operator. IPS has the advantage of providing real-time corrective action in response to an attack but has many disadvantages as well. An IPS must be placed in-line along a network boundary; thus, the IPS itself is susceptible to attack. Also, if false alarms and legitimate traffic haven't been properly identified and filtered, authorized users and applications may be improperly denied access. Finally, the IPS itself may be used to effect a Denial of Service (DoS) attack by intentionally flooding the system with alarms that cause it to block connections until no connections or bandwidth are available.

A passive IDS is a system that's configured only to monitor and analyze network traffic activity and alert an operator to potential vulnerabilities and attacks. It isn't capable of performing any protective or corrective functions on its own. The major advantages of passive IDSSes are that these systems can be easily and rapidly deployed and are not normally susceptible to attack themselves.

### Network-based and host-based IDS

A network-based IDS usually consists of a network appliance (or sensor) with a Network Interface Card (NIC) operating in promiscuous mode and a separate management interface. The IDS is placed along a network segment or boundary and monitors all traffic on that segment.

A host-based IDS requires small programs (or agents) to be installed on individual systems to be monitored. The agents monitor the operating system and write data to log files and/or trigger alarms. A host-based IDS can only monitor the individual host systems on which the agents are installed; it doesn't monitor the entire network.

### Knowledge-based and behavior-based IDS

A knowledge-based (or signature-based) IDS references a database of previous attack profiles and known system vulnerabilities to identify active intrusion attempts. Knowledge-based IDS is currently more common than behavior-based IDS.

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Advantages of knowledge-based systems include the following:

It has lower false alarm rates than behavior-based IDS.

Alarms are more standardized and more easily understood than behavior-based IDS.

Disadvantages of knowledge-based systems include these:

Signature database must be continually updated and maintained.

New, unique, or original attacks may not be detected or may be improperly classified.

A behavior-based (or statistical anomaly-based) IDS references a baseline or learned pattern of normal system activity to identify active intrusion attempts. Deviations from this baseline or pattern cause an alarm to be triggered.

Advantages of behavior-based systems include that they

Dynamically adapt to new, unique, or original attacks.

Are less dependent on identifying specific operating system vulnerabilities.

Disadvantages of behavior-based systems include

Higher false alarm rates than knowledge-based IDSSes.

Usage patterns that may change often and may not be static enough to implement an effective behavior-based IDS.

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### QUESTION 345

Which RAID Level often implements a one-for-one disk to disk ratio?

- A. RAID Level 1
- B. RAID Level 0
- C. RAID Level 2
- D. RAID Level 5

Answer: A

Explanation: RAID Level 1 often implemented by a one-for-one disk to disk ratio.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 65.

See Also: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 7: Telecommunications and Network Security (page 480).

See also: "This level duplicates all disk writes from one disk to another to create two identical drives. This technique is also known as data mirroring. Redundancy is provided at this level"

Source: Official ISC2 Guide to the CISSP CBK. p. 657

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RAID Level 0 - "Writes files in stripes across multiple disks without the use of parity information. This technique allows for fast reading and writing to disk. However, without parity information, it is not possible to recover from a hard drive failure." Source: Official ISC2 Guide to the CISSP CBK. p. 657

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RAID Level 2 - "Data is spread across multiple disks at the bit level using this technique.

Redundancy information is computed using a Hamming error correction code, which is the same technique used within hard drives and error-correcting memory modules." Source: Official ISC2 guide to the CISSP CBK p.657-658

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RAID Level 5 - "This level requires three or more drives to implement. Data and parity information is striped together across all drives. This level is the most popular and can tolerate the loss of any one drive." Source: Official ISC2 Guide to the CISSP CBK p. 658

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**QUESTION 346**

Which cable technology refers to the CAT3 and CAT5 categories?

- A. Coaxial cables
- B. Fiber Optic cables
- C. Axial cables
- D. Twisted Pair cables

Answer: D

Explanation: Twisted Pair cables currently have two categories in common usage. CAT3 and CAT5.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 72.

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**QUESTION 347**

The older coaxial cable has been widely replaced with twisted pair, which is extremely easy to work with, inexpensive, and also resistant to multiple hosts failure at once, especially when used in one of the following topology:

- A. Token Passing Configuration.
- B. Star Configuration.
- C. Ring Configuration.
- D. Point to Point Configuration.

Answer: B

Explanation: The older coaxial cable has been widely replaced with twisted pair, which is extremely resistant to failure, especially in a star-wired configuration where a switch is used as a central point the traffic is going through.

If one cable fail then only one station will be affected and not all of the station as in Coaxial Cable.

NOTE: You must be familiar with the term Topology versus Media Access Control methods.

TOPOLOGY (Bus, Star, Ring, Mesh, Tree, Point to Point):

Network topology is the arrangement of the various elements (links, nodes, etc.) of a computer network. Essentially, it is the topological structure of a network, and may be depicted physically or logically. Physical topology refers to the placement of the network's various components, including device location and cable installation, while logical topology shows how data flows within a network, regardless of its physical design. Distances between nodes, physical interconnections, transmission rates, and/or signal types may differ between two networks, yet their topologies may be identical.

A good example is a local area network (LAN): Any given node in the LAN has one or more physical links to other devices in the network; graphically mapping these links results in a

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geometric shape that can be used to describe the physical topology of the network. Conversely, mapping the data flow between the components determines the logical topology of the network.

#### MEDIA ACCESS CONTROL METHODS (Polling, Token Passing, Contention ):

This method decides the presentation and possibilities from the network

Polling: Making periodic requests is called polling. Polling also reduces the burden on the network because the polls originate from a single system are at a predictable rate. The shortcoming of polling is that it does not allow for real-time updates. If a problem occurs on a managed device, the manager does not find out until the agent polled. Mostly used in a star network topology.

Token passing: Token passing that every device on the network receives a periodic opportunity to transmit. The token consists of a special frame that circulates from device to device around the ring. Only the device that possesses the token is permitted to transmit. After transmitting, the device restarts the token, enabling other devices the opportunity to transmit.

Contention (CSMA/CA or CSMA/CD): A condition occurring in some LAN's wherin the Media Access Control sublayer allows more than one node to transmit at the same time, risking collisions.

The following are incorrect answers:

Token passing configuration is not correct because token passing is a channel access method, not a network topology.

Point-to-point configuration is not correct because it is not a network topology.

Ring configuration is not correct because, while each host has two neighbors, messages only pass in one direction; so any break in the ring kills half the communications on the network.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 7554-7555). Auerbach Publications. Kindle Edition.

and

[http://en.wikipedia.org/wiki/Network\\_topology](http://en.wikipedia.org/wiki/Network_topology)

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#### QUESTION 348

Which of the following was designed as a more fault-tolerant topology than Ethernet, and very resilient when properly implemented?

- A. Token Link.
- B. Token system.
- C. Token Ring.
- D. Duplicate ring.

Answer: C

Explanation: Token Ring was designed to be a more fault-tolerant topology than Ethernet, and can be a very resilient topology when properly implemented.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 72.

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#### QUESTION 349

Frame relay uses a public switched network to provide:

- 
- A. Local Area Network (LAN) connectivity.
  - B. Metropolitan Area Network (MAN) connectivity.
  - C. Wide Area Network (WAN) connectivity.
  - D. World Area Network (WAN) connectivity.

Answer: C

Explanation: Frame relay uses a public switched network to provide Wide Area Network (WAN) connectivity.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 73.

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### QUESTION 350

Which of the following items is NOT primarily used to ensure integrity?

- A. Cyclic Redundancy Check (CRC)
- B. Redundant Array of Inexpensive Disks (RAID) system
- C. Hashing Algorithms
- D. The Biba Security model

Answer: B

Explanation: RAID systems are mostly concerned with availability and performance.

All of the following were all concerned with integrity, only RAID was NOT mostly concerned with Integrity:

**Cyclic Redundancy Check:** A cyclic redundancy check (CRC) is a type of function that takes as input a data stream of unlimited length and produces as output a value of a certain fixed size. The term CRC is often used to denote either the function or the function's output. A CRC can be used in the same way as a checksum to detect accidental alteration of data during transmission or storage. CRCs are popular because they are simple to implement in binary hardware, are easy to analyze mathematically, and are particularly good at detecting common errors caused by noise in transmission channels.

**Hashing Algorithms:** In cryptography, a cryptographic hash function is a hash function with certain additional security properties to make it suitable for use as a primitive in various information security applications, such as authentication and message integrity. A hash function takes a long string (or 'message') of any length as input and produces a fixed length string as output, sometimes termed a message digest or a digital fingerprint.

Enlarge

Above you see a hash function at work

In various standards and applications, the two most-commonly used hash functions are MD5 and SHA-1. In 2005, security flaws were identified in both algorithms. Many security professionals have started making use of SHA-256 and SHA-512 which are stronger hashing algorithms.

**The Biba Security Model:**

The Biba Integrity Model was developed to circumvent a weakness in the Bell-LaPadula computer operating system protection model which did not include the possibility of implicit deletion of security objects by writing to them.

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In general, preservation of integrity has three goals:

Prevent data modification by unauthorized parties

Prevent unauthorized data modification by authorized parties

Maintain internal and external consistency (i.e. data reflects the real world)

The Biba model address only the first goal of integrity. The Clark-Wilson model address all 3 goals listed above.

References:

<http://www.answers.com/topic/biba-integrity-model>

<http://www.answers.com/message+digest?cat=technology>

<http://www.answers.com/topic/hashing?cat=technology>

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### QUESTION 351

Which of the following is most affected by denial-of-service (DOS) attacks?

- A. Confidentiality
- B. Integrity
- C. Accountability
- D. Availability

Answer: D

Explanation: Denial of service attacks obviously affect availability of targeted systems.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 61).

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### QUESTION 352

Which conceptual approach to intrusion detection system is the most common?

- A. Behavior-based intrusion detection
- B. Knowledge-based intrusion detection
- C. Statistical anomaly-based intrusion detection
- D. Host-based intrusion detection

Answer: B

Explanation: There are two conceptual approaches to intrusion detection. Knowledge-based intrusion detection uses a database of known vulnerabilities to look for current attempts to exploit them on a system and trigger an alarm if an attempt is found. The other approach, not as common, is called behaviour-based or statistical analysis-based. A host-based intrusion detection system is a common implementation of intrusion detection, not a conceptual approach.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 63).

Also: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 4: Access Control (pages 193-194).

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**QUESTION 353**

Several analysis methods can be employed by an IDS, each with its own strengths and weaknesses, and their applicability to any given situation should be carefully considered. There are two basic IDS analysis methods that exists. Which of the basic method is more prone to false positive?

- A. Pattern Matching (also called signature analysis)
- B. Anomaly Detection
- C. Host-based intrusion detection
- D. Network-based intrusion detection

Answer: B

Explanation: Several analysis methods can be employed by an IDS, each with its own strengths and weaknesses, and their applicability to any given situation should be carefully considered.

There are two basic IDS analysis methods:

- 1. Pattern Matching (also called signature analysis), and
- 2. Anomaly detection

#### PATTERN MATCHING

Some of the first IDS products used signature analysis as their detection method and simply looked for known characteristics of an attack (such as specific packet sequences or text in the data stream) to produce an alert if that pattern was detected. If a new or different attack vector is used, it will not match a known signature and, thus, slip past the IDS.

#### ANOMALY DETECTION

Alternately, anomaly detection uses behavioral characteristics of a system's operation or network traffic to draw conclusions on whether the traffic represents a risk to the network or host.

Anomalies may include but are not limited to:

- Multiple failed log-on attempts
- Users logging in at strange hours
- Unexplained changes to system clocks
- Unusual error messages
- Unexplained system shutdowns or restarts
- Attempts to access restricted files

An anomaly-based IDS tends to produce more data because anything outside of the expected behavior is reported. Thus, they tend to report more false positives as expected behavior patterns change. An advantage to anomaly-based IDS is that, because they are based on behavior identification and not specific patterns of traffic, they are often able to detect new attacks that may be overlooked by a signature-based system. Often information from an anomaly-based IDS may be used to create a pattern for a signature-based IDS.

#### Host Based Intrusion Detection (HIDS)

HIDS is the implementation of IDS capabilities at the host level. Its most significant difference from NIDS is that related processes are limited to the boundaries of a single-host system. However, this presents advantages in effectively detecting objectionable activities because the IDS process is running directly on the host system, not just observing it from the network. This offers unfettered access to system logs, processes, system information, and device information, and virtually

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eliminates limits associated with encryption. The level of integration represented by HIDS increases the level of visibility and control at the disposal of the HIDS application.

#### Network Based Intrusion Detection (NIDS)

NIDS are usually incorporated into the network in a passive architecture, taking advantage of promiscuous mode access to the network. This means that it has visibility into every packet traversing the network segment. This allows the system to inspect packets and monitor sessions without impacting the network or the systems and applications utilizing the network.

Below you have other ways that intrusion detection can be performed:

#### Stateful Matching Intrusion Detection

Stateful matching takes pattern matching to the next level. It scans for attack signatures in the context of a stream of traffic or overall system behavior rather than the individual packets or discrete system activities. For example, an attacker may use a tool that sends a volley of valid packets to a targeted system. Because all the packets are valid, pattern matching is nearly useless. However, the fact that a large volume of the packets was seen may, itself, represent a known or potential attack pattern. To evade attack, then, the attacker may send the packets from multiple locations with long wait periods between each transmission to either confuse the signature detection system or exhaust its session timing window. If the IDS service is tuned to record and analyze traffic over a long period of time it may detect such an attack. Because stateful matching also uses signatures, it too must be updated regularly and, thus, has some of the same limitations as pattern matching.

#### Statistical Anomaly-Based Intrusion Detection

The statistical anomaly-based IDS analyzes event data by comparing it to typical, known, or predicted traffic profiles in an effort to find potential security breaches. It attempts to identify suspicious behavior by analyzing event data and identifying patterns of entries that deviate from a predicted norm. This type of detection method can be very effective and, at a very high level, begins to take on characteristics seen in IPS by establishing an expected baseline of behavior and acting on divergence from that baseline. However, there are some potential issues that may surface with a statistical IDS. Tuning the IDS can be challenging and, if not performed regularly, the system will be prone to false positives. Also, the definition of normal traffic can be open to interpretation and does not preclude an attacker from using normal activities to penetrate systems. Additionally, in a large, complex, dynamic corporate environment, it can be difficult, if not impossible, to clearly define “normal” traffic. The value of statistical analysis is that the system has the potential to detect previously unknown attacks. This is a huge departure from the limitation of matching previously known signatures. Therefore, when combined with signature matching technology, the statistical anomaly-based IDS can be very effective.

#### Protocol Anomaly-Based Intrusion Detection

A protocol anomaly-based IDS identifies any unacceptable deviation from expected behavior based on known network protocols. For example, if the IDS is monitoring an HTTP session and the traffic contains attributes that deviate from established HTTP session protocol standards, the IDS may view that as a malicious attempt to manipulate the protocol, penetrate a firewall, or exploit a vulnerability. The value of this method is directly related to the use of well-known or well-defined protocols within an environment. If an organization primarily uses well-known protocols (such as HTTP, FTP, or telnet) this can be an effective method of performing intrusion detection. In the face of custom or nonstandard protocols, however, the system will have more difficulty or be completely unable to determine the proper packet format. Interestingly, this type of method is prone to the same challenges faced by signature-based IDSs. For example, specific protocol

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analysis modules may have to be added or customized to deal with unique or new protocols or unusual use of standard protocols. Nevertheless, having an IDS that is intimately aware of valid protocol use can be very powerful when an organization employs standard implementations of common protocols.

#### Traffic Anomaly-Based Intrusion

Detection A traffic anomaly-based IDS identifies any unacceptable deviation from expected behavior based on actual traffic structure. When a session is established between systems, there is typically an expected pattern and behavior to the traffic transmitted in that session. That traffic can be compared to expected traffic conduct based on the understandings of traditional system interaction for that type of connection. Like the other types of anomaly-based IDS, traffic anomaly-based IDS relies on the ability to establish “normal” patterns of traffic and expected modes of behavior in systems, networks, and applications. In a highly dynamic environment it may be difficult, if not impossible, to clearly define these parameters.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 3664-3686). Auerbach Publications. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 3711-3734). Auerbach Publications. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 3694-3711). Auerbach Publications. Kindle Edition.

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### QUESTION 354

What is the primary purpose of using redundant array of inexpensive disks (RAID) level zero?

- A. To improve system performance.
- B. To maximize usage of hard disk space.
- C. To provide fault tolerance and protection against file server hard disk crashes.
- D. To implement integrity.

Answer: A

Explanation: Redundant array of inexpensive disks (RAID) are primarily used to improve speed, availability, and redundancy, not integrity. They provide fault tolerance and protection against file server hard disk crashes.

NOTE: For the purpose of the exam you need to be familiar with RAID 1 to 5, RAID 10, and RAID 50.

PC Magazine had a great article on RAID that has great explanations, see below:

Anyone who's ever looked into purchasing a NAS device or server, particularly for a business, has inevitably stumbled across the term "RAID." RAID stands for Redundant Array of Inexpensive or (the more marketing-friendly "Independent) Disks." In general, RAID uses two or more hard disk drives to improve the performance or provide some level of fault tolerance for a machine—typically a NAS or server. Fault tolerance is simply providing a "safety net" for failed hardware, usually a hard drive, by ensuring that the machine with the failed component can still operate. Fault tolerance lessens interruptions in productivity and the chance of data loss.

## Hardware RAID

There are two ways to configure RAID: with hardware or software. Hardware RAID is most traditionally implemented in businesses and organizations where disk fault tolerance and optimized performance are must-haves, not luxuries. There are some advantages and disadvantages with hardware-based RAID. It's more expensive, because configuring it requires an additional hardware component, a RAID controller which is a piece of hardware that controls the RAID array. RAID controllers can be internal, meaning they connect inside of a server to the motherboard or external (usually reserved for enterprise, high-level RAID solutions). Hardware-based RAID is also considered a better performing, more efficient way to implement RAID than software RAID. Hardware-based RAID is used most in corporate servers and business-class NAS drives.

## Software RAID

Software RAID is arguably not as reliable as hardware RAID, but it's definitely more economical and can still deliver basic fault tolerance. You can't configure RAID arrays as complex with software as you can with hardware, but if you just want to implement mirroring (which is copying data from one drive to another, to keep that data accessible in case a drive fails) then software RAID is a cheaper, less complicated to set up option. Instead of using a bunch of disks and a controller to make an array, some software RAID solutions can use logical partitions on a single disk. That's what makes it both cheaper and less reliable—if that single disk fails completely, your data is gone.

Windows 7 (Pro and Ultimate editions) has inherent support for RAID; you can set up a single disk with two partitions, and have those partitions mirrored (RAID 1) or you can setup disk striping for performance (RAID 0). This type of RAID is available in other operating systems as well like Apple's Snow Leopard Server 10.6, Linux and Windows Server 2003 and 2008. Since this type of RAID already comes as a feature in the OS, the price can't be beat. Software RAID can also comprise of virtual RAID solutions offered by vendors such as Dot Hill to deliver powerful hostbased virtual RAID adapters. This is a solution that is more tailored to enterprise networks.

## Which RAID Is Right For Me?

Once you've decided whether software or hardware RAID best suits your purposes, you need to pick a RAID level—this refers to how you are going to configure RAID on your device. There are several RAID levels, and the one you choose depends on whether you are using RAID for performance or fault tolerance (or both). It also matters whether you have hardware or software RAID, because software supports fewer levels than hardware-based RAID. In the case of hardware RAID, the type of controller you have matters, too. Different controllers support different levels of RAID and also dictate the kinds of disks you can use in an array: SAS, SATA or SSD). Here's a rundown on each level of RAID:

RAID 0 is used to boost a server's performance. It's also known as "disk striping." With RAID 0, data is written across multiple disks. This means the work that the computer is doing is handled by multiple disks rather than just one, increasing performance because multiple drives are reading and writing data, improving disk I/O. A minimum of two disks is required. Both software and hardware RAID support RAID 0 as do most controllers. The downside is that there is no fault tolerance. If one disk fails then that affects the entire array and the chances for data loss or corruption increases.

RAID 1 is a fault-tolerance configuration known as "disk mirroring." With RAID 1, data is copied seamlessly and simultaneously, from one disk to another, creating a replica, or mirror. If one disk gets fried, the other can keep working. It's the simplest relatively low-cost way to implement faulttolerance.

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The downside is that RAID 1 causes a slight drag on performance. RAID 1 can be implemented through either software or hardware RAID. A minimum of two disks are required for RAID 1 hardware implementations. With software RAID 1, instead of two physical disks, data is mirrored between volumes on a single disk. One additional point to remember is that RAID 1 cuts total disk capacity in half: if a server with two 1 TB drives is configured with RAID 1, then total storage capacity will be 1 TB not 2 TB.

RAID 5 is by far the most common RAID configuration for business servers and enterprise NAS devices. This RAID level provides better performance than mirroring as well as fault-tolerance. With RAID 5, data and parity (which is additional data used for recovery) are striped across three or more disks. Disk drives typically fail in sectors, rather than the entire drive dying. When RAID 5 is configured, if a portion of a disk fails, that data gets recreated from the remaining data and parity, seamlessly and automatically.

This is beneficial because RAID 5 allows many NAS and server drives to be "hot-swappable" meaning in case a drive in the array fails, that drive can be swapped with a new drive without shutting down the server or NAS and without having to interrupt users who may be accessing the server or NAS. It's a great solution for data redundancy, because as drives fail (and they eventually will), the data can be re-built to new disks as failing disks are replaced. RAID 5 can be implemented as a software or hardware solution. You'll get better performance with hardware RAID 5, because the work is done by the controller without taxing the system processor. The downside to RAID 5 is the performance hit to servers that perform a lot of write operations. For example, with RAID 5 on a server that has a database that many employees access in a workday, there could be noticeable lag.

RAID 10 is a combination of RAID 1 and 0 and is often denoted as RAID 1+0. It combines the mirroring of RAID 1 with the striping of RAID 0. It's the RAID level that gives the best performance, but it is also costly, requiring two times as many disks of other RAID levels, for a minimum of four. This is the RAID level ideal for highly used database servers or any server that's performing many write operations. RAID 10 can be implemented as hardware or software but the general consensus is that many of the performance advantages are lost when you use software RAID 10. RAID 10 requires a minimum of four disks.

#### Other RAID Levels

There are other RAID levels: 2, 3, 4, 7, 0+1...but they are really variants of the main RAID configurations already mentioned and used for specific instances. Here are some short descriptions of each:

RAID 2 is similar to RAID 5, but instead of disk striping using parity, striping occurs at the bit-level. RAID 2 is seldom deployed because costs to implement are usually prohibitive (a typical setup requires 10 disks) and gives poor performance with some disk I/O operations.

RAID 3 is also similar to RAID 5, except this solution requires a dedicated parity drive. RAID 3 is seldom used but in the most specific types of database or processing environments that would benefit from it.

RAID 4 is similar to RAID except disk striping happens at the byte level, rather than the bit-level as in RAID 3.

RAID 7 is a proprietary level of RAID owned by the now-extinct Storage Computer Corporation. RAID 0+1 is often interchanged for RAID 10 (which is RAID 1+0) but the two are not same. RAID 0+1 is a mirrored array with segments that are RAID 0 arrays. It's implemented in specific infrastructures requiring high performance but not a high level of scalability.

For most small to mid-size business purposes, RAID 0, 1, 5 and in some cases 10 suffice for good

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fault tolerance and or performance solutions. For most home users RAID 5 may be overkill, but software RAID 1 mirroring provides decent fault tolerance, and hardware mirroring with two physical drives is provides even better, if you can afford it.

One last thought: Remember, RAID is not backup, nor does it replace a backup strategy—preferably an automated one. RAID can be a great way to optimize NAS and server performance, but it's only part of an overall disaster recovery solution.

Reference:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 65).

and

PC MAGAZINE article at <http://www.pc当地.com/article2/0,2817,2370235,00.asp>

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### QUESTION 355

Which RAID implementation stripes data and parity at block level across all the drives?

- A. RAID level 1
- B. RAID level 2
- C. RAID level 4
- D. RAID level 5

Answer: D

Explanation: RAID level 5 stripes data and parity at block level across all the drives in the set. A RAID 5 uses block-level striping with parity data distributed across all member disks. RAID 5 has achieved popularity because of its low cost of redundancy. This can be seen by comparing the number of drives needed to achieve a given capacity.

For example, four 1 TB drives can be made into two separate 1 TB redundant arrays under RAID 1 or 2 TB under RAID 1+0, but the same four drives can be used to build a 3 TB array under RAID 5.

Although RAID 5 may be implemented in a disk controller, some have hardware support for parity calculations (hardware RAID cards with onboard processors) while some use the main system processor (a form of software RAID in vendor drivers for inexpensive controllers).

Many operating systems also provide software RAID support independently of the disk controller, such as Windows Dynamic Disks, Linux mdadm, or RAID-Z. In most implementations, a minimum of three disks is required for a complete RAID 5 configuration.

Please see the reference below for a lot more details about all of the types of raid. For the purpose of the exam you have to be familiar with level zero to five, and combinations such as RAID 10 and RAID 50.

The following are incorrect answers:

RAID 1 : an exact copy (or mirror) of a set of data on two disks. This is useful when read performance or reliability is more important than data storage capacity. Such an array can only be as big as the smallest member disk. A classic RAID 1 mirrored pair contains two disks over a single disk. Since each member contains a complete copy and can be addressed independently, ordinary wear-and-tear reliability is raised by the power of the number of self-contained copies.

RAID 2 : stripes data at the bit (rather than block) level, and uses a Hamming code for error

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correction. The disks are synchronized by the controller to spin at the same angular orientation (they reach Index at the same time), so it generally cannot service multiple requests simultaneously. Extremely high data transfer rates are possible. This is the only original level of RAID that is not currently used.

All hard disks eventually implemented Hamming code error correction. This made RAID 2 error correction redundant and unnecessarily complex. Like RAID 3, this level quickly became useless and is now obsolete. There are no commercial applications of RAID 2.

RAID 4 : uses block-level striping with a dedicated parity disk. This allows each member of the set to act independently when only a single block is requested.

Reference(s) use for this question:

[http://en.wikipedia.org/wiki/Standard\\_RAID\\_levels](http://en.wikipedia.org/wiki/Standard_RAID_levels)

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### QUESTION 356

Which RAID level concept is considered more expensive and is applied to servers to create what is commonly known as server fault tolerance?

- A. RAID level 0
- B. RAID level 1
- C. RAID level 2
- D. RAID level 5

Answer: B

Explanation: RAID 1 (Mirroring) is usually used to create Server Fault Tolerance

Redundant server implementations take the concept of RAID 1 (mirroring) and applies it to a pair of servers to provide server fault tolerance. Each of the two servers have 100% of the data and the data is maintained in synch all the time.

#### RAID 0 (STRIPING)

Offers no redundancy or fault tolerance, hence does not truly fit the "RAID" acronym. In level 0, data is striped across drives, resulting in higher data throughput. Since no redundant information is stored, performance is very good, but the failure of any disk in the array results in data loss. This level is commonly referred to as striping.

#### Advantages of RAID 0

Since redundant data is not stored in RAID, hence the capacity of this RAID storage system is excellent, complete 100%.

This RAID level is very good for large data transfers.

Splitting up of data across various hard drives provides very high input/output rates.

There is no parity generation.

Since, copies of data are not created, hence it is very cost effective. No extra space is used in storing duplicate data.

It is very easy to implement RAID level 0.

#### Disadvantages of RAID 0

The single drive MTBF causes the data availability feature to be very low.

It is not a proper RAID level, since it cannot provide data redundancy.

A single disk failure can result in a considerable amount of data loss.

RAID 0 is not the right RAID level for critical systems, where data holds the prime importance.

## RAID 1 (MIRRORING)

Provides redundancy by writing all data to two or more drives. The performance of a level 1 array tends to be faster on reads and slower on writes compared to a single drive, but if either drive fails, no data is lost. This is a good entry-level redundant system, since only two drives are required; however, since one drive is used to store a duplicate of the data, the cost per megabyte is high. This level is commonly referred to as mirroring.

This level is known for its mirroring capability. Two hard disks are used, out of which one stores duplicate data. In other words, same data is stored in both the hard disks. Thus, data redundancy is provided very well in this RAID level. However, the cost of implementing this RAID level becomes very high, since one of the hard drives is just used for keeping the duplicate content of the data in the other hard drive.

### Advantages of RAID 1

The capacity of data storage in RAID 1 is not that bad. It is 50%.

For large data transfers, this RAID level is also very good.

In RAID 1, reading data is quite fast.

Most importantly, failure of any one of the disks, cannot cause data loss, as a backup is always there in the other hard disk.

This is another easy to implement RAID level.

### Disadvantages of RAID 1

It is not very much cost effective, because one of the drives is just storing the duplicate data of the other.

The writing speed is decreased, since data has to be written twice.

The disk overhead is also very high

DUPLEXING: Is the same as mirroring but two drives controllers are being used.

## RAID 2 (STRIPPING AT THE BIT LEVEL)

In RAID 2, data is not stripped at blocks, but at the level of bits. Hamming code is used for error correction. Hamming code is a linear error correcting code. This is very efficient in recovering accurate data from the single bit corruption in data. Thus, this RAID level provides a very high data transfer rate.

### Advantages of RAID 2

High data transfer rates.

Single bit corruption of data can be accurately recovered.

Multiple bit corruption can also be detected with much ease.

### Disadvantages of RAID 2

Multiple bit corruption is possible.

Multiple bit corruption can be detected but not corrected.

The error bit correction logic is very complex. RAID 2 has become almost an obsolete method of data storage.

## RAID 3 (STRIPPING AT THE BYTE LEVEL)

In RAID 3, data is split at byte level. In this method, one additional hard disk is used for holding the parity bits. Since data is stored and stripped at the byte level, hence, accessing a single block of data requires access to more than one hard disks. This is another RAID level, whose use is very much limited to certain applications.

### Advantages of RAID 3

For large file transfers, it provides very high read and write speeds.

It is quite cost effective.

The capacity of the hard disks used in this system is also very good, since, only one extra hard disk is used for storing the parity bits.

#### Disadvantages of RAID 3

RAID 3 is not very good for small data transfers.

Accessing a block of data means, dealing with more than one hard drive in the hard drive array.

Application is limited to certain specific fields.

#### RAID 4 (STRIPING AT THE BLOCK LEVEL)

RAID 4 is quite similar to that of RAID 3. It also uses a dedicated parity disk, but the difference is that, it strips the data at block level. This is another RAID level, which became obsolete very soon.

#### Advantages of RAID 4

It can provide multiple reads if the controller allows it to do so.

It is also quite cost effective.

Unlike RAID 3, it does not require synchronized spindles.

#### RAID 5 (STRIPING AT THE BLOCK LEVEL - MULTIPLE PARITY DRIVES)

This is perhaps the most popular RAID level. It also uses block level stripping, but a single dedicated hard drive is not used for holding the parity data. It also provides high storage capacity too. Provides redundancy by writing data and parity information across three or more drives, thus increasing performance.

#### Advantages of RAID 5

High read/write speeds are possible. As against RAID 3 and RAID 4, which were quickly replaced by RAID 5, the RAID level 5 allowed multiple writes.

It is very cost effective. With a minimum of just 3 hard drives, this RAID level can be implemented and explained.

The capacity of this RAID level is also very good.

#### Disadvantages of RAID 5

It is not very efficient with large data transfers.

Though the performance is very good, a disk failure can have a good impact on the system's performance.

#### RAID 10 (RAID 1 and 0 USED TOGETHER)

RAID 10 is often referred to as RAID 1+0. The reason is that this RAID level uses the combined features of RAID 1 and RAID 0. Here, a mirror of each block of data is created and data is also stripped. This is a very good system for handling multiple drive failures.

#### RAID 50

RAID 10 is often referred to as RAID 5+0. The reason is that this RAID level uses the combined features of RAID 5 and RAID 0.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 67).

and

<http://www.buzzle.com/articles/raid-levels-explained.html>

and

<http://www.sohoconsult.ch/raid/raid.html>

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### QUESTION 357

Which backup method only copies files that have been recently added or changed and also leaves the archive bit unchanged?

- A. Full backup method
- B. Incremental backup method
- C. Fast backup method
- D. Differential backup method

Answer: D

Explanation: A differential backup is a partial backup that copies a selected file to tape only if the archive bit for that file is turned on, indicating that it has changed since the last full backup. A differential backup leaves the archive bits unchanged on the files it copies.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 69).

Also see: <http://e-articles.info/e/a/title/Backup-Types/>

Backup software can use or ignore the archive bit in determining which files to back up, and can either turn the archive bit off or leave it unchanged when the backup is complete. How the archive bit is used and manipulated determines what type of backup is done, as follows

#### Full backup

A full backup, which Microsoft calls a normal backup, backs up every selected file, regardless of the status of the archive bit. When the backup completes, the backup software turns off the archive bit for every file that was backed up. Note that "full" is a misnomer because a full backup backs up only the files you have selected, which may be as little as one directory or even a single file, so in that sense Microsoft's terminology is actually more accurate. Given the choice, full backup is the method to use because all files are on one tape, which makes it much easier to retrieve files from tape when necessary. Relative to partial backups, full backups also increase redundancy because all files are on all tapes. That means that if one tape fails, you may still be able to retrieve a given file from another tape.

#### Differential backup

A differential backup is a partial backup that copies a selected file to tape only if the archive bit for that file is turned on, indicating that it has changed since the last full backup. A differential backup leaves the archive bits unchanged on the files it copies. Accordingly, any differential backup set contains all files that have changed since the last full backup. A differential backup set run soon after a full backup will contain relatively few files. One run soon before the next full backup is due will contain many files, including those contained on all previous differential backup sets since the last full backup. When you use differential backup, a complete backup set comprises only two tapes or tape sets: the tape that contains the last full backup and the tape that contains the most recent differential backup.

#### Incremental backup

An incremental backup is another form of partial backup. Like differential backups, Incremental Backups copy a selected file to tape only if the archive bit for that file is turned on. Unlike the differential backup, however, the incremental backup clears the archive bits for the files it backs up. An incremental backup set therefore contains only files that have changed since the last full backup or the last incremental backup. If you run an incremental backup daily, files changed on Monday are on the Monday tape, files changed on Tuesday are on the Tuesday tape, and so forth. When you use an incremental backup scheme, a complete backup set comprises the tape that

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contains the last full backup and all of the tapes that contain every incremental backup done since the last normal backup. The only advantages of incremental backups are that they minimize backup time and keep multiple versions of files that change frequently. The disadvantages are that backed-up files are scattered across multiple tapes, making it difficult to locate any particular file you need to restore, and that there is no redundancy. That is, each file is stored only on one tape.

#### Full copy backup

A full copy backup (which Microsoft calls a copy backup) is identical to a full backup except for the last step. The full backup finishes by turning off the archive bit on all files that have been backed up. The full copy backup instead leaves the archive bits unchanged. The full copy backup is useful only if you are using a combination of full backups and incremental or differential partial backups. The full copy backup allows you to make a duplicate "full" backup—e.g., for storage offsite, without altering the state of the hard drive you are backing up, which would destroy the integrity of the partial backup rotation.

Some Microsoft backup software provides a bizarre backup method Microsoft calls a daily copy backup. This method ignores the archive bit entirely and instead depends on the date- and timestamp of files to determine which files should be backed up. The problem is, it's quite possible for software to change a file without changing the date- and timestamp, or to change the date- and timestamp without changing the contents of the file. For this reason, we regard the daily copy backup as entirely unreliable and recommend you avoid using it.

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#### QUESTION 358

Which backup method does not reset the archive bit on files that are backed up?

- A. Full backup method
- B. Incremental backup method
- C. Differential backup method
- D. Additive backup method

Answer: C

Explanation: The differential backup method only copies files that have changed since the last full backup was performed. It is additive in the fact that it does not reset the archive bit so all changed or added files are backed up in every differential backup until the next full backup. The "additive backup method" is not a common backup method.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 69).

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#### QUESTION 359

Which of the following is a drawback of fiber optic cables?

- A. It is affected by electromagnetic interference (EMI).
- B. It can easily be tapped.
- C. The expertise needed to install it.
- D. The limited distance at high speeds.

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Answer: C

Explanation: Fiber optic is immune to the effects of electromagnetic interference, is very hard to tap and has a much longer effective usable length than any other cable type. The primary drawbacks of this cable type are its cost of installation and the high level of expertise needed to have it properly terminated.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 72).

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### QUESTION 360

What refers to legitimate users accessing networked services that would normally be restricted to them?

- A. Spoofing
- B. Piggybacking
- C. Eavesdropping
- D. Logon abuse

Answer: D

Explanation: Unauthorized access of restricted network services by the circumvention of security access controls is known as logon abuse. This type of abuse refers to users who may be internal to the network but access resources they would not normally be allowed.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 74).

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### QUESTION 361

What is called an attack in which an attacker floods a system with connection requests but does not respond when the target system replies to those requests?

- A. Ping of death attack
- B. SYN attack
- C. Smurf attack
- D. Buffer overflow attack

Answer: B

Explanation: A SYN attack occurs when an attacker floods the target system's small "in-process" queue with connection requests, but it does not respond when the target system replies to those requests. This causes the target system to "time out" while waiting for the proper response, which makes the system crash or become unusable. A buffer overflow attack occurs when a process receives much more data than expected. One common buffer overflow attack is the ping of death, where an attacker sends IP packets that exceed the maximum legal length (65535 octets). A smurf attack is an attack where the attacker spoofs the source IP address in an ICMP ECHO

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broadcast packet so it seems to have originated at the victim's system, in order to flood it with REPLY packets.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 76).

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### QUESTION 362

Which type of attack involves hijacking a session between a host and a target by predicting the target's choice of an initial TCP sequence number?

- A. IP spoofing attack
- B. SYN flood attack
- C. TCP sequence number attack
- D. Smurf attack

Answer: C

Explanation: A TCP sequence number attack exploits the communication session which was established between the target and the trusted host that initiated the session. It involves hijacking the session between the host and the target by predicting the target's choice of an initial TCP sequence number. An IP spoofing attack is used to convince a system that it is communicating with a known entity that gives an intruder access. It involves modifying the source address of a packet for a trusted source's address. A SYN attack is when an attacker floods a system with connection requests but does not respond when the target system replies to those requests. A smurf attack occurs when an attacker sends a spoofed (IP spoofing) PING (ICMP ECHO) packet to the broadcast address of a large network (the bounce site). The modified packet containing the address of the target system, all devices on its local network respond with a ICMP REPLY to the target system, which is then saturated with those replies.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 77).

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### QUESTION 363

Which OSI/ISO layer defines how to address the physical devices on the network?

- A. Session layer
- B. Data Link layer
- C. Application layer
- D. Transport layer

Answer: B

Explanation: The data link layer (layer 2) defines how to address the physical locations and/or devices on the network.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 7: Telecommunications and Network Security (page 352).

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**QUESTION 364**

Which layer defines how packets are routed between end systems?

- A. Session layer
- B. Transport layer
- C. Network layer
- D. Data link layer

Answer: C

Explanation: The network layer (layer 3) defines how packets are routed and relayed between end systems on the same network or on interconnected networks. Message routing, error detection and control of node traffic are managed at this level.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 82).

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**QUESTION 365**

At which of the OSI/ISO model layer is IP implemented?

- A. Session layer
- B. Transport layer
- C. Network layer
- D. Data link layer

Answer: C

Explanation: IP operates at the network layer (layer 3).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 82).

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**QUESTION 366**

Which ISO/OSI layer establishes the communications link between individual devices over a physical link or channel?

- A. Transport layer
- B. Network layer
- C. Data link layer
- D. Physical layer

Answer: C

Explanation: The data link layer (layer 2) establishes the communications link between individual

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devices over a physical link or channel. It also ensures that messages are delivered to the proper device and translates the messages from layers above into bits for the physical layer (layer 1) to transmit.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 83).

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**QUESTION 367**

Which OSI/ISO layer is the Media Access Control (MAC) sublayer part of?

- A. Transport layer
- B. Network layer
- C. Data link layer
- D. Physical layer

Answer: C

Explanation: The data link layer contains the Logical Link Control sublayer and the Media Access Control (MAC) sublayer.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 83).

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**QUESTION 368**

Which OSI/OSI layer defines the X.24, V.35, X.21 and HSSI standard interfaces?

- A. Transport layer
- B. Network layer
- C. Data link layer
- D. Physical layer

Answer: D

Explanation: The physical layer (layer 1) defines the X.24, V.35, X.21 and HSSI standard interfaces.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 83).

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**QUESTION 369**

How many layers are defined within the US Department of Defense (DoD) TCP/IP Model?

- A. 7
- B. 5
- C. 4
- D. 3

Answer: C

Explanation: The TCP/IP protocol model is similar to the OSI model but it defines only four layers:

Application

Host-to-host

Internet

Network access

Reference(s) used for this question:

[http://www.novell.com/documentation/nw65/ntwk\\_ipv4\\_nw/data/h0zdx4oj.html](http://www.novell.com/documentation/nw65/ntwk_ipv4_nw/data/h0zdx4oj.html)

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 84).

also see:

[http://en.wikipedia.org/wiki/Internet\\_Protocol\\_Suite#Layer\\_names\\_and\\_number\\_of\\_layers\\_in\\_the\\_literature](http://en.wikipedia.org/wiki/Internet_Protocol_Suite#Layer_names_and_number_of_layers_in_the_literature)

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### QUESTION 370

Which layer of the TCP/IP protocol model defines the IP datagram and handles the routing of data across networks?

- A. Application layer
- B. Host-to-host transport layer
- C. Internet layer
- D. Network access layer

Answer: C

Explanation: In the TCP/IP protocol model, the Internet layer defines the IP datagram and handles the routing of data across networks.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 84).

And: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 7: Telecommunications and Network Security (page 344).

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### QUESTION 371

Which layer of the TCP/IP protocol model would best correspond to the OSI/ISO model's network layer?

- A. Network access layer
- B. Application layer
- C. Host-to-host transport layer
- D. Internet layer

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Answer: D

Explanation: The Internet layer corresponds to the OSI's network layer. It handles the routing of packets among multiple networks.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 85).

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### QUESTION 372

Which layer of the DoD TCP/IP model controls the communication flow between hosts?

- A. Internet layer
- B. Host-to-host transport layer
- C. Application layer
- D. Network access layer

Answer: B

Explanation: Whereas the host-to-host layer (equivalent to the OSI's transport layer) provides end-to-end data delivery service, flow control, to the application layer.

The four layers in the DoD model, from top to bottom, are:

The Application Layer contains protocols that implement user-level functions, such as mail delivery, file transfer and remote login.

The Host-to-Host Layer handles connection rendez vous, flow control, retransmission of lost data, and other generic data flow management between hosts. The mutually exclusive TCP and UDP protocols are this layer's most important members.

The Internet Layer is responsible for delivering data across a series of different physical networks that interconnect a source and destination machine. Routing protocols are most closely associated with this layer, as is the IP Protocol, the Internet's fundamental protocol.

The Network Access Layer is responsible for delivering data over the particular hardware media in use. Different protocols are selected from this layer, depending on the type of physical network

The OSI model organizes communication services into seven groups called layers. The layers are as follows:

Layer 7, The Application Layer: The application layer serves as a window for users and application processes to access network services. It handles issues such as network transparency, resource allocation, etc. This layer is not an application in itself, although some applications may perform application layer functions.

Layer 6, The Presentation Layer: The presentation layer serves as the data translator for a network. It is usually a part of an operating system and converts incoming and outgoing data from one presentation format to another. This layer is also known as syntax layer.

Layer 5, The Session Layer: The session layer establishes a communication session between processes running on different communication entities in a network and can support a message mode data transfer. It deals with session and connection coordination.

Layer 4, The Transport Layer: The transport layer ensures that messages are delivered in the order in which they are sent and that there is no loss or duplication. It ensures complete data transfer. This layer provides an additional connection below the Session layer and assists with

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managing some data flow control between hosts. Data is divided into packets on the sending node, and the receiving node's Transport layer reassembles the message from packets. This layer is also responsible for error checking to guarantee error-free data delivery, and requests a retransmission if necessary. It is also responsible for sending acknowledgments of successful transmissions back to the sending host. A number of protocols run at the Transport layer, including TCP, UDP, Sequenced Packet Exchange (SPX), and NWLink.

Layer 3, The Network Layer: The network layer controls the operation of the subnet. It determines the physical path that data takes on the basis of network conditions, priority of service, and other factors. The network layer is responsible for routing and forwarding data packets.

Layer 2, The Data-Link Layer: The data-link layer is responsible for error free transfer of data frames. This layer provides synchronization for the physical layer. ARP and RARP would be found at this layer.

Layer 1, The Physical Layer: The physical layer is responsible for packaging and transmitting data on the physical media. This layer conveys the bit stream through a network at the electrical and mechanical level.

See a great flash animation on the subject at:

<http://www.maris.com/content/applets/flash/comp/fa0301.swf>

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 85).

Also: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 7: Telecommunications and Network Security (page 344).

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### QUESTION 373

How many bits compose an IPv6 address?

- A. 32 bits
- B. 64 bits
- C. 96 bits
- D. 128 bits

Answer: D

Explanation: The actual IP address (IPv4) is composed of 32 bits. An IPv6 address is composed of 128 bits.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 87).

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### QUESTION 374

What protocol is used on the Local Area Network (LAN) to obtain an IP address from its known MAC address?

- A. Reverse address resolution protocol (RARP)
- B. Address resolution protocol (ARP)
- C. Data link layer

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D. Network address translation (NAT)

Answer: A

Explanation: The reverse address resolution protocol (RARP) sends out a packet including a MAC address and a request to be informed of the IP address that should be assigned to that MAC.

Diskless workstations do not have a full operating system but have just enough code to know how to boot up and broadcast for an IP address, and they may have a pointer to the server that holds the operating system. The diskless workstation knows its hardware address, so it broadcasts this information so that a listening server can assign it the correct IP address.

As with ARP, Reverse Address Resolution Protocol (RARP) frames go to all systems on the subnet, but only the RARP server responds. Once the RARP server receives this request, it looks in its table to see which IP address matches the broadcast hardware address. The server then sends a message that contains its IP address back to the requesting computer. The system now has an IP address and can function on the network.

The Bootstrap Protocol (BOOTP) was created after RARP to enhance the functionality that RARP provides for diskless workstations. The diskless workstation can receive its IP address, the name server address for future name resolutions, and the default gateway address from the BOOTP server. BOOTP usually provides more functionality to diskless workstations than does RARP.

The evolution of this protocol has unfolded as follows: RARP evolved into BOOTP, which evolved into DHCP.

The following are incorrect answers:

NAT is a tool that is used for masking true IP addresses by employing internal addresses.

ARP does the opposite of RARP, it finds the MAC address that maps with an existing IP address.

Data Link layer The Data Link layer is not a protocol; it is represented at layer 2 of the OSI model.

In the TCP/IP model, the Data Link and Physical layers are combined into the Network Access layer, which is sometimes called the Link layer or the Network Interface layer.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition, Telecommunications and Network Security, Page 584-585 and also 598. For Kindle users see Kindle Locations 12348-12357. McGraw-Hill.

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 87).

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**QUESTION 375**

Which of the following security-focused protocols has confidentiality services operating at a layer different from the others?

- A. Secure HTTP (S-HTTP)
- B. FTP Secure (FTPS)
- C. Secure socket layer (SSL)
- D. Sequenced Packet Exchange (SPX)

---

Answer: A

Explanation: All the previous protocols operate at the transport layer except for Secure HTTP (SHTTP), which operates at the application layer. S-HTTP has been replaced by SSL and TLS.

As it is very well explained in the Shon Harris book:

The transport layer receives data from many different applications and assembles the data into a stream to be properly transmitted over the network. The main protocols that work at this layer are TCP, UDP, Secure Sockets Layer (SSL), and Sequenced Packet Exchange (SPX).

NOTE:

Different references can place specific protocols at different layers. For example, many references place the SSL protocol in the session layer, while other references place it in the transport layer. It is not that one is right or wrong. The OSI model tries to draw boxes around reality, but some protocols straddle the different layers. SSL is made up of two protocols— one works in the lower portion of the session layer and the other works in the transport layer.

For purposes of the CISSP exam, SSL resides in the transport layer.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 526). McGraw-Hill. Kindle Edition.

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### QUESTION 376

Which of the following is the most secure firewall implementation?

- A. Dual-homed host firewalls
- B. Screened-subnet firewalls
- C. Screened-host firewalls
- D. Packet-filtering firewalls

Answer: B

Explanation: One the most secure implementations of firewall architectures is the screenedsubnet firewall. It employs two packet-filtering routers and a bastion host. Like a screened host firewall, this firewall supports both packet-filtering and proxy services.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 93).

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### QUESTION 377

Which of the following is NOT a VPN communications protocol standard?

- A. Point-to-point tunnelling protocol (PPTP)
- B. Challenge Handshake Authentication Protocol (CHAP)
- C. Layer 2 tunnelling protocol (L2TP)
- D. IP Security

Answer: B

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Explanation: CHAP is an authentication mechanism for point-to-point protocol connections that encrypt the user's password. It is a protocol that uses a three-way handshake. The server sends the client a challenge, which includes a random value (a nonce) to thwart replay attacks. The client responds with a MD5 hash of the nonce and the password. The authentication is successful if the client's response is the one that the server expected.

The VPN communication protocol standards listed above are PPTP, L2TP and IPSec.

PPTP and L2TP operate at the data link layer (layer 2) of the OSI model and enable only a single point-to-point connection per session.

The following are incorrect answers:

PPTP uses native PPP authentication and encryption services. Point-to-Point Tunneling Protocol (PPTP) is a VPN protocol that runs over other protocols. PPTP relies on generic routing encapsulation (GRE) to build the tunnel between the endpoints. After the user authenticates, typically with Microsoft Challenge Handshake Authentication Protocol version 2 (MSCHAPv2), a Point-to-Point Protocol (PPP) session creates a tunnel using GRE.

L2TP is a combination of PPTP and the earlier Layer 2 Forwarding protocol (L2F). Layer 2 Tunneling Protocol (L2TP) is a hybrid of Cisco's Layer 2 Forwarding (L2F) and Microsoft's PPTP. It allows callers over a serial line using PPP to connect over the Internet to a remote network. A dial-up user connects to his ISP's L2TP access concentrator (LAC) with a PPP connection. The LAC encapsulates the PPP packets into L2TP and forwards it to the remote network's layer 2 network server (LNS). At this point, the LNS authenticates the dial-up user. If authentication is successful, the dial-up user will have access to the remote network.

IPSec operates at the network layer (layer 3) and enables multiple simultaneous tunnels. IP Security (IPSec) is a suite of protocols for communicating securely with IP by providing mechanisms for authenticating and encryption. Implementation of IPSec is mandatory in IPv6, and many organizations are using it over IPv4. Further, IPSec can be implemented in two modes, one that is appropriate for end-to-end protection and one that safeguards traffic between networks.

Reference used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 7067-7071). Auerbach Publications. Kindle Edition.  
and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 6987-6990). Auerbach Publications. Kindle Edition.

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## QUESTION 378

What layer of the OSI/ISO model does Point-to-point tunnelling protocol (PPTP) work at?

- A. Data link layer
- B. Transport layer
- C. Session layer
- D. Network layer

Answer: A

Explanation: PPTP operates at the data link layer (layer 2) of the OSI model and uses native PPP authentication and encryption services. Designed for individual client to server connections, it enables only a single point-to-point connection per session.

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PPTP - Point-to-Point Tunneling Protocol - extends the Point to Point Protocol (PPP) standard for traditional dial-up networking. PPTP is best suited for the remote access applications of VPNs, but it also supports LAN internetworking.

PPTP operates at Layer 2 of the OSI model.

#### Using PPTP

PPTP packages data within PPP packets, then encapsulates the PPP packets within IP packets (datagrams) for transmission through an Internet-based VPN tunnel. PPTP supports data encryption and compression of these packets. PPTP also uses a form of General Routing Encapsulation (GRE) to get data to and from its final destination.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 95).

and

<http://compnetworking.about.com/od/vpn/l/aa030103a.htm>

and

<http://technet.microsoft.com/en-us/library/cc768084.aspx>

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### QUESTION 379

Which of the following statements pertaining to VPN protocol standards is false?

- A. L2TP is a combination of PPTP and L2F.
- B. L2TP and PPTP were designed for single point-to-point client to server communication.
- C. L2TP operates at the network layer.
- D. PPTP uses native PPP authentication and encryption services.

Answer: C

Explanation: L2TP and PPTP were both designed for individual client to server connections; they enable only a single point-to-point connection per session. Dial-up VPNs use L2TP often. Both L2TP and PPTP operate at the data link layer (layer 2) of the OSI model. PPTP uses native PPP authentication and encryption services and L2TP is a combination of PPTP and Layer 2 Forwarding protocol (L2F).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 95).

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### QUESTION 380

Which IPSec operational mode encrypts the entire data packet (including header and data) into an IPSec packet?

- A. Authentication mode
- B. Tunnel mode
- C. Transport mode
- D. Safe mode

Answer: B

Explanation: In tunnel mode, the entire packet is encrypted and encased into an IPSec packet. In transport mode, only the datagram (payload) is encrypted, leaving the IP address visible within the IP header.

Authentication mode and safe mode are not defined IPSec operational modes.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 96).

### QUESTION 381

Which of the following category of UTP cables is specified to be able to handle gigabit Ethernet (1 Gbps) according to the EIA/TIA-568-B standards?

- A. Category 5e UTP
- B. Category 2 UTP
- C. Category 3 UTP
- D. Category 1e UTP

Answer: A

Explanation: Categories 1 through 6 are based on the EIA/TIA-568-B standards.

On the newer wiring for LANs is CAT5e, an improved version of CAT5 which used to be outside of the standard, for more information on twisted pair, please see: twisted pair.

Category Cable Type Mhz Usage Speed

=====

CAT1 UTP Analog voice, Plain Old Telephone System (POTS)

CAT2 UTP 4 Mbps on Token Ring, also used on Arcnet networks

CAT3 UTP, ScTP, STP 16 MHz 10 Mbps

CAT4 UTP, ScTP, STP 20 MHz 16 Mbps on Token Ring Networks

CAT5 UTP, ScTP, STP 100 MHz 100 Mbps on ethernet, 155 Mbps on ATM

CAT5e UTP, ScTP, STP 100 MHz 1 Gbps (out of standard version, improved version of CAT5)

CAT6 UTP, ScTP, STP 250 MHz 10 Gbps

CAT7 ScTP, STP 600 M 100 Gbps

Category 6 has a minimum of 250 MHz of bandwidth. Allowing 10/100/1000 use with up to 100 meter cable length, along with 10GbE over shorter distances.

Category 6a or Augmented Category 6 has a minimum of 500 MHz of bandwidth. It is the newest standard and allows up to 10GbE with a length up to 100m.

Category 7 is a future cabling standard that should allow for up to 100GbE over 100 meters of cable. Expected availability is in 2013. It has not been approved as a cable standard, and anyone now selling you Cat. 7 cable is fooling you.

REFERENCES:

<http://donutey.com/ethernet.php>

<http://en.wikipedia.org/wiki/TIA/EIA-568-B>

[http://en.wikipedia.org/wiki/Category\\_1\\_cable](http://en.wikipedia.org/wiki/Category_1_cable)

**QUESTION 382**

In which LAN transmission method is a source packet copied and sent to specific multiple destinations but not ALL of the destinations on the network?

- A. Overcast
- B. Unicast
- C. Multicast
- D. Broadcast

Answer: C

Explanation: With multicast, a source packet is copied and sent to specific multiple destinations on the network. Multicast is a special protocol for use with IP. Multicast enables a single device to communicate with a specific set of hosts, not defined by any standard IP address and mask combination. This allows for communication that resembles a conference call. Anyone from anywhere can join the conference, and everyone at the conference hears what the speaker has to say. The speaker's message isn't broadcasted everywhere, but only to those in the conference call itself. A special set of addresses is used for multicast communication.

The following are incorrect answers:

Unicast sends a packet from a single source to a single destination. Unicast packets are sent from host to host. The communication is from a single host to another single host. There is one device transmitting a message destined for one receiver.

In a broadcast, a packet is copied and then sent to all the stations on a network. Broadcast is when a single device is transmitting a message to all other devices in a given address range. This broadcast could reach all hosts on the subnet, all subnets, or all hosts on all subnets. Broadcast packets have the host (and/or subnet) portion of the address set to all ones. By design, most modern routers will block IP broadcast traffic and restrict it to the local subnet.

Overcast is not a defined LAN transmission method.

The following reference(s) were used for this question:

[http://www.inetdaemon.com/tutorials/internet/ip/addresses/unicast\\_vs\\_broadcast.shtml](http://www.inetdaemon.com/tutorials/internet/ip/addresses/unicast_vs_broadcast.shtml)

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 104).

**QUESTION 383**

Which of the following can prevent hijacking of a web session?

- A. RSA
- B. SET
- C. SSL
- D. PPP

Answer: C

Explanation: The Secure Socket Layer (SSL) protocol is used between a web server and client

and provides entire session encryption, thus preventing from session hijacking. RSA is asymmetric encryption algorithm that can be used in setting up a SSL session. SET is the Secure Electronic Transaction protocol that was introduced by Visa and Mastercard to allow for more credit card transaction possibilities. PPP is a point-to-point protocol.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 89).

### QUESTION 384

What is defined as the rules for communicating between computers on a Local Area Network (LAN)?

- A. LAN Media Access methods
- B. LAN topologies
- C. LAN transmission methods
- D. Contention Access Control

Answer: A

Explanation: Media contention occurs when two or more network devices have data to send at the same time. Because multiple devices cannot talk on the network simultaneously, some type of method must be used to allow one device access to the network media at a time.

This is done in two main ways: carrier sense multiple access collision detect (CSMA/CD) and token passing.

In networks using CSMA/CD technology such as Ethernet, network devices contend for the network media. When a device has data to send, it first listens to see if any other device is currently using the network. If not, it starts sending its data. After finishing its transmission, it listens again to see if a collision occurred. A collision occurs when two devices send data simultaneously. When a collision happens, each device waits a random length of time before resending its data. In most cases, a collision will not occur again between the two devices. Because of this type of network contention, the busier a network becomes, the more collisions occur. This is why performance of Ethernet degrades rapidly as the number of devices on a single network increases.

In token-passing networks such as Token Ring and FDDI, a special network frame called a token is passed around the network from device to device. When a device has data to send, it must wait until it has the token and then sends its data. When the data transmission is complete, the token is released so that other devices may use the network media. The main advantage of token-passing networks is that they are deterministic. In other words, it is easy to calculate the maximum time that will pass before a device has the opportunity to send data. This explains the popularity of token-passing networks in some real-time environments such as factories, where machinery must be capable of communicating at a determinable interval.

For CSMA/CD networks, switches segment the network into multiple collision domains. This reduces the number of devices per network segment that must contend for the media. By creating smaller collision domains, the performance of a network can be increased significantly without requiring addressing changes.

The following are incorrect answers:

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LAN topologies: Think of a topology as a network's virtual shape or structure. This shape does not necessarily correspond to the actual physical layout of the devices on the network. For example, the computers on a home LAN may be arranged in a circle in a family room, but it would be highly unlikely to find a ring topology there. Common topologies are: bus, ring, star or meshed. See THIS LINK for more information.

LAN transmission methods: refer to the way packets are sent on the network and are either unicast, multicast or broadcast. See THIS LINK for more information.

Contention Access Control: This is a bogus detractor.

Contention is a real term but Contention Access Control is just made up. Contention methods is very closely related to Media Access Control methods. In communication networks, contention is a media access method that is used to share a broadcast medium. In contention, any computer in the network can transmit data at any time (first come-first served). This system breaks down when two computers attempt to transmit at the same time. This is a case of collision. To avoid collision, carrier sensing mechanism is used. Here each computer listens to the network before attempting to transmit. If the network is busy, it waits until network quiets down. In carrier detection, computers continue to listen to the network as they transmit. If computer detects another signal that interferes with the signal it is sending, it stops transmitting. Both computers then wait for random amount of time and attempt to transmit. Contention methods are most popular media access control method on LANs.

Reference(s) used for this question:

[http://docwiki.cisco.com/wiki/Introduction\\_to\\_LAN\\_Protocols#LAN\\_Media-Access\\_Methods](http://docwiki.cisco.com/wiki/Introduction_to_LAN_Protocols#LAN_Media-Access_Methods)

[http://en.wikipedia.org/wiki/Contention\\_%28telecommunications%29](http://en.wikipedia.org/wiki/Contention_%28telecommunications%29)

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## QUESTION 385

Which of the following is a LAN transmission method?

- A. Broadcast
- B. Carrier-sense multiple access with collision detection (CSMA/CD)
- C. Token ring
- D. Fiber Distributed Data Interface (FDDI)

Answer: A

Explanation: LAN transmission methods refer to the way packets are sent on the network and are either unicast, multicast or broadcast.

CSMA/CD is a common LAN media access method.

Token ring is a LAN Topology.

LAN transmission protocols are the rules for communicating between computers on a LAN.

Common LAN transmission protocols are: polling and token-passing.

A LAN topology defines the manner in which the network devices are organized to facilitate communications.

Common LAN topologies are: bus, ring, star or meshed.

LAN transmission methods refer to the way packets are sent on the network and are either unicast, multicast or broadcast.

LAN media access methods control the use of a network (physical and data link layers). They can be Ethernet, ARCnet, Token ring and FDDI.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 103).

HERE IS A NICE OVERVIEW FROM CISCO:

#### LAN Transmission Methods

LAN data transmissions fall into three classifications: unicast, multicast, and broadcast.

In each type of transmission, a single packet is sent to one or more nodes.

In a unicast transmission, a single packet is sent from the source to a destination on a network.

First, the source node addresses the packet by using the address of the destination node. The package is then sent onto the network, and finally, the network passes the packet to its destination.

A multicast transmission consists of a single data packet that is copied and sent to a specific subset of nodes on the network. First, the source node addresses the packet by using a multicast address. The packet is then sent into the network, which makes copies of the packet and sends a copy to each node that is part of the multicast address.

A broadcast transmission consists of a single data packet that is copied and sent to all nodes on the network. In these types of transmissions, the source node addresses the packet by using the broadcast address. The packet is then sent on to the network, which makes copies of the packet and sends a copy to every node on the network.

#### LAN Topologies

LAN topologies define the manner in which network devices are organized. Four common LAN topologies exist: bus, ring, star, and tree. These topologies are logical architectures, but the actual devices need not be physically organized in these configurations. Logical bus and ring topologies, for example, are commonly organized physically as a star. A bus topology is a linear LAN architecture in which transmissions from network stations propagate the length of the medium and are received by all other stations. Of the three

most widely used LAN implementations, Ethernet/IEEE 802.3 networks—including 100BaseT—implement a bus topology

#### Sources:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 104).

[http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito\\_doc/introlan.htm](http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/introlan.htm)

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### QUESTION 386

In what LAN topology do all the transmissions of the network travel the full length of cable and are received by all other stations?

- A. Bus topology
- B. Ring topology
- C. Star topology
- D. FDDI topology

Answer: A

Explanation: In a bus topology, all the transmissions of the network travel the full length of cable

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and are received by all other stations. This topology is associated with Ethernet LAN media access. In a ring topology, all nodes are connected by unidirectional transmission links to form a closed loop. In a star technology, all stations are directly connected to a central device. FDDI is not a LAN topology, but a LAN media access method.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 105).

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**QUESTION 387**

Which of the following IEEE standards defines the token ring media access method?

- A. 802.3
- B. 802.11
- C. 802.5
- D. 802.2

Answer: C

Explanation: The IEEE 802.5 standard defines the token ring media access method. 802.3 refers to Ethernet's CSMA/CD, 802.11 refers to wireless communications and 802.2 refers to the logical link control.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 109).

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**QUESTION 388**

Which of the following LAN devices only operates at the physical layer of the OSI/ISO model?

- A. Switch
- B. Bridge
- C. Hub
- D. Router

Answer: C

Explanation: Repeaters and hubs are devices that only operate at the physical layer of the OSI model.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 109).

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**QUESTION 389**

Which of the following technologies has been developed to support TCP/IP networking over low-speed serial interfaces?

- A. ISDN

- B. SLIP
- C. xDSL
- D. T1

Answer: B

Explanation: Serial Line IP (SLIP) was developed in 1984 to support TCP/IP networking over low-speed serial interfaces.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 114).

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### QUESTION 390

Which xDSL flavour, appropriate for home or small offices, delivers more bandwidth downstream than upstream and over longer distance?

- A. VDSL
- B. SDSL
- C. ADSL
- D. HDSL

Answer: C

Explanation: Asymmetric digital subscriber line (ADSL) is designed to provide more bandwidth downstream (1 to 8 Mbps) than upstream (16 to 800Kb).

DSL (Digital Subscriber Line) is a modem technology for broadband data access over ordinary copper telephone lines (POTS) from homes and businesses. xDSL refers collectively to all types of DSL, such as ADSL (and G.Lite), HDSL, SDSL, IDSL and VDSL etc. They are sometimes referred to as last-mile (or first mile) technologies because they are used only for connections from a telephone switching station to a home or office, not between switching stations.

xDSL is similar to ISDN in as much as both operate over existing copper telephone lines (POTS) using sophisticated modulation schemes and both require the short runs to a central telephone office Graphic below from: <http://computer.howstuffworks.com/vdsl3.htm> DSL speed chart

The following are incorrect answers:

Single-line Digital Subscriber Line (SDSL) deliver 2.3 Mbps of bandwidth each way.

High-rate Digital Subscriber Line (HDSL) deliver 1.544 Mbps of bandwidth each way.

Very-high data-rate Digital Subscriber Line (VDSL) can deliver up to 52 Mbps downstream over a single copper twisted pair over a relatively short distance (1000 to 4500 feet).

Reference used for this question:

<http://computer.howstuffworks.com/vdsl3.htm>

and

<http://www.javvin.com/protocolxDL.html>

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 115).

**QUESTION 391**

Which of the following services is provided by S-RPC?

- A. Availability
- B. Accountability
- C. Integrity
- D. Authentication

Answer: D

Explanation: Secure RPC provides authentication services. Secure RPC (Remote Procedure Call) protects remote procedures with an authentication mechanism. The Diffie-Hellman authentication mechanism authenticates both the host and the user who is making a request for a service. The authentication mechanism uses Data Encryption Standard (DES) encryption.

Applications that use Secure RPC include NFS and the naming services, NIS and NIS+.

**WHAT IS RPC?**

Remote Procedure Call (RPC) is a protocol that one program can use to request a service from a program located in another computer in a network without having to understand network details. (A procedure call is also sometimes known as a function call or a subroutine call.) RPC uses the client/server model. The requesting program is a client and the service-providing program is the server. Like a regular or local procedure call, an RPC is a synchronous operation requiring the requesting program to be suspended until the results of the remote procedure are returned. However, the use of lightweight processes or threads that share the same address space allows multiple RPCs to be performed concurrently.

When program statements that use RPC are compiled into an executable program, a stub is included in the compiled code that acts as the representative of the remote procedure code. When the program is run and the procedure call is issued, the stub receives the request and forwards it to a client runtime program in the local computer. The client runtime program has the knowledge of how to address the remote computer and server application and sends the message across the network that requests the remote procedure. Similarly, the server includes a runtime program and stub that interface with the remote procedure itself. Results are returned the same way.

There are several RPC models and implementations. A popular model and implementation is the Open Software Foundation's Distributed Computing Environment (DCE). The Institute of Electrical and Electronics Engineers defines RPC in its ISO Remote Procedure Call Specification, ISO/IEC CD 11578 N6561, ISO/IEC, November 1991.

RPC spans the Transport layer and the Application layer in the Open Systems Interconnection (OSI) model of network communication. RPC makes it easier to develop an application that includes multiple programs distributed in a network.

All of the other answers are not features of S/RPC.

Reference(s) used for this question:

<http://docs.sun.com/app/docs/doc/816-4883/6mb2joane?a=view>

and

[http://docs.oracle.com/cd/E23823\\_01/html/816-4557/auth-2.html](http://docs.oracle.com/cd/E23823_01/html/816-4557/auth-2.html)

and

**QUESTION 392**

What is the framing specification used for transmitting digital signals at 1.544 Mbps on a T1 facility?

- A. DS-0
- B. DS-1
- C. DS-2
- D. DS-3

Answer: B

Explanation: Digital Signal level 1 (DS-1) is the framing specification used for transmitting digital signals at 1.544 Mbps on a T1 facility. DS-0 is the framing specification used in transmitting digital signals over a single 64 Kbps channel over a T1 facility. DS-3 is the framing specification used for transmitting digital signals at 44.736 Mbps on a T3 facility. DS-2 is not a defined framing specification.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 114).

**QUESTION 393**

Which of the following is the biggest concern with firewall security?

- A. Internal hackers
- B. Complex configuration rules leading to misconfiguration
- C. Buffer overflows
- D. Distributed denial of service (DDOS) attacks

Answer: B

Explanation: Firewalls tend to give a false sense of security. They can be very hard to bypass but they need to be properly configured. The complexity of configuration rules can introduce a vulnerability when the person responsible for its configuration does not fully understand all possible options and switches. Denial of service attacks mainly concerns availability.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 3: Telecommunications and Network Security (page 412).

**QUESTION 394**

Which of the following is the simplest type of firewall?

- A. Stateful packet filtering firewall
- B. Packet filtering firewall
- C. Dual-homed host firewall
- D. Application gateway

Answer: B

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Explanation: A static packet filtering firewall is the simplest and least expensive type of firewalls, offering minimum security provisions to a low-risk computing environment.

A static packet filter firewall examines both the source and destination addresses of the incoming data packet and applies ACL's to them. They operate at either the Network or Transport layer.

They are known as the First generation of firewall.

Older firewalls that were only packet filters were essentially routing devices that provided access control functionality for host addresses and communication sessions. These devices, also known as stateless inspection firewalls, do not keep track of the state of each flow of traffic that passes through the firewall; this means, for example, that they cannot associate multiple requests within a single session to each other. Packet filtering is at the core of most modern firewalls, but there are few firewalls sold today that only do stateless packet filtering. Unlike more advanced filters, packet filters are not concerned about the content of packets. Their access control functionality is governed by a set of directives referred to as a ruleset. Packet filtering capabilities are built into most operating systems and devices capable of routing; the most common example of a pure packet filtering device is a network router that employs access control lists.

There are many types of Firewall:

Application Level Firewalls – Often called a Proxy Server. It works by transferring a copy of each accepted data packet from one network to another. They are known as the Second generation of firewalls.

An application-proxy gateway is a feature of advanced firewalls that combines lower-layer access control with upper-layer functionality. These firewalls contain a proxy agent that acts as an intermediary between two hosts that wish to communicate with each other, and never allows a direct connection between them. Each successful connection attempt actually results in the creation of two separate connections—one between the client and the proxy server, and another between the proxy server and the true destination. The proxy is meant to be transparent to the two hosts—from their perspectives there is a direct connection. Because external hosts only communicate with the proxy agent, internal IP addresses are not visible to the outside world. The proxy agent interfaces directly with the firewall ruleset to determine whether a given instance of network traffic should be allowed to transit the firewall.

Stateful Inspection Firewall - Packets are captured by the inspection engine operating at the network layer and then analyzed at all layers. They are known as the Third generation of firewalls. Stateful inspection improves on the functions of packet filters by tracking the state of connections and blocking packets that deviate from the expected state. This is accomplished by incorporating greater awareness of the transport layer. As with packet filtering, stateful inspection intercepts packets at the network layer and inspects them to see if they are permitted by an existing firewall rule, but unlike packet filtering, stateful inspection keeps track of each connection in a state table. While the details of state table entries vary by firewall product, they typically include source IP address, destination IP address, port numbers, and connection state information.

Web Application Firewalls - The HTTP protocol used in web servers has been exploited by attackers in many ways, such as to place malicious software on the computer of someone browsing the web, or to fool a person into revealing private information that they might not have otherwise. Many of these exploits can be detected by specialized application firewalls called web application firewalls that reside in front of the web server.

Web application firewalls are a relatively new technology, as compared to other firewall technologies, and the type of threats that they mitigate are still changing frequently. Because they

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are put in front of web servers to prevent attacks on the server, they are often considered to be very different than traditional firewalls.

**Host-Based Firewalls and Personal Firewalls** - Host-based firewalls for servers and personal firewalls for desktop and laptop personal computers (PC) provide an additional layer of security against network-based attacks. These firewalls are software-based, residing on the hosts they are protecting—each monitors and controls the incoming and outgoing network traffic for a single host. They can provide more granular protection than network firewalls to meet the needs of specific hosts.

Host-based firewalls are available as part of server operating systems such as Linux, Windows, Solaris, BSD, and Mac OS X Server, and they can also be installed as third-party add-ons.

Configuring a host-based firewall to allow only necessary traffic to the server provides protection against malicious activity from all hosts, including those on the same subnet or on other internal subnets not separated by a network firewall. Limiting outgoing traffic from a server may also be helpful in preventing certain malware that infects a host from spreading to other hosts.<sup>11</sup> Hostbased firewalls usually perform logging, and can often be configured to perform address-based and application-based access controls

**Dynamic Packet Filtering** – Makes informed decisions on the ACL's to apply. They are known as the Fourth generation of firewalls.

**Kernel Proxy** - Very specialized architecture that provides modular kernel-based, multi-layer evaluation and runs in the NT executive space. They are known as the Fifth generation of firewalls.

The following were incorrect answers:

All of the other types of firewalls listed are more complex than the Packet Filtering Firewall.

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 6th Edition, Telecommunications and Network Security, Page 630.

and

NIST Guidelines on Firewalls and Firewalls policies, Special Publication 800-4 Revision 1

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### QUESTION 395

Which of the following devices enables more than one signal to be sent out simultaneously over one physical circuit?

- A. Router
- B. Multiplexer
- C. Channel service unit/Data service unit (CSU/DSU)
- D. Wan switch

Answer: B

Explanation: Multiplexers are devices that enable enables more than one signal to be sent out simultaneously over one physical circuit.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 118).

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**QUESTION 396**

Which of the following is NOT an advantage that TACACS+ has over TACACS?

- A. Event logging
- B. Use of two-factor password authentication
- C. User has the ability to change his password
- D. Ability for security tokens to be resynchronized

Answer: A

Explanation: Although TACACS+ provides better audit trails, event logging is a service that is provided with TACACS.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 121).

**QUESTION 397**

Which of the following remote access authentication systems is the most robust?

- A. TACACS+
- B. RADIUS
- C. PAP
- D. TACACS

Answer: A

Explanation: TACACS+ is a proprietary Cisco enhancement to TACACS and is more robust than RADIUS. PAP is not a remote access authentication system but a remote node security protocol.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 122).

**QUESTION 398**

Which of the following is true about link encryption?

- A. Each entity has a common key with the destination node.
- B. Encrypted messages are only decrypted by the final node.
- C. This mode does not provide protection if anyone of the nodes along the transmission path is compromised.
- D. Only secure nodes are used in this type of transmission.

Answer: C

Explanation: In link encryption, each entity has keys in common with its two neighboring nodes in the transmission chain.

Thus, a node receives the encrypted message from its predecessor, decrypts it, and then reencrypts

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it with a new key, common to the successor node. Obviously, this mode does not provide protection if anyone of the nodes along the transmission path is compromised. Encryption can be performed at different communication levels, each with different types of protection and implications. Two general modes of encryption implementation are link encryption and end-to-end encryption.

Link encryption encrypts all the data along a specific communication path, as in a satellite link, T3 line, or telephone circuit. Not only is the user information encrypted, but the header, trailers, addresses, and routing data that are part of the packets are also encrypted. The only traffic not encrypted in this technology is the data link control messaging information, which includes instructions and parameters that the different link devices use to synchronize communication methods. Link encryption provides protection against packet sniffers and eavesdroppers.

In end-to-end encryption, the headers, addresses, routing, and trailer information are not encrypted, enabling attackers to learn more about a captured packet and where it is headed.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (pp. 845-846). McGraw-Hill.

And:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 132).

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### QUESTION 399

Which of the following protects Kerberos against replay attacks?

- A. Tokens
- B. Passwords
- C. Cryptography
- D. Time stamps

Answer: D

Explanation: A replay attack refers to the recording and retransmission of packets on the network. Kerberos uses time stamps, which protect against this type of attack.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 8: Cryptography (page 581).

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### QUESTION 400

Which of the following offers security to wireless communications?

- A. S-WAP
- B. WTLS
- C. WSP
- D. WDP

Answer: B

Explanation: Wireless Transport Layer Security (WTLS) is a communication protocol that allows wireless devices to send and receive encrypted information over the Internet. S-WAP is not

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defined. WSP (Wireless Session Protocol) and WDP (Wireless Datagram Protocol) are part of Wireless Access Protocol (WAP).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 173).

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### QUESTION 401

Which of the following offers confidentiality to an e-mail message?

- A. The sender encrypting it with its private key.
- B. The sender encrypting it with its public key.
- C. The sender encrypting it with the receiver's public key.
- D. The sender encrypting it with the receiver's private key.

Answer: C

Explanation: An e-mail message's confidentiality is protected when encrypted with the receiver's public key, because he is the only one able to decrypt the message. The sender is not supposed to have the receiver's private key. By encrypting a message with its private key, anybody possessing the corresponding public key would be able to read the message. By encrypting the message with its public key, not even the receiver would be able to read the message.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 8: Cryptography (page 517).

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### QUESTION 402

Which of the following is a Wide Area Network that was originally funded by the Department of Defense, which uses TCP/IP for data interchange?

- A. the Internet.
- B. the Intranet.
- C. the extranet.
- D. the Ethernet.

Answer: A

Explanation: The Internet is a WAN that was originally funded by the Department of Defense, which uses TCP/IP for data interchange.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 99.

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### QUESTION 403

An intranet is an Internet-like logical network that uses:

- A. a firm's internal, physical network infrastructure.
- B. a firm's external, physical network infrastructure.
- C. a firm's external, physical netBIOS infrastructure.
- D. a firm's internal, physical netBIOS infrastructure.

Answer: A

Explanation: An intranet is an Internet-like logical network that uses a firm's internal, physical network infrastructure.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 99.

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#### **QUESTION 404**

An intranet provides more security and control than which of the following:

- A. private posting on the Internet.
- B. public posting on the Ethernet.
- C. public posting on the Internet.
- D. public posting on the Extranet.

Answer: C

Explanation: An intranet provides more security and control than a public posting on the Internet.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 99.

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#### **QUESTION 405**

Which of the following Common Data Network Services is used to share data files and subdirectories on file servers?

- A. File services.
- B. Mail services.
- C. Print services.
- D. Client/Server services.

Answer: A

Explanation: File services share data files and subdirectories on file servers.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 99.

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#### **QUESTION 406**

Which of the following Common Data Network Services is used to send and receive email internally or externally through an email gateway device?

- A. File services.
- B. Mail services.
- C. Print services.
- D. Client/Server services.

Answer: B

Explanation: Mail services send and receive email internally or externally through an email gateway device.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 99.  
158.

Asynchronous Communication transfers data by sending:

- A. bits of data sequentially
- B. bits of data sequentially in irregular timing patterns
- C. bits of data in sync with a heartbeat or clock
- D. bits of data simultaneously

Answer: B

Asynchronous Communication transfers data by sending bits of data in irregular timing patterns. In asynchronous transmission each character is transmitted separately, that is one character at a time. The character is preceded by a start bit, which tells the receiving end where the character coding begins, and is followed by a stop bit, which tells the receiver where the character coding ends. There will be intervals of ideal time on the channel shown as gaps. Thus there can be gaps between two adjacent characters in the asynchronous communication scheme. In this scheme, the bits within the character frame (including start, parity and stop bits) are sent at the baud rate.

The START BIT and STOP BIT including gaps allow the receiving and sending computers to synchronise the data transmission. Asynchronous communication is used when slow speed peripherals communicate with the computer. The main disadvantage of asynchronous communication is slow speed transmission. Asynchronous communication however, does not require the complex and costly hardware equipments as is required for synchronous transmission. Asynchronous communication is transmission of data without the use of an external clock signal. Any timing required to recover data from the communication symbols is encoded within the symbols. The most significant aspect of asynchronous communications is variable bit rate, or that the transmitter and receiver clock generators do not have to be exactly synchronized.

The asynchronous communication technique is a physical layer transmission technique which is most widely used for personal computers providing connectivity to printers, modems, fax machines, etc.

An asynchronous link communicates data as a series of characters of fixed size and format. Each character is preceded by a start bit and followed by 1-2 stop bits.

Parity is often added to provide some limited protection against errors occurring on the link.

The use of independent transmit and receive clocks constrains transmission to relatively short characters (<8 bits) and moderate data rates (< 64 kbps, but typically lower).

The asynchronous transmitter delimits each character by a start sequence and a stop sequence. The start bit (0), data (usually 8 bits plus parity) and stop bit(s) (1) are transmitted using a shift register clocked at the nominal data rate.

When asynchronous transmission is used to support packet data links (e.g. IP), then special characters have to be used ("framing") to indicate the start and end of each frame transmitted. One character (none as an escape character) is reserved to mark any occurrence of the special characters within the frame. In this way the receiver is able to identify which characters are part of

the frame and which are part of the "framing".

Packet communication over asynchronous links is used by some users to get access to a network using a modem.

Most Wide Area Networks use synchronous links and a more sophisticated link protocol

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 100.

and

[http://en.wikipedia.org/wiki/Asynchronous\\_communication](http://en.wikipedia.org/wiki/Asynchronous_communication)

and

<http://www.erg.abdn.ac.uk/users/gorry/course/phy-pages/async.html>

and

[http://www.ligaturesoft.com/data\\_communications/async-data-transmission.html](http://www.ligaturesoft.com/data_communications/async-data-transmission.html)

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### QUESTION 407

Communications devices must operate:

- A. at different speeds to communicate.
- B. at the same speed to communicate.
- C. at varying speeds to interact.
- D. at high speed to interact.

Answer: B

Explanation: Communications devices must operate at the same speed to communicate.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 100.

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### QUESTION 408

The basic language of modems and dial-up remote access systems is:

- A. Asynchronous Communication.
- B. Synchronous Communication.
- C. Asynchronous Interaction.
- D. Synchronous Interaction.

Answer: A

Explanation: Asynchronous Communication is the basic language of modems and dial-up remote access systems.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 100.

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### QUESTION 409

Which of the following Common Data Network Services is used to print documents to a shared printer or a print queue/spooler?

- A. Mail services.
- B. Print services.
- C. Client/Server services.
- D. Domain Name Service.

Answer: B

Explanation: Print services are used to print documents to a shared printer or a print queue/spooler.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 100.

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Which of the following Common Data Network Services allocates computing power resources among workstations with some shared resources centralized on a server?

- A. Print services
- B. File services
- C. Client/Server services
- D. Domain Name Service

Answer: C

Client/Server services allocate computing power resources among workstations with some shared resources centralized in servers.

For example, if you are using a product that is working in a client/ server model, in reality you have a small piece of the product on your computer (client portion) and the larger piece of the software product is running on a different computer (server portion). The communication between these two pieces of the same software product needs to be controlled, which is why session layer protocols even exist. Session layer protocols take on the functionality of middleware, which allows software on two different computers to communicate.

Distributed systems are the opposite of centralized systems like mainframes and thin client implementations. Traditional client/server architectures are the most common example of a distributed system. In a traditional client/server architecture, responsibilities for processing have been balanced between centralized servers providing services to multiple clients and client machines that focus on user interaction and standalone processing where appropriate. For the most part, servers are responsible for serving, meaning that they provide services that will be leveraged by the clients in the environment. Clients are the primary consumers of server services, while also hosting services of their own primarily for their own individual use.

Reference used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 524). McGraw-Hill. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 18741-18745). Auerbach Publications. Kindle Edition.

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 100

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**QUESTION 410**

Domain Name Service is a distributed database system that is used to map:

- A. Domain Name to IP addresses.
- B. MAC addresses to domain names.
- C. MAC Address to IP addresses.
- D. IP addresses to MAC Addresses.

Answer: A

Explanation: The Domain Name Service is a distributed database system that is used to map domain names to IP addresses and IP addresses to domain names.

The Domain Name System is maintained by a distributed database system, which uses the clientserver model. The nodes of this database are the name servers. Each domain has at least one authoritative DNS server that publishes information about that domain and the name servers of any domains subordinate to it. The top of the hierarchy is served by the root nameservers, the servers to query when looking up (resolving) a TLD.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 100.

and

[https://en.wikipedia.org/wiki/Domain\\_Name\\_System](https://en.wikipedia.org/wiki/Domain_Name_System)  
164.

The Domain Name System (DNS) is a global network of:

- A. servers that provide these Domain Name Services.
- B. clients that provide these Domain Name Services.
- C. hosts that provide these Domain Name Services.
- D. workstations that provide these Domain Name Services.

Answer: A

The Domain Name System (DNS) is a global network of servers that provide these Domain Name Services.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 100.

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**QUESTION 411**

The communications products and services, which ensure that the various components of a network (such as devices, protocols, and access methods) work together refers to:

- A. Netware Architecture.
- B. Network Architecture.
- C. WAN Architecture.
- D. Multiprotocol Architecture.

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Answer: B

Explanation: A Network Architecture refers to the communications products and services, which ensure that the various components of a network (such as devices, protocols, and access methods) work together.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 101.

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### QUESTION 412

Unshielded Twisted Pair cabling is a:

- A. four-pair wire medium that is used in a variety of networks.
- B. three-pair wire medium that is used in a variety of networks.
- C. two-pair wire medium that is used in a variety of networks.
- D. one-pair wire medium that is used in a variety of networks.

Answer: A

Explanation: Unshielded Twisted Pair cabling is a four-pair wire medium that is used in a variety of networks

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 101.

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### QUESTION 413

In the UTP category rating, the tighter the wind:

- A. the higher the rating and its resistance against interference and crosstalk.
- B. the slower the rating and its resistance against interference and attenuation.
- C. the shorter the rating and its resistance against interference and attenuation.
- D. the longer the rating and its resistance against interference and attenuation.

Answer: A

Explanation: The category rating is based on how tightly the copper cable is wound within the shielding: The tighter the wind, the higher the rating and its resistance against interference and crosstalk.

Twisted pair copper cabling is a form of wiring in which two conductors are wound together for the purposes of canceling out electromagnetic interference (EMI) from external sources and crosstalk from neighboring wires. Twisting wires decreases interference because the loop area between the wires (which determines the magnetic coupling into the signal) is reduced. In balanced pair operation, the two wires typically carry equal and opposite signals (differential mode) which are combined by subtraction at the destination. The noise from the two wires cancel each other in this subtraction because the two wires have been exposed to similar EMI.

The twist rate (usually defined in twists per metre) makes up part of the specification for a given type of cable. The greater the number of twists, the greater the attenuation of crosstalk. Where pairs are not twisted, as in most residential interior telephone wiring, one member of the pair may

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be closer to the source than the other, and thus exposed to slightly different induced EMF.

Reference:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 101.

and

[http://www.consultants-online.co.za/pub/itap\\_101/html/ch04s05.html](http://www.consultants-online.co.za/pub/itap_101/html/ch04s05.html)

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### QUESTION 414

What works as an E-mail message transfer agent?

- A. SMTP
- B. SNMP
- C. S-RPC
- D. S/MIME

Answer: A

Explanation: SMTP (Simple Mail Transfer Protocol) works as a message transfer agent.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, Page 821.

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### QUESTION 415

Which of the following statements pertaining to packet switching is incorrect?

- A. Most data sent today uses digital signals over network employing packet switching.
- B. Messages are divided into packets.
- C. All packets from a message travel through the same route.
- D. Each network node or point examines each packet for routing.

Answer: C

Explanation: When using packet switching, messages are broken down into packets. Source and destination address are added to each packet so that when passing through a network node, they can be examined and eventually rerouted through different paths as conditions change. All message packets may travel different paths and not arrive in the same order as sent. Packets need to be collected and reassembled into the original message at destination.

Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 416

All hosts on an IP network have a logical ID called a(n):

- A. IP address.
- B. MAC address.
- C. TCP address.
- D. Datagram address.

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Answer: A

Explanation: All hosts on a network have a logical ID that is called an IP address. An IP address is a numeric identifier that is assigned to each machine on an IP network. It designates the location of a device on a network. A MAC address is typically called a hardware address because it is "burned" into the NIC card. TCP address and Datagram address are imposter answers.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 87.

171.

An Ethernet address is composed of how many bits?

- A. 48-bit address
- B. 32-bit address.
- C. 64-bit address
- D. 128-bit address

Answer: A

An Ethernet address is a 48-bit address that is hard-wired into the Network Interface Cards (NIC) of the network node.

A Media Access Control address (MAC address) is a unique identifier assigned to network interfaces for communications on the physical network segment. MAC addresses are used for numerous network technologies and most IEEE 802 network technologies, including Ethernet. Logically, MAC addresses are used in the Media Access Control protocol sub-layer of the OSI reference model.

MAC addresses are most often assigned by the manufacturer of a network interface card (NIC) and are stored in its hardware, the card's read-only memory, or some other firmware mechanism. If assigned by the manufacturer, a MAC address usually encodes the manufacturer's registered identification number and may be referred to as the burned-in address. It may also be known as an Ethernet hardware address (EHA), hardware address or physical address. A network node may have multiple NICs and will then have one unique MAC address per NIC.

MAC addresses are formed according to the rules of one of three numbering name spaces managed by the Institute of Electrical and Electronics Engineers (IEEE): MAC-48, EUI-48, and EUI-64. The IEEE claims trademarks on the names EUI-48 and EUI-64, in which EUI is an abbreviation for Extended Unique Identifier.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 87.

and

[https://en.wikipedia.org/wiki/MAC\\_address](https://en.wikipedia.org/wiki/MAC_address)

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## QUESTION 417

Address Resolution Protocol (ARP) interrogates the network by sending out a?

- A. broadcast.
- B. multicast.
- C. unicast.

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D. semicast.

Answer: A

Explanation: ARP interrogates the network by sending out a broadcast seeking a network node that has a specific IP address, and asks it to reply with its hardware address. A broadcast message is sent to everyone whether or not the message was requested. A traditional unicast is a "one-to-one" or "narrowcast" message. A multicast is a "one-to-many" message that is traditionally only sent to those machine that requested the information. Semicast is an imposter answer.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 87.

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### QUESTION 418

When a station communicates on the network for the first time, which of the following protocol would search for and find the Internet Protocol (IP) address that matches with a known Ethernet address?

- A. Address Resolution Protocol (ARP).
- B. Reverse Address Resolution Protocol (RARP).
- C. Internet Control Message protocol (ICMP).
- D. User Datagram Protocol (UDP).

Answer: B

Explanation: The RARP protocol sends out a packet, which includes its MAC address and a request to be informed of the IP address that should be assigned to that MAC address.

ARP does the opposite by broadcasting a request to find the Ethernet address that matches a known IP address.

ICMP supports packets containing error, control, and informational messages (e.g. PING).  
UDP runs over IP and is used primarily for broadcasting messages over a network.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 87.

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### QUESTION 419

Which protocol's primary function is to facilitate file and directory transfer between two machines?

- A. Telnet.
- B. File Transfer Protocol (FTP).
- C. Trivial File Transfer Protocol (TFTP).
- D. Simple Mail Transfer Protocol (SMTP)

Answer: B

Explanation: File Transfer Protocol (FTP) is the protocol that is used to facilitate file transfer between two machines. TFTP has no directory browsing capabilities. SMTP is generally used to send messages from a mail client to a mail server. Telnet's primary function is terminal emulation.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 88.

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**QUESTION 420**

What is the primary reason why some sites choose not to implement Trivial File Transfer Protocol (TFTP)?

- A. It is too complex to manage user access restrictions under TFTP
- B. Due to the inherent security risks
- C. It does not offer high level encryption like FTP
- D. It cannot support the Lightweight Directory Access Protocol (LDAP)

Answer: B

Explanation: Some sites choose not to implement Trivial File Transfer Protocol (TFTP) due to the inherent security risks. TFTP is a UDP-based file transfer program that provides no security. There is no user authentication.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 88.

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**QUESTION 421**

Which protocol is used to send email?

- A. File Transfer Protocol (FTP).
- B. Post Office Protocol (POP).
- C. Network File System (NFS).
- D. Simple Mail Transfer Protocol (SMTP).

Answer: D

Explanation: Simple Mail Transfer Protocol (SMTP) is a protocol for sending e-mail messages between servers. POP is a protocol used to retrieve e-mail from a mail server. NFS is a TCP/IP client/server application developed by Sun that enables different types of file systems to interoperate regardless of operating system or network architecture. FTP is the protocol that is used to facilitate file transfer between two machines.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 88.

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**QUESTION 422**

Which of the following best describes the Secure Electronic Transaction (SET) protocol?

- A. Originated by VISA and MasterCard as an Internet credit card protocol using Message Authentication Code.
- B. Originated by VISA and MasterCard as an Internet credit card protocol using digital signatures.
- C. Originated by VISA and MasterCard as an Internet credit card protocol using the transport layer.

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D. Originated by VISA and American Express as an Internet credit card protocol using SSL.

Answer: B

Explanation: Secure Electronic Transaction (SET). Originated by VISA and MasterCard as an Internet credit card protocol using digital signatures. SET operates at the application layer which distinguishes it from SSL. SSL operates at the Transport layer.

Secure Electronic Transaction (SET) is a system for ensuring the security of financial transactions on the Internet. It was supported initially by Mastercard, Visa, Microsoft, Netscape, and others. With SET, a user is given an electronic wallet (digital certificate) and a transaction is conducted and verified using a combination of digital certificates and digital signatures among the purchaser, a merchant, and the purchaser's bank in a way that ensures privacy and confidentiality. SET makes use of Netscape's Secure Sockets Layer (SSL), Microsoft's Secure Transaction Technology (STT), and Terisa System's Secure Hypertext Transfer Protocol (S-HTTP). SET uses some but not all aspects of a public key infrastructure (PKI).

Here's how SET works:

Assume that a customer has a SET-enabled browser such as Mozilla or Microsoft's Internet Explorer and that the transaction provider (bank, store, etc.) has a SET-enabled server.

The customer opens a Mastercard or Visa bank account. Any issuer of a credit card is some kind of bank.

The customer receives a digital certificate. This electronic file functions as a credit card for online purchases or other transactions. It includes a public key with an expiration date. It has been through a digital switch to the bank to ensure its validity.

Third-party merchants also receive certificates from the bank. These certificates include the merchant's public key and the bank's public key.

The customer places an order over a Web page, by phone, or some other means.

The customer's browser receives and confirms from the merchant's certificate that the merchant is valid.

The browser sends the order information. This message is encrypted with the merchant's public key, the payment information, which is encrypted with the bank's public key (which can't be read by the merchant), and information that ensures the payment can only be used with this particular order.

The merchant verifies the customer by checking the digital signature on the customer's certificate. This may be done by referring the certificate to the bank or to a third-party verifier.

The merchant sends the order message along to the bank. This includes the bank's public key, the customer's payment information (which the merchant can't decode), and the merchant's certificate. The bank verifies the merchant and the message. The bank uses the digital signature on the certificate with the message and verifies the payment part of the message.

The bank digitally signs and sends authorization to the merchant, who can then fill the order.

Reference(s) used for this question:

Mc Graw Hill, Shon Harris, CISSP All In One (AIO) Book, Sixth Edition, Pages 856-858 and

What is Secure Electronic Transactions (SET) by SearchFinancialSecurity and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Pages 89, 170.

**QUESTION 423**

Which of the following protocols is designed to send individual messages securely?

- A. Kerberos
- B. Secure Electronic Transaction (SET).
- C. Secure Sockets Layer (SSL).
- D. Secure HTTP (S-HTTP).

Answer: D

Explanation: An early standard for encrypting HTTP documents, Secure HTTP (S-HTTP) is designed to send individual messages securely. SSL is designed to establish a secure connection between two computers. SET was originated by VISA and MasterCard as an Internet credit card protocol using digital signatures. Kerberos is an authentication system.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 89.

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**QUESTION 424**

Secure Electronic Transaction (SET) and Secure HTTP (S-HTTP) operate at which layer of the OSI model?

- A. Application Layer.
- B. Transport Layer.
- C. Session Layer.
- D. Network Layer.

Answer: A

Explanation: The Secure Electronic Transaction (SET) and Secure HTTP (S-HTTP) operate at the Application Layer of the Open Systems Interconnect (OSI) model.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 89.

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**QUESTION 425**

Which of the following statements pertaining to IPSec is incorrect?

- A. IPSec can help in protecting networks from some of the IP network attacks.
- B. IPSec provides confidentiality and integrity to information transferred over IP networks through transport layer encryption and authentication.
- C. IPSec protects against man-in-the-middle attacks.
- D. IPSec protects against spoofing.

Answer: B

Explanation: IPSec provides confidentiality and integrity to information transferred over IP

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networks through network (not transport) layer encryption and authentication. All other statements are correct.

Source: TIPTON, Harold F. & KRAUSE, Micki, Information Security Management Handbook, 4th edition (volume 1), 2000, CRC Press, Chapter 6, Extranet Access Control Issues (page 110).

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### QUESTION 426

Which of the following is NOT a characteristic or shortcoming of packet filtering gateways?

- A. The source and destination addresses, protocols, and ports contained in the IP packet header are the only information that is available to the router in making a decision whether or not to permit traffic access to an internal network.
- B. They don't protect against IP or DNS address spoofing.
- C. They do not support strong user authentication.
- D. They are appropriate for medium-risk environment.

Answer: D

Explanation: Packet filtering firewalls use routers with packet filtering rules to grant or deny access based on source address, destination address, and port.

They offer minimum security but at a very low cost, and can be an appropriate choice for a low-risk environment.

Source: TIPTON, Harold F. & KRAUSE, Micki, Information Security Management Handbook, 4th edition (volume 1), 2000, CRC Press, Chapter 3, Secured Connections to External Networks (page 60).

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### QUESTION 427

In order to ensure the privacy and integrity of the data, connections between firewalls over public networks should use:

- A. Screened subnets
- B. Digital certificates
- C. An encrypted Virtual Private Network
- D. Encryption

Answer: C

Explanation: Virtual Private Networks allow a trusted network to communicate with another trusted network over untrusted networks such as the Internet.

Screened Subnet: A screened subnet is essentially the same as the screened host architecture, but adds an extra strata of security by creating a network which the bastion host resides (often call perimeter network) which is separated from the internal network. A screened subnet will be deployed by adding a perimeter network in order to separate the internal network from the external. This assures that if there is a successful attack on the bastion host, the attacker is restricted to the perimeter network by the screening router that is connected between the internal and perimeter network.

Digital Certificates: Digital Certificates will be used in the intitial steps of establishing a VPN but

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they would not provide the encryption and integrity by themselves.

Encryption: Even thou this seems like a choice that would include the other choices, encryption by itself does not provide integrity mechanims. So encryption would satisfy only half of the requirements of the question.

Source: TIPTON, Harold F. & KRAUSE, Micki, Information Security Management Handbook, 4th edition (volume 1), 2000, CRC Press, Chapter 3, Secured Connections to External Networks (page 65).

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### QUESTION 428

Which of the following protocols does not operate at the data link layer (layer 2)?

- A. PPP
- B. RARP
- C. L2F
- D. ICMP

Answer: D

Explanation: ICMP is the only of the mentioned protocols to operate at the network layer (layer 3). Other protocols operate at layer 2.

Source: WALLHOFF, John, CBK#2 Telecommunications and Network Security (CISSP Study Guide), April 2002 (page 1).

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### QUESTION 429

Which of the following protocols operates at the session layer (layer 5)?

- A. RPC
- B. IGMP
- C. LPD
- D. SPX

Answer: A

Explanation: Remotre Procedure Call (RPC) is the only of the above choices to operate at the session layer (layer 5).

All of the other answers were wrong.

LPD operates at layer 7

SPX operates at layer 4

IGMP operates at layer 3.

Reference:

WALLHOFF, John, CBK#2 Telecommunications and Network Security (CISSP Study Guide), April 2002 (page 1).

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### QUESTION 430

Which layer of the TCP/IP protocol stack corresponds to the ISO/OSI Network layer (layer 3)?

- 
- A. Host-to-host layer
  - B. Internet layer
  - C. Network access layer
  - D. Session layer

Answer: B

Explanation: The Internet layer in the TCP/IP protocol stack corresponds to the network layer (layer 3) in the OSI/ISO model. The host-to-host layer corresponds to the transport layer (layer 4) in the OSI/ISO model. The Network access layer corresponds to the data link and physical layers (layers 2 and 1) in the OSI/ISO model. The session layer is not defined in the TCP/IP protocol stack.

Source: WALLHOFF, John, CBK#2 Telecommunications and Network Security (CISSP Study Guide), April 2002 (page 1).

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#### QUESTION 431

Which layer of the OSI/ISO model handles physical addressing, network topology, line discipline, error notification, orderly delivery of frames, and optional flow control?

- A. Physical
- B. Data link
- C. Network
- D. Session

Answer: B

Explanation: The Data Link layer provides data transport across a physical link. It handles physical addressing, network topology, line discipline, error notification, orderly delivery of frames, and optional flow control.

Source: ROTHKE, Ben, CISSP CBK Review presentation on domain 2, August 1999.

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#### QUESTION 432

The Logical Link Control sub-layer is a part of which of the following?

- A. The ISO/OSI Data Link layer
- B. The Reference monitor
- C. The Transport layer of the TCP/IP stack model
- D. Change management control

Answer: A

Explanation: The OSI/ISO Data Link layer is made up of two sub-layers; (1) the Media Access Control layer refers downward to lower layer hardware functions and (2) the Logical Link Control refers upward to higher layer software functions. Other choices are distractors.

Source: ROTHKE, Ben, CISSP CBK Review presentation on domain 2, August 1999.

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**QUESTION 433**

Which of the following services relies on UDP?

- A. FTP
- B. Telnet
- C. DNS
- D. SMTP

Answer: C

Explanation: DNS relies on connectionless UDP whereas services like FTP, Telnet and SMTP rely on TCP.

Source: ROTHKE, Ben, CISSP CBK Review presentation on domain 2, August 1999.

**QUESTION 434**

Which of the following is not a common weakness of packet filtering firewalls?

- A. Vulnerability to denial-of-service and related attacks.
- B. Vulnerability to IP spoofing.
- C. Limited logging functionality.
- D. No support for advanced user authentication schemes.

Answer: A

Explanation: An important point with packet filtering firewalls is their speed and flexibility, as well as capacity to block some denial-of-service and related attacks, makes them ideal for placement at the outermost boundary with an untrusted network.

Other choices represent weaknesses of packet filtering firewalls.

Reference(s) used for this question:

WACK, John et al., NIST Special publication 800-41, Guidelines on Firewalls and Firewall Policy, January 2002 (page 7).

and

Shon Harris All In One Book Page Version 4 Page 550 "Weaknesses of Packet Filtering"

**QUESTION 435**

Which Network Address Translation (NAT) is the most convenient and secure solution?

- A. Hiding Network Address Translation
- B. Port Address Translation
- C. Dedicated Address Translation
- D. Static Address Translation

Answer: B

Explanation: Static network address translation offers the most flexibility, but it is not normally practical given the shortage of IP version 4 addresses. Hiding network address translation is was

an interim step in the development of network address translation technology, and is seldom used because port address translation offers additional features above and beyond those present in hiding network address translation while maintaining the same basic design and engineering considerations. PAT is often the most convenient and secure solution.

Source: WACK, John et al., NIST Special publication 800-41, Guidelines on Firewalls and Firewall Policy, January 2002 (page 18).

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**QUESTION 436**

What is the primary difference between FTP and TFTP?

- A. Speed of negotiation
- B. Authentication
- C. Ability to automate
- D. TFTP is used to transfer configuration files to and from network equipment.

Answer: B

Explanation: TFTP (Trivial File Transfer Protocol) is sometimes used to transfer configuration files from equipments such as routers but the primary difference between FTP and TFTP is that TFTP does not require authentication. Speed and ability to automate are not important.

Both of these protocols (FTP and TFTP) can be used for transferring files across the Internet. The differences between the two protocols are explained below:

FTP is a complete, session-oriented, general purpose file transfer protocol. TFTP is used as a bare-bones special purpose file transfer protocol.

FTP can be used interactively. TFTP allows only unidirectional transfer of files.

FTP depends on TCP, is connection oriented, and provides reliable control. TFTP depends on UDP, requires less overhead, and provides virtually no control.

FTP provides user authentication. TFTP does not.

FTP uses well-known TCP port numbers: 20 for data and 21 for connection dialog. TFTP uses UDP port number 69 for its file transfer activity.

The Windows NT FTP server service does not support TFTP because TFTP does not support authentication.

Windows 95 and TCP/IP-32 for Windows for Workgroups do not include a TFTP client program.

Ref: <http://support.microsoft.com/kb/102737>

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**QUESTION 437**

Which of the following cable types is limited in length to 185 meters?

- A. 10BaseT
- B. RG8
- C. RG58
- D. 10Base5

Answer: C

Explanation: 10Base2, also known as RG58, or thinnet, is limited to 185 meters. 10Base5, also

known as RG8/RG11 or thicknet, is limited to 500 meters. 10BaseT is only limited to 100 meters. Note that the 2 in 10Base2 refers to the maximum cable length (200 meters, 185, actually) and the 5 in 10Base5 is for 500 meters.

Source: ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 3: Telecommunications and Network Security (page 32).

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**QUESTION 438**

In a SSL session between a client and a server, who is responsible for generating the master secret that will be used as a seed to generate the symmetric keys that will be used during the session?

- A. Both client and server
- B. The client's browser
- C. The web server
- D. The merchant's Certificate Server

Answer: B

Explanation: Once the merchant server has been authenticated by the browser client, the browser generates a master secret that is to be shared only between the server and client. This secret serves as a seed to generate the session (private) keys. The master secret is then encrypted with the merchant's public key and sent to the server. The fact that the master secret is generated by the client's browser provides the client assurance that the server is not reusing keys that would have been used in a previous session with another client.

Source: ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 6: Cryptography (page 112).

Also: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, page 569.

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**QUESTION 439**

Which of the following statements pertaining to PPTP (Point-to-Point Tunneling Protocol) is incorrect?

- A. PPTP allow the tunnelling of any protocols that can be carried within PPP.
- B. PPTP does not provide strong encryption.
- C. PPTP does not support any token-based authentication method for users.
- D. PPTP is derived from L2TP.

Answer: D

Explanation: PPTP is an encapsulation protocol based on PPP that works at OSI layer 2 (Data Link) and that enables a single point-to-point connection, usually between a client and a server. While PPTP depends on IP to establish its connection.

As currently implemented, PPTP encapsulates PPP packets using a modified version of the generic routing encapsulation (GRE) protocol, which gives PPTP to the flexibility of handling protocols other than IP, such as IPX and NETBEUI over IP networks.

PPTP does have some limitations:

It does not provide strong encryption for protecting data, nor does it support any token-based methods for authenticating users.

L2TP is derived from L2F and PPTP, not the opposite.

### QUESTION 440

During the initial stage of configuration of your firewall, which of the following rules appearing in an Internet firewall policy is inappropriate?

- A. The firewall software shall run on a dedicated computer.
- B. Appropriate firewall documentation and a copy of the rulebase shall be maintained on offline storage at all times.
- C. The firewall shall be configured to deny all services not expressly permitted.
- D. The firewall should be tested online first to validate proper configuration.

Answer: D

Explanation: As it is very clearly state in NIST SP 800-41-Rev1:

New firewalls should be tested and evaluated before deployment to ensure that they are working properly. Testing should be completed on a test network without connectivity to the production network. This test network should attempt to replicate the production network as faithfully as possible, including the network topology and network traffic that would travel through the firewall.

Aspects of the solution to evaluate include the following:

Connectivity

Users can establish and maintain connections through the firewall.

Ruleset

Traffic that is specifically allowed by the security policy is permitted. All traffic that is not allowed by the security policy is blocked. Verification of the ruleset should include both reviewing it manually and testing whether the rules work as expected.

Application Compatibility

Host-based or personal firewall solutions do not break or interfere with the use of existing software applications. This includes network communications between application components. Network firewall solutions do not interfere with applications that have components that interact through the firewall (e.g., client and server software).

Management

Administrators can configure and manage the solution effectively and securely.

Logging

Logging and data management function in accordance with the organization's policies and strategies.

Performance

Solutions provide adequate performance during normal and peak usage. In many cases, the best way to test performance under the load of a prototype implementation is to use simulated traffic generators on a live test network to mimic the actual characteristics of expected traffic as closely as possible. Simulating the loads caused by DoS attacks can also be helpful in assessing firewall performance. Testing should incorporate a variety of applications that will traverse the firewall, especially those that are most likely to be affected by network throughput or latency issues.

## Security of the Implementation

The firewall implementation itself may contain vulnerabilities and weaknesses that attackers could exploit. Organizations with high security needs may want to perform vulnerability assessments against firewall components.

## Component Interoperability

Components of the firewall solution must function together properly. This is of greatest concern when a variety of components from different vendors are used.

## Policy Synchronization

If there are multiple firewalls running synchronized policies or groups of rules, test that the synchronization works in various scenarios (such as if one or more nodes are offline).

## Additional Features

Additional features that will be used by the firewall—such as VPN and antimalware capabilities—should be tested to ensure they are working properly.

If a firewall needs to be brought down for reconfiguration, Internet services should be disabled or a secondary firewall should be made operational; internal systems should not be connected to the Internet without a firewall.

After being reconfigured and tested, the firewall must be brought back into an operational and reliable state.

Reference(s) used for this question:

GUTTMAN, Barbara & BAGWILL, Robert, NIST Special Publication 800-xx, Internet Security Policy: A Technical Guide, Draft Version, May 25, 2000 (pages 76-78).

and

NIST SP 800-41-Rev1, Guidelines on Firewalls and Firewall Policy

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## QUESTION 441

SMTP can best be described as:

- A. a host-to-host email protocol.
- B. an email retrieval protocol.
- C. a web-based e-mail reading protocol.
- D. a standard defining the format of e-mail messages.

Answer: A

Explanation: Simple Mail Transfer Protocol (SMTP) is a host-to-host email protocol. An SMTP server accepts email messages from other systems and stores them for the addressees. Stored email can be read in various ways. Users with interactive accounts on the email server machine can read the email using local email applications. Users on other systems can download their email via email clients using POP or IMAP email retrieval protocols. Sometimes mail can also be read through a web-based interface (using HTTP or HTTPS). MIME is a standard defining the format of e-mail messages, as stated in RFC2045.

Source: GUTTMAN, Barbara & BAGWILL, Robert, NIST Special Publication 800-xx, Internet Security Policy: A Technical Guide, Draft Version, May 25, 2000 (pages 91-92).

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## QUESTION 442

Which of the following is not a security goal for remote access?

- A. Reliable authentication of users and systems
- B. Protection of confidential data
- C. Easy to manage access control to systems and network resources
- D. Automated login for remote users

Answer: D

Explanation: An automated login function for remote users would imply a weak authentication, thus certainly not a security goal.

Source: TIPTON, Harold F. & KRAUSE, Micki, Information Security Management Handbook, 4th edition, volume 2, 2001, CRC Press, Chapter 5: An Introduction to Secure Remote Access (page 100).

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### QUESTION 443

What attack involves the perpetrator sending spoofed packet(s) which contains the same destination and source IP address as the remote host, the same port for the source and destination, having the SYN flag, and targeting any open ports that are open on the remote host?

- A. Boink attack
- B. Land attack
- C. Teardrop attack
- D. Smurf attack

Answer: B

Explanation: The Land attack involves the perpetrator sending spoofed packet(s) with the SYN flag set to the victim's machine on any open port that is listening. The packet(s) contain the same destination and source IP address as the host, causing the victim's machine to reply to itself repeatedly. In addition, most systems experience a total freeze up, where as CTRL-ALT-DELETE fails to work, the mouse and keyboard become non operational and the only method of correction is to reboot via a reset button on the system or by turning the machine off.

The Boink attack, a modified version of the original Teardrop and Bonk exploit programs, is very similar to the Bonk attack, in that it involves the perpetrator sending corrupt UDP packets to the host. It however allows the attacker to attack multiple ports where Bonk was mainly directed to port 53 (DNS).

The Teardrop attack involves the perpetrator sending overlapping packets to the victim, when their machine attempts to re-construct the packets the victim's machine hangs.

A Smurf attack is a network-level attack against hosts where a perpetrator sends a large amount of ICMP echo (ping) traffic at broadcast addresses, all of it having a spoofed source address of a victim. If the routing device delivering traffic to those broadcast addresses performs the IP broadcast to layer 2 broadcast function, most hosts on that IP network will take the ICMP echo request and reply to it with an echo reply each, multiplying the traffic by the number of hosts responding. On a multi-access broadcast network, there could potentially be hundreds of machines to reply to each packet.

Resources:

[http://en.wikipedia.org/wiki/Denial-of-service\\_attack](http://en.wikipedia.org/wiki/Denial-of-service_attack)

<http://en.wikipedia.org/wiki/LAND>

199.

Which of the following is NOT a component of IPSec?

- A. Authentication Header
- B. Encapsulating Security Payload
- C. Key Distribution Center
- D. Internet Key Exchange

Answer: C

AH, ESP and IKE are the three main components of IPSec. A KDC (Key Distribution Center) is a component of Kerberos, not IPSec.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, Chapter 4: Protection of Information Assets (page 217).

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#### QUESTION 444

Which of the following statements pertaining to IPSec is incorrect?

- A. A security association has to be defined between two IPSec systems in order for bi-directional communication to be established.
- B. Integrity and authentication for IP datagrams are provided by AH.
- C. ESP provides for integrity, authentication and encryption to IP datagrams.
- D. In transport mode, ESP only encrypts the data payload of each packet.

Answer: A

Explanation: This is incorrect, there would be a pair of Security Association (SA) needed for bi directional communication and NOT only one S

A. The sender and the receiver would both negotiate an SA for inbound and outbound connections.

The two main concepts of IPSec are Security Associations (SA) and tunneling. A Security Association (SA) is a simplex logical connection between two IPSec systems. For bi-directional communication to be established between two IPSec systems, two separate Security Associations, one in each direction, must be defined.

The security protocols can either be AH or ESP.

NOTE FROM CLEMENT:

The explanations below are a bit more thorough than what you need to know for the exam. However, they always say a picture is worth one thousands words, I think it is very true when it comes to explaining IPSEC and its inner working. I have found a great article from CISCO PRESS and DLINK covering this subject, see references below.

Tunnel and Transport Modes

IPSec can be run in either tunnel mode or transport mode. Each of these modes has its own particular uses and care should be taken to ensure that the correct one is selected for the solution: Tunnel mode is most commonly used between gateways, or at an end-station to a gateway, the gateway acting as a proxy for the hosts behind it.

Transport mode is used between end-stations or between an end-station and a gateway, if the gateway is being treated as a host—for example, an encrypted Telnet session from a workstation to a router, in which the router is the actual destination.

As you can see in the Figure 1 graphic below, basically transport mode should be used for end-to-end sessions and tunnel mode should be used for everything else.

FIGURE: 1

### IPSEC Transport Mode versus Tunnel Mode

#### Tunnel and transport modes in IPsec.

Figure 1 above displays some examples of when to use tunnel versus transport mode:

Tunnel mode is most commonly used to encrypt traffic between secure IPsec gateways, such as between the Cisco router and PIX Firewall (as shown in example A in Figure 1). The IPsec gateways proxy IPsec for the devices behind them, such as Alice's PC and the HR servers in Figure 1. In example A, Alice connects to the HR servers securely through the IPsec tunnel set up between the gateways.

Tunnel mode is also used to connect an end-station running IPsec software, such as the Cisco Secure VPN Client, to an IPsec gateway, as shown in example B.

In example C, tunnel mode is used to set up an IPsec tunnel between the Cisco router and a server running IPsec software. Note that Cisco IOS software and the PIX Firewall sets tunnel mode as the default IPsec mode.

Transport mode is used between end-stations supporting IPsec, or between an end-station and a gateway, if the gateway is being treated as a host. In example D, transport mode is used to set up an encrypted Telnet session from Alice's PC running Cisco Secure VPN Client software to terminate at the PIX Firewall, enabling Alice to remotely configure the PIX Firewall securely.

FIGURE: 2

### IPSEC AH Tunnel and Transport mode

#### AH Tunnel Versus Transport Mode

Figure 2 above, shows the differences that the IPsec mode makes to AH. In transport mode, AH services protect the external IP header along with the data payload. AH services protect all the fields in the header that don't change in transport. The header goes after the IP header and before the ESP header, if present, and other higher-layer protocols.

As you can see in Figure 2 above, In tunnel mode, the entire original header is authenticated, a new IP header is built, and the new IP header is protected in the same way as the IP header in transport mode.

AH is incompatible with Network Address Translation (NAT) because NAT changes the source IP address, which breaks the AH header and causes the packets to be rejected by the IPsec peer.

FIGURE: 3

### IPSEC ESP Tunnel versus Transport modes

#### ESP Tunnel Versus Transport Mode

Figure 3 above shows the differences that the IPsec mode makes to ESP. In transport mode, the IP payload is encrypted and the original headers are left intact. The ESP header is inserted after the IP header and before the upper-layer protocol header. The upper-layer protocols are encrypted and authenticated along with the ESP header. ESP doesn't authenticate the IP header itself.

NOTE: Higher-layer information is not available because it's part of the encrypted payload.

When ESP is used in tunnel mode, the original IP header is well protected because the entire original IP datagram is encrypted. With an ESP authentication mechanism, the original IP

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datagram and the ESP header are included; however, the new IP header is not included in the authentication.

When both authentication and encryption are selected, encryption is performed first, before authentication. One reason for this order of processing is that it facilitates rapid detection and rejection of replayed or bogus packets by the receiving node. Prior to decrypting the packet, the receiver can detect the problem and potentially reduce the impact of denial-of-service attacks. ESP can also provide packet authentication with an optional field for authentication. Cisco IOS software and the PIX Firewall refer to this service as ESP hashed message authentication code (HMAC). Authentication is calculated after the encryption is done. The current IPSec standard specifies which hashing algorithms have to be supported as the mandatory HMAC algorithms. The main difference between the authentication provided by ESP and AH is the extent of the coverage. Specifically, ESP doesn't protect any IP header fields unless those fields are encapsulated by ESP (tunnel mode).

The following were incorrect answers for this question:

Integrity and authentication for IP datagrams are provided by AH This is correct, AH provides integrity and authentication and ESP provides integrity, authentication and encryption.

ESP provides for integrity, authentication and encryption to IP datagrams. ESP provides authentication, integrity, and confidentiality, which protect against data tampering and, most importantly, provide message content protection.

In transport mode, ESP only encrypts the data payload of each packet. ESP can be operated in either tunnel mode (where the original packet is encapsulated into a new one) or transport mode (where only the data payload of each packet is encrypted, leaving the header untouched).

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 6986-6989). Auerbach Publications. Kindle Edition.

and

<http://www.ciscopress.com/articles/article.asp?p=25477>

and

<http://documentation.netgear.com/reference/sve/vpn/VPNBasics-3-05.html>

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## QUESTION 445

Which of the following statements pertaining to packet filtering is incorrect?

- A. It is based on ACLs.
- B. It is not application dependant.
- C. It operates at the network layer.
- D. It keeps track of the state of a connection.

Answer: D

Explanation: Packet filtering is used in the first generation of firewalls and does not keep track of the state of a connection. Stateful packet filtering does.

Source: WALLHOFF, John, CISSP Summary 2002, April 2002, CBK#2 Telecommunications and Network Security (page 6), /Documents/CISSP\_Summary\_2002/index.html.

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**QUESTION 446**

Which of the following is a method of multiplexing data where a communication channel is divided into an arbitrary number of variable bit-rate digital channels or data streams. This method allocates bandwidth dynamically to physical channels having information to transmit?

- A. Time-division multiplexing
- B. Asynchronous time-division multiplexing
- C. Statistical multiplexing
- D. Frequency division multiplexing

Answer: C

**Explanation:** Statistical multiplexing is a type of communication link sharing, very similar to dynamic bandwidth allocation (DBA). In statistical multiplexing, a communication channel is divided into an arbitrary number of variable bit-rate digital channels or data streams. The link sharing is adapted to the instantaneous traffic demands of the data streams that are transferred over each channel. This is an alternative to creating a fixed sharing of a link, such as in general time division multiplexing (TDM) and frequency division multiplexing (FDM). When performed correctly, statistical multiplexing can provide a link utilization improvement, called the statistical multiplexing gain.

Generally, the methods for multiplexing data include the following :

**Time-division multiplexing (TDM):** information from each data channel is allocated bandwidth based on pre-assigned time slots, regardless of whether there is data to transmit. Time-division multiplexing is used primarily for digital signals, but may be applied in analog multiplexing in which two or more signals or bit streams are transferred appearing simultaneously as sub-channels in one communication channel, but are physically taking turns on the channel. The time domain is divided into several recurrent time slots of fixed length, one for each sub-channel. A sample byte or data block of sub-channel 1 is transmitted during time slot 1, sub-channel 2 during time slot 2, etc. One TDM frame consists of one time slot per sub-channel plus a synchronization channel and sometimes error correction channel before the synchronization. After the last sub-channel, error correction, and synchronization, the cycle starts all over again with a new frame, starting with the second sample, byte or data block from sub-channel 1, etc.

**Asynchronous time-division multiplexing (ATDM):** information from data channels is allocated bandwidth as needed, via dynamically assigned time slots. ATM provides functionality that is similar to both circuit switching and packet switching networks: ATM uses asynchronous timedivision multiplexing, and encodes data into small, fixed-sized packets (ISO-OSI frames) called cells. This differs from approaches such as the Internet Protocol or Ethernet that use variable sized packets and frames. ATM uses a connection-oriented model in which a virtual circuit must be established between two endpoints before the actual data exchange begins. These virtual circuits may be “permanent”, i.e. dedicated connections that are usually preconfigured by the service provider, or “switched”, i.e. set up on a per-call basis using signalling and disconnected when the call is terminated.

**Frequency division multiplexing (FDM):** information from each data channel is allocated bandwidth based on the signal frequency of the traffic. In telecommunications, frequency-division multiplexing (FDM) is a technique by which the total bandwidth available in a communication medium is divided into a series of non-overlapping frequency sub-bands, each of which is used to carry a separate

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signal. This allows a single transmission medium such as the radio spectrum, a cable or optical fiber to be shared by many signals.

Reference used for this question:

[http://en.wikipedia.org/wiki/Statistical\\_multiplexing](http://en.wikipedia.org/wiki/Statistical_multiplexing)

and

[http://en.wikipedia.org/wiki/Frequency\\_division\\_multiplexing](http://en.wikipedia.org/wiki/Frequency_division_multiplexing)

and

Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, Chapter 3: Technical Infrastructure and Operational Practices (page 114).

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### QUESTION 447

If an organization were to deploy only one Intrusion Detection System (IDS) sensor to protect its information system from the Internet:

- A. It should be host-based and installed on the most critical system in the DMZ, between the external router and the firewall.
- B. It should be network-based and installed in the DMZ, between the external router and the firewall.
- C. It should be network-based and installed between the firewall to the DMZ and the intranet.
- D. It should be host-based and installed between the external router and the Internet.

Answer: B

Explanation: A network sensor is much better suited to monitoring large segments of a network, whereas a host sensor is limited to monitoring that it resides on. In this scenario, the ideal location to place the sole network sensor is in the DMZ, between the external router and the firewall to the intranet.

This will allow the sensor to monitor all network traffic going to and coming from the Internet. This design allows the IDS to be used for maximum effectiveness. Furthermore, because the router can filter all incoming traffic from the Internet, the IDS sensor can be tuned to ignore certain types of attacks, thereby allowing the sensor to operate with maximum efficiency.

Source: National Security Agency, Systems and Network Attack Center (SNAC), The 60 Minute Network Security Guide, 2006.

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### QUESTION 448

Why is infrared generally considered to be more secure to eavesdropping than multidirectional radio transmissions?

- A. Because infrared eavesdropping requires more sophisticated equipment.
- B. Because infrared operates only over short distances.
- C. Because infrared requires direct line-of-sight paths.
- D. Because infrared operates at extra-low frequencies (ELF).

Answer: C

Explanation: Infrared is generally considered to be more secure to eavesdropping than

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multidirectional radio transmissions because infrared requires direct line-of-sight paths.  
Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 173).

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**QUESTION 449**

Authentication Headers (AH) and Encapsulating Security Payload (ESP) protocols are the driving force of IPsec. Authentication Headers (AH) provides the following service except:

- A. Authentication
- B. Integrity
- C. Replay resistance and non-repudiations
- D. Confidentiality

Answer: D

Explanation: AH provides integrity, authentication, and non-repudiation. AH does not provide encryption which means that NO confidentiality is in place if only AH is being used. You must make use of the Encapsulating Security Payload if you wish to get confidentiality.

IPSec uses two basic security protocols: Authentication Header (AH) and Encapsulation Security Payload.

AH is the authenticating protocol and the ESP is the authenticating and encrypting protocol that uses cryptographic mechanisms to provide source authentication, confidentiality and message integrity.

The modes of IPSEC, the protocols that have to be used are all negotiated using Security Association. Security Associations (SAs) can be combined into bundles to provide authentication, confidentiality and layered communication.

Source:

TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 2, 2001, CRC Press, NY, page 164.

also see:

Shon Harris, CISSP All In One Exam Guide, 5th Edition, Page 758

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**QUESTION 450**

In IPsec, if the communication is to be gateway-to-gateway or host-to-gateway:

- A. Tunnel mode of operation is required
- B. Only transport mode can be used
- C. Encapsulating Security Payload (ESP) authentication must be used
- D. Both tunnel and transport mode can be used

Answer: A

Explanation: Transport mode is established when the endpoint is a host. If the gateway in a gateway-to-host communication was to use transport mode, it would act as a host system, which is acceptable for direct protocols to that gateway. Otherwise, TUNNEL mode is required for gateway services... This is the most common mode of operation and is required for gateway-to-gateway

and host-to-gateway communications.

Source: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 2, 2001, CRC Press, NY, page 167.

### QUESTION 451

Which of the following is NOT true about IPSec Tunnel mode?

- A. Fundamentally an IP tunnel with encryption and authentication
- B. Works at the Transport layer of the OSI model
- C. Have two sets of IP headers
- D. Established for gateway service

Answer: B

Explanation: IPSec can be run in either tunnel mode or transport mode. Each of these modes has its own particular uses and care should be taken to ensure that the correct one is selected for the solution:

Tunnel mode is most commonly used between gateways, or at an end-station to a gateway, the gateway acting as a proxy for the hosts behind it.

Transport mode is used between end-stations or between an end-station and a gateway, if the gateway is being treated as a host—for example, an encrypted Telnet session from a workstation to a router, in which the router is the actual destination.

As Figure 1 shows, basically transport mode should be used for end-to-end sessions and tunnel mode should be used for everything else. (Refer to the figure for the following discussion.)

Figure 1 Tunnel and transport modes in IPSec.

Figure 1 displays some examples of when to use tunnel versus transport mode:

Tunnel mode is most commonly used to encrypt traffic between secure IPSec gateways, such as between the Cisco router and PIX Firewall (as shown in example A in Figure 1). The IPSec gateways proxy IPSec for the devices behind them, such as Alice's PC and the HR servers in Figure 1. In example A, Alice connects to the HR servers securely through the IPSec tunnel set up between the gateways.

Tunnel mode is also used to connect an end-station running IPSec software, such as the Cisco Secure VPN Client, to an IPSec gateway, as shown in example B.

In example C, tunnel mode is used to set up an IPSec tunnel between the Cisco router and a server running IPSec software. Note that Cisco IOS software and the PIX Firewall sets tunnel mode as the default IPSec mode.

Transport mode is used between end-stations supporting IPSec, or between an end-station and a gateway, if the gateway is being treated as a host. In example D, transport mode is used to set up an encrypted Telnet session from Alice's PC running Cisco Secure VPN Client software to terminate at the PIX Firewall, enabling Alice to remotely configure the PIX Firewall securely.

AH Tunnel Versus Transport Mode

Figure 2 shows the differences that the IPSec mode makes to AH. In transport mode, AH services protect the external IP header along with the data payload. AH services protect all the fields in the header that don't change in transport. The header goes after the IP header and before the ESP header, if present, and other higher-layer protocols.

In tunnel mode, the entire original header is authenticated, a new IP header is built, and the new

IP header is protected in the same way as the IP header in transport mode.

#### Figure 2 AH tunnel versus transport mode.

AH is incompatible with Network Address Translation (NAT) because NAT changes the source IP address, which breaks the AH header and causes the packets to be rejected by the IPSec peer.

#### ESP Tunnel Versus Transport Mode

Figure 3 shows the differences that the IPSec mode makes to ESP. In transport mode, the IP payload is encrypted and the original headers are left intact. The ESP header is inserted after the IP header and before the upper-layer protocol header. The upper-layer protocols are encrypted and authenticated along with the ESP header. ESP doesn't authenticate the IP header itself.

#### NOTE

Higher-layer information is not available because it's part of the encrypted payload.

When ESP is used in tunnel mode, the original IP header is well protected because the entire original IP datagram is encrypted. With an ESP authentication mechanism, the original IP datagram and the ESP header are included; however, the new IP header is not included in the authentication.

When both authentication and encryption are selected, encryption is performed first, before authentication. One reason for this order of processing is that it facilitates rapid detection and rejection of replayed or bogus packets by the receiving node. Prior to decrypting the packet, the receiver can detect the problem and potentially reduce the impact of denial-of-service attacks.

#### Figure 3 ESP tunnel versus transport mode.

ESP can also provide packet authentication with an optional field for authentication. Cisco IOS software and the PIX Firewall refer to this service as ESP hashed message authentication code (HMAC). Authentication is calculated after the encryption is done. The current IPSec standard specifies SHA-1 and MD5 as the mandatory HMAC algorithms.

The main difference between the authentication provided by ESP and AH is the extent of the coverage. Specifically, ESP doesn't protect any IP header fields unless those fields are encapsulated by ESP (tunnel mode). Figure 4 illustrates the fields protected by ESP HMAC.

#### Figure 4 ESP encryption with a keyed HMAC.

#### IPSec Transforms

An IPSec transform specifies a single IPSec security protocol (either AH or ESP) with its corresponding security algorithms and mode. Example transforms include the following:

The AH protocol with the HMAC with MD5 authentication algorithm in tunnel mode is used for authentication.

The ESP protocol with the triple DES (3DES) encryption algorithm in transport mode is used for confidentiality of data.

The ESP protocol with the 56-bit DES encryption algorithm and the HMAC with SHA-1 authentication algorithm in tunnel mode is used for authentication and confidentiality.

#### Transform Sets

A transform set is a combination of individual IPSec transforms designed to enact a specific security policy for traffic. During the ISAKMP IPSec security association negotiation that occurs in IKE phase 2 quick mode, the peers agree to use a particular transform set for protecting a particular data flow. Transform sets combine the following IPSec factors:

Mechanism for payload authentication—AH transform

Mechanism for payload encryption—ESP transform

IPSec mode (transport versus tunnel)

Transform sets equal a combination of an AH transform, plus an ESP transform, plus the IPSec

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mode (either tunnel or transport mode).

This brings us to the end of the second part of this five-part series of articles covering IPSec. Be sure to catch the next installment.

Cisco Press at: <http://www.ciscopress.com/articles/printfriendly.asp?p=25477>

and

Source: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 2, 2001, CRC Press, NY, Pages 166-167.

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### QUESTION 452

Which of the following statements is NOT true of IPSec Transport mode?

- A. It is required for gateways providing access to internal systems
- B. Set-up when end-point is host or communications terminates at end-points
- C. If used in gateway-to-host communication, gateway must act as host
- D. When ESP is used for the security protocol, the hash is only applied to the upper layer protocols contained in the packet

Answer: A

Explanation: Source: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 2, 2001, CRC Press, NY, Pages 166-167.

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### QUESTION 453

Which of the following statements pertaining to firewalls is incorrect?

- A. Firewalls create bottlenecks between the internal and external network.
- B. Firewalls allow for centralization of security services in machines optimized and dedicated to the task.
- C. Firewalls protect a network at all layers of the OSI models.
- D. Firewalls are used to create security checkpoints at the boundaries of private networks.

Answer: C

Explanation: Firewalls can protect a network at multiple layers of the OSI models, however most of the firewalls do not have the ability to monitor the payload of the packets and see if an application level attack is taking place.

Today there are a new breed of firewall called Unified Threat Managers or UTM. They are a collection of products on a single computer and not necessarily a typical firewall. A UTM can address all of the layers but typically a firewall cannot.

Firewalls are security checkpoints at the boundaries of internal networks through which every packet must pass and be inspected, hence they create bottlenecks between the internal and external networks. But since external connections are relatively slow compared to modern computers, the latency caused by this bottleneck can almost be transparent.

By implementing the concept of border security, they centralize security services in machines optimized and dedicated to the task, thus relieving the other hosts on the network from that function.

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Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 1:  
Understanding Firewalls.

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**QUESTION 454**

Which of the following is an extension to Network Address Translation that permits multiple devices providing services on a local area network (LAN) to be mapped to a single public IP address?

- A. IP Spoofing
- B. IP subnetting
- C. Port address translation
- D. IP Distribution

Answer: C

Explanation: Port Address Translation (PAT), is an extension to network address translation (NAT) that permits multiple devices on a local area network (LAN) to be mapped to a single public IP address. The goal of PAT is to conserve IP addresses or to publish multiple hosts with service to the internet while having only one single IP assigned on the external side of your gateway. Most home networks use PAT. In such a scenario, the Internet Service Provider (ISP) assigns a single IP address to the home network's router. When Computer X logs on the Internet, the router assigns the client a port number, which is appended to the internal IP address. This, in effect, gives Computer X a unique address. If Computer Z logs on the Internet at the same time, the router assigns it the same local IP address with a different port number. Although both computers are sharing the same public IP address and accessing the Internet at the same time, the router knows exactly which computer to send specific packets to because each computer has a unique internal address.

Port Address Translation is also called porting, port overloading, port-level multiplexed NAT and single address NAT.

Shon Harris has the following example in her book:

The company owns and uses only one public IP address for all systems that need to communicate outside the internal network. How in the world could all computers use the exact same IP address? Good question. Here's an example: The NAT device has an IP address of 127.50.41.3. When computer A needs to communicate with a system on the Internet, the NAT device documents this computer's private address and source port number (10.10.44.3; port 43,887). The NAT device changes the IP address in the computer's packet header to 127.50.41.3, with the source port 40,000. When computer B also needs to communicate with a system on the Internet, the NAT device documents the private address and source port number (10.10.44.15; port 23,398) and changes the header information to 127.50.41.3 with source port 40,001. So when a system responds to computer A, the packet first goes to the NAT device, which looks up the port number 40,000 and sees that it maps to computer A's real information. So the NAT device changes the header information to address 10.10.44.3 and port 43,887 and sends it to computer A for processing. A company can save a lot more money by using PAT, because the company needs to buy only a few public IP addresses, which are used by all systems in the network.

As mentioned on Wikipedia:

NAT is also known as Port Address Translation: is a feature of a network device that translate

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TCP or UDP communications made between host on a private network and host on a public network. It allows a single public IP address to be used by many hosts on a private network which is usually a local area network (LAN).

NAT effectively hides all TCP/IP-level information about internal hosts from the Internet.

The following were all incorrect answers:

**IP Spoofing** - In computer networking, the term IP address spoofing or IP spoofing refers to the creation of Internet Protocol (IP) packets with a forged source IP address, called spoofing, with the purpose of concealing the identity of the sender or impersonating another computing system.

**Subnetting** - Subnetting is a network design strategy that segregates a larger network into smaller components. While connected through the larger network, each subnetwork or subnet functions with a unique IP address. All systems that are assigned to a particular subnet will share values that are common for both the subnet and for the network as a whole.

A different approach to network construction can be thought of as subnetting in reverse. Known as CIDR, or Classless Inter-Domain Routing, this approach also creates a series of subnetworks.

Rather than dividing an existing network into small components, CIDR takes smaller components and connects them into a larger network. This can often be the case when a business is acquired by a larger corporation. Instead of doing away with the network developed and used by the newly acquired business, the corporation chooses to continue operating that network as a subsidiary or an added component of the corporation's network. In effect, the system of the purchased entity becomes a subnet of the parent company's network.

**IP Distribution** - This is a generic term which could mean distribution of content over an IP network or distribution of IP addresses within a Company. Sometimes people will refer to this as Internet Protocol address management (IPAM) is a means of planning, tracking, and managing the Internet Protocol address space used in a network. Most commonly, tools such as DNS and DHCP are used in conjunction as integral functions of the IP address management function, and true IPAM glues these point services together so that each is aware of changes in the other (for instance DNS knowing of the IP address taken by a client via DHCP, and updating itself accordingly).

Additional functionality, such as controlling reservations in DHCP as well as other data aggregation and reporting capability, is also common. IPAM tools are increasingly important as new IPv6 networks are deployed with larger address pools, different subnetting techniques, and more complex 128-bit hexadecimal numbers which are not as easily human-readable as IPv4 addresses.

Reference(s) used for this question:

STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 1: Understanding Firewalls.

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Telecommunications and Network Security, Page 350.

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 12765-12774). Telecommunications and Network Security, Page 604-606

<http://searchnetworking.techtarget.com/definition/Port-Address-Translation-PAT>

[http://en.wikipedia.org/wiki/IP\\_address\\_spoofing](http://en.wikipedia.org/wiki/IP_address_spoofing)

<http://www.wisegeek.com/what-is-subnetting.htm>

[http://en.wikipedia.org/wiki/IP\\_address\\_management](http://en.wikipedia.org/wiki/IP_address_management)

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## QUESTION 455

At which OSI/ISO layer is an encrypted authentication between a client software package and a

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firewall performed?

- A. Network layer
- B. Session layer
- C. Transport layer
- D. Data link layer

Answer: C

Explanation: Encrypted authentication is a firewall feature that allows users on an external network to authenticate themselves to prove that they are authorized to access resources on the internal network. Encrypted authentication is convenient because it happens at the transport layer between a client software and a firewall, allowing all normal application software to run without hindrance.

Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 1: Understanding Firewalls.

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### QUESTION 456

Which of the following can best eliminate dial-up access through a Remote Access Server as a hacking vector?

- A. Using a TACACS+ server.
- B. Installing the Remote Access Server outside the firewall and forcing legitimate users to authenticate to the firewall.
- C. Setting modem ring count to at least 5.
- D. Only attaching modems to non-networked hosts.

Answer: B

Explanation: Containing the dial-up problem is conceptually easy: by installing the Remote Access Server outside the firewall and forcing legitimate users to authenticate to the firewall, any access to internal resources through the RAS can be filtered as would any other connection coming from the Internet.

The use of a TACACS+ Server by itself cannot eliminate hacking.

Setting a modem ring count to 5 may help in defeating war-dialing hackers who look for modem by dialing long series of numbers.

Attaching modems only to non-networked hosts is not practical and would not prevent these hosts from being hacked.

Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 2: Hackers.

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### QUESTION 457

Which of the following was designed to support multiple network types over the same serial link?

- A. Ethernet
- B. SLIP

- 
- C. PPP
  - D. PPTP

Answer: C

Explanation: The Point-to-Point Protocol (PPP) was designed to support multiple network types over the same serial link, just as Ethernet supports multiple network types over the same LAN. PPP replaces the earlier Serial Line Internet Protocol (SLIP) that only supports IP over a serial link. PPTP is a tunneling protocol.

Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 3: TCP/IP from a Security Viewpoint.

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### QUESTION 458

What is an IP routing table?

- A. A list of IP addresses and corresponding MAC addresses.
- B. A list of station and network addresses with corresponding gateway IP address.
- C. A list of host names and corresponding IP addresses.
- D. A list of current network interfaces on which IP routing is enabled.

Answer: B

Explanation: A routing table is used when a destination IP address is not located on the current LAN segment. It consists of a list of station and network addresses and a corresponding gateway IP address further along to which a routing equipment should send packets that match that station or network address. A list of IP addresses and corresponding MAC addresses is an ARP table. A DNS is used to match host names and corresponding IP addresses. The last choice is a distracter.  
Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 3: TCP/IP from a Security Viewpoint.

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### QUESTION 459

Which of the following should be allowed through a firewall to easy communication and usage by users?

- A. RIP
- B. IGRP
- C. DNS
- D. OSPF

Answer: C

Explanation: DNS is a service that must be allowed through an organization's firewall because without it, network users won't be able to find anything unless they remember IP addresses for any sites they wish to connect to.

DNSSEC should be considered today as a more secure replacement for DNS. If you make use of DNS you must ensure it is properly configured to allow only queries (UDP 53) and not zone

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transfer (TCP 53). Else abuse could be attempted against your DNS.

RIP, IGRP and OSPF are interior IP routing protocols normally used to keep routing tables updated and consistent inside an organization's network. Changes to an organization's routing tables should neither be advertised to, or come from, outside of the organization's network. Those protocols should not normally be allowed through the organization's firewall with an external network like the Internet.

Reference used for this question:

STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 4: Sockets and Services from a Security Viewpoint.

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### QUESTION 460

Which of the following was developed as a simple mechanism for allowing simple network terminals to load their operating system from a server over the LAN?

- A. DHCP
- B. BootP
- C. DNS
- D. ARP

Answer: B

Explanation: BootP was developed as a simple mechanism for allowing simple network terminals to load their operating system from a server over the LAN. Over time, it has expanded to allow centralized configuration of many aspects of a host's identity and behavior on the network. Note that DHCP, more complex, has replaced BootP over time.

Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 4: Sockets and Services from a Security Viewpoint.

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### QUESTION 461

What is the greatest danger from DHCP?

- A. An intruder on the network impersonating a DHCP server and thereby misconfiguring the DHCP clients.
- B. Having multiple clients on the same LAN having the same IP address.
- C. Having the wrong router used as the default gateway.
- D. Having the organization's mail server unreachable.

Answer: A

Explanation: The greatest danger from BootP or DHCP (Dynamic Host Control Protocol) is from an intruder on the network impersonating a DHCP server and thereby misconfiguring the DHCP clients. Other choices are possible consequences of DHCP impersonation.

Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 4: Sockets and Services from a Security Viewpoint.

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**QUESTION 462**

Which of the following allows two computers to coordinate in executing software?

- A. RSH
- B. RPC
- C. NFS
- D. SNMP

Answer: B

Explanation: Remote Procedure Call (RPC, UDP port 111) is a protocol that allows two computers to coordinate in executing software. RPC can be used by a program on one computer to transfer execution of a subroutine to another computer, and have the results returned to the first. RPC is a fragile service, and most operating systems cannot handle arbitrary data being sent to an RPC port. It is best used in trusted LAN environments and should not usually be allowed through the organization's firewall. RPC is being replaced by Secure-RPC.

Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 4: Sockets and Services from a Security Viewpoint.

**QUESTION 463**

Which of the following should NOT normally be allowed through a firewall?

- A. SNMP
- B. SMTP
- C. HTTP
- D. SSH

Answer: A

Explanation: The Simple Network Management Protocol (SNMP) is a useful tool for remotely managing network devices.

Since it can be used to reconfigure devices, SNMP traffic should be blocked at the organization's firewall.

Using a VPN with encryption or some type of Tunneling software would be highly recommended in this case.

Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 4: Sockets and Services from a Security Viewpoint.

**QUESTION 464**

Which of the following NAT firewall translation modes allows a large group of internal clients to share a single or small group of ROUTABLE IP addresses for the purpose of hiding their identities when communicating with external hosts?

- A. Static translation
- B. Load balancing translation
- C. Network redundancy translation

#### D. Dynamic translation

Answer: D

Explanation: With dynamic translation (also called Automatic, Hide Mode, or IP Masquerade), a large group of internal clients share a single or small group of ROUTABLE IP addresses for the purpose of hiding their identities when communicating with external hosts or expanding the internal network address space.

Static translation (also called port forwarding), assigns a fixed address to a specific internal network resource (usually a server). Static NAT is required to make internal hosts available for connection from external hosts.

Load Balancing Translation is used to translate a single IP address and port to a pool of identically configured servers so that a single public address can be served by a number of servers. In Network Redundancy Translation, multiple Internet connections are attached to a single NAT firewall that it chooses and uses based on load and availability.

Reference used for this question:

STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 7: Network Address Translation.

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#### QUESTION 465

Which of the following NAT firewall translation modes offers no protection from hacking attacks to an internal host using this functionality?

- A. Network redundancy translation
- B. Load balancing translation
- C. Dynamic translation
- D. Static translation

Answer: D

Explanation:

Static translation (also called port forwarding), assigns a fixed address to a specific internal network resource (usually a server).

Static NAT is required to make internal hosts available for connection from external hosts.

It merely replaces port information on a one-to-one basis. This affords no protection to statistically translated hosts: hacking attacks will be just as efficiently translated as any other valid connection attempt.

**NOTE FROM CLEMENT:**

Hiding Nat or Overloaded Nat is when you have a group of users behind a unique public IP address. This will provide you with some security through obscurity where an attacker scanning your network would see the unique IP address on the outside of the gateway but could not tell if there is one user, ten users, or hundreds of users behind that IP.

NAT was NEVER built as a security mechanism.

In the case of Static NAT used for some of your servers for example, your web server private IP is map to a valid external public IP on a one on one basis, your SMTP server private IP is mapped to a static public IP, and so on.

If an attacker scan the IP address range on the external side of the gateway he would discover every single one of your servers or any other hosts using static natting. Ports that are open, services that are listening, and all of this info could be gathered just as if the server was in fact using a public IP. It does not provide this security through obscurity mentioned above.

All of the other answer are incorrect.

Reference used for this question:

STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 7: Network Address Translation.

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### QUESTION 466

Which of the following is the primary security feature of a proxy server?

- A. Virus Detection
- B. URL blocking
- C. Route blocking
- D. Content filtering

Answer: D

Explanation: In many organizations, the HTTP proxy is used as a means to implement content filtering, for instance, by logging or blocking traffic that has been defined as, or is assumed to be nonbusiness related for some reason.

Although filtering on a proxy server or firewall as part of a layered defense can be quite effective to prevent, for instance, virus infections (though it should never be the only protection against viruses), it will be only moderately effective in preventing access to unauthorized services (such as certain remote-access services or file sharing), as well as preventing the download of unwanted content. **HTTP Tunneling**.

HTTP tunneling is technically a misuse of the protocol on the part of the designer of such tunneling applications. It has become a popular feature with the rise of the first streaming video and audio applications and has been implemented into many applications that have a market need to bypass user policy restrictions.

Usually, HTTP tunneling is applied by encapsulating outgoing traffic from an application in an HTTP request and incoming traffic in a response. This is usually not done to circumvent security, but rather, to be compatible with existing firewall rules and allow an application to function through a firewall without the need to apply special rules, or additional configurations.

The following are incorrect choices:

Virus Detection A proxy is not best at detection malware and viruses within content. A antivirus product would be use for that purpose.

URL blocking This would be a subset of Proxying, based on the content some URL's may be blocked by the proxy but it is not doing filtering based on URL addresses only. This is not the BEST answer.

Route blocking This is a function that would be done by Intrusion Detection and Intrusion prevention system and not the proxy. This could be done by filtering devices such as Firewalls and Routers as well. Again, not the best choice.

Reference(s) used for this question:

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Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 6195-6201). Auerbach Publications. Kindle Edition.

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**QUESTION 467**

Which of the following is an advantage of proxies?

- A. Proxies provide a single point of access, control, and logging.
- B. Proxies must exist for each service.
- C. Proxies create a single point of failure.
- D. Proxies do not protect the base operating system.

Answer: A

Explanation: By ensuring that all content flows through a single point, proxies provide a checkpoint for network data, which is an advantage rather than a liability, as are other choices.

Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 8: Application-Level Proxies.

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**QUESTION 468**

Which of the following packets should NOT be dropped at a firewall protecting an organization's internal network?

- A. Inbound packets with Source Routing option set
- B. Router information exchange protocols
- C. Inbound packets with an internal address as the source IP address
- D. Outbound packets with an external destination IP address

Answer: D

Explanation: Normal outbound traffic has an internal source IP address and an external destination IP address.

Traffic with an internal source IP address should only come from an internal interface. Such packets coming from an external interface should be dropped.

Packets with the source-routing option enabled usually indicates a network intrusion attempt.

Router information exchange protocols like RIP and OSPF should be dropped to avoid having internal routing equipment being reconfigured by external agents.

Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 10: The Perfect Firewall.

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**QUESTION 469**

Why does fiber optic communication technology have significant security advantage over other transmission technology?

- A. Higher data rates can be transmitted.
- B. Interception of data traffic is more difficult.
- C. Traffic analysis is prevented by multiplexing.

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D. Single and double-bit errors are correctable.

Answer: B

Explanation: It would be correct to select the first answer if the word "security" was not in the question.

Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 470

Another name for a VPN is a:

- A. tunnel
- B. one-time password
- C. pipeline
- D. bypass

Answer: A

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 471

Which one of the following is used to provide authentication and confidentiality for e-mail messages?

- A. Digital signature
- B. PGP
- C. IPSEC AH
- D. MD4

Answer: B

Explanation: Instead of using a Certificate Authority, PGP uses a "Web of Trust", where users can certify each other in a mesh model, which is best applied to smaller groups.

In cryptography, a web of trust is a concept used in PGP, GnuPG, and other OpenPGP compatible systems to establish the authenticity of the binding between a public key and its owner. Its decentralized trust model is an alternative to the centralized trust model of a public key infrastructure (PKI), which relies exclusively on a certificate authority (or a hierarchy of such). The web of trust concept was first put forth by PGP creator Phil Zimmermann in 1992 in the manual for PGP version 2.0.

Pretty Good Privacy (PGP) is a data encryption and decryption computer program that provides cryptographic privacy and authentication for data communication. PGP is often used for signing, encrypting and decrypting texts, E-mails, files, directories and whole disk partitions to increase the security of e-mail communications. It was created by Phil Zimmermann in 1991.

As per Shon Harris's book:

Pretty Good Privacy (PGP) was designed by Phil Zimmerman as a freeware e-mail security program and was released in 1991. It was the first widespread public key encryption program.

PGP is a complete cryptosystem that uses cryptographic protection to protect e-mail and files. It can use RSA public key encryption for key management and use IDEA symmetric cipher for bulk encryption of data, although the user has the option of picking different types of algorithms for these functions. PGP can provide confidentiality by using the IDEA encryption algorithm, integrity by using the MD5 hashing algorithm, authentication by using the public key certificates, and nonrepudiation by using cryptographically signed messages. PGP initially used its own type of digital certificates rather than what is used in PKI, but they both have similar purposes. Today PGP support X.509 V3 digital certificates.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 169).

Shon Harris, CISSP All in One book

[https://en.wikipedia.org/wiki/Pretty\\_Good\\_Privacy](https://en.wikipedia.org/wiki/Pretty_Good_Privacy)

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 472

Which of the following media is MOST resistant to EMI interference?

- A. microwave
- B. fiber optic
- C. twisted pair
- D. coaxial cable

Answer: B

Explanation: A fiber optic cable is a physical medium that is capable of conducting modulated light transmission. Fiber optic cable carries signals as light waves, thus creating higher transmission speeds and greater distances due to less attenuation. This type of cabling is more difficult to tap than other cabling and is most resistant to interference, especially EMI.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 103).

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### QUESTION 473

Which of the following is NOT a way to secure a wireless network?

- A. Disable broadcast of SSID within AP's configuration
- B. Change AP's default values
- C. Put the access points (AP) in a location protected by a firewall
- D. Give AP's descriptive names

Answer: D

Explanation: The SSID of the AP has very little value when it comes to security. In fact using descriptive names such as your company name would make you a more likely target in some cases.

The SSID is sent in clear text within the packets. It is not a security mechanism.  
The following answer are incorrect answers:  
All other choices would improve your AP security.

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**QUESTION 474**

Behavioral-based systems are also known as?

- A. Profile-based systems
- B. Pattern matching systems
- C. Misuse detective systems
- D. Rule-based IDS

Answer: A

Explanation: There are two complementary approaches to detecting intrusions, knowledge-based approaches and behavior-based approaches. This entry describes the second approach. It must be noted that very few tools today implement such an approach, even if the founding Denning paper {D. Denning, An Intrusion Detection Model, IEEE transactions on software engineering} recognizes this as a requirement for IDS systems.

Behavior-based intrusion detection techniques assume that an intrusion can be detected by observing a deviation from normal or expected behavior of the system or the users. The model of normal or valid behavior is extracted from reference information collected by various means. The intrusion detection system later compares this model with the current activity. When a deviation is observed, an alarm is generated. In other words, anything that does not correspond to a previously learned behavior is considered intrusive. Therefore, the intrusion detection system might be complete (i.e. all attacks should be caught), but its accuracy is a difficult issue (i.e. you get a lot of false alarms).

Advantages of behavior-based approaches are that they can detect attempts to exploit new and unforeseen vulnerabilities. They can even contribute to the (partially) automatic discovery of these new attacks. They are less dependent on operating system-specific mechanisms. They also help detect 'abuse of privileges' types of attacks that do not actually involve exploiting any security vulnerability. In short, this is the paranoid approach: Everything which has not been seen previously is dangerous.

The high false alarm rate is generally cited as the main drawback of behavior-based techniques because the entire scope of the behavior of an information system may not be covered during the learning phase. Also, behavior can change over time, introducing the need for periodic online retraining of the behavior profile, resulting either in unavailability of the intrusion detection system or in additional false alarms. The information system can undergo attacks at the same time the intrusion detection system is learning the behavior. As a result, the behavior profile contains intrusive behavior, which is not detected as anomalous.

Herve Debar

IBM Zurich Research Laboratory

The following answers are incorrect:

Pattern matching systems are signature-based (e.g. Anti-virus).

Misuse detection systems is another name for signature-based IDSs.

Rule-based IDS is a distractor.

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The following reference(s) were/was used to create this question:

Shon Harris AIO - 4th edition, Page 254

and

[http://www.sans.org/security-resources/idfaq/behavior\\_based.php](http://www.sans.org/security-resources/idfaq/behavior_based.php)

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### QUESTION 475

This OSI layer has a service that negotiates transfer syntax and translates data to and from the transfer syntax for users, which may represent data using different syntaxes. At which of the following layers would you find such service?

- A. Session
- B. Transport
- C. Presentation
- D. Application

Answer: C

Explanation: It is responsible for taking information from the "Application layer protocols" and putting it in a form suitable for the application to process.

The presentation-layer implementation of the OSI protocol suite consists of a presentation protocol and a presentation service. The presentation protocol allows presentation-service users (PSusers) to communicate with the presentation service.

A PS-user is an entity that requests the services of the presentation layer. Such requests are made at Presentation-Service Access Points (PSAPs). PS-users are uniquely identified by using PSAP addresses.

Presentation service negotiates transfer syntax and translates data to and from the transfer syntax for PS-users, which represent data using different syntaxes. The presentation service is used by two PS-users to agree upon the transfer syntax that will be used. When a transfer syntax is agreed upon, presentation-service entities must translate the data from the PS-user to the correct transfer syntax.

The OSI presentation-layer service is defined in the ISO 8822 standard and in the ITU-T X.216 recommendation. The OSI presentation protocol is defined in the ISO 8823 standard and in the ITU-T X.226 recommendation. A connectionless version of the presentation protocol is specified in the ISO 9576 standard.

To remember the OSI layers you can use the following Mnemonics:

The first one is from the bottom (Physical Layer - Layer 1) up (Application - Layer 7):

Please Do Not Throw Sausage Pizza Away

There is another mnemonic from the top down:

All People Seem To Need Data Processing

Both maps to:

1. Physical - 2. Data link - 3. Network - 4. Transport - 5. Session - 6. Presentation - 7. Application

The following answers are incorrect:

Transport: Responsible for providing end to end data transport services and establish the logical connection between COMPUTERS for example TCP and UDP

Session: Responsible for maintaining the connection between two APPLICATIONS during the data

transfer for example NFS , RPC protocol

Application : Works closest to the application , it does not itself contain applications but rather the protocols that support the applications. for example HTTP work at this layer but the application it support is IE , Mozilla , opera , chrome ...

The following reference(s) were/was used to create this question:

<http://www.cisco.com/cpress/cc/td/cpress/fund/ith2nd/it2432.htm>

and

[http://en.wikipedia.org/wiki/List\\_of\\_network\\_protocols\\_%28OSI\\_model%29](http://en.wikipedia.org/wiki/List_of_network_protocols_%28OSI_model%29)

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### QUESTION 476

At which layer of ISO/OSI does the fiber optics work?

- A. Network layer
- B. Transport layer
- C. Data link layer
- D. Physical layer

Answer: D

Explanation: The

Answer: Physical layer The Physical layer is responsible for the transmission of the data through the physical medium. This includes such things as cables. Fiber optics is a cabling mechanism which works at Physical layer of OSI model

All of the other answers are incorrect.

The following reference(s) were/was used to create this question:

Shon Harris all in one - Chapter 7 (Cabling)

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### QUESTION 477

What is Dumpster Diving?

- A. Going through dust bin
- B. Running through another person's garbage for discarded document, information and other various items that could be used against that person or company
- C. Performing media analysis
- D. performing forensics on the deleted items

Answer: B

Explanation: The

Answer: Running through another person's garbage for discarded document, information and other various items that could be used against that person or company. Dumpster diving is done with malicious intent. A synonym for Dumpster Diving is Data Scavenging.

The following answers are incorrect:

Going through dust bin will not give you access to sensitive information. It was not the best choice. Performing forensics on the deleted items is related to data remanence which means files were not destroyed properly and they can be recovered using specialized tools.

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Performing media analysis is not related to going through rubbish in a dumpster.

The following reference(s) were/was used to create this question:

CISSP Summary 2002 by John Wallhoff

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### QUESTION 478

You wish to make use of "port knocking" technologies. How can you BEST explain this?

- A. Port knocking is where the client will attempt to connect to a predefined set of ports to identify him as an authorized client.
- B. Port knocking is where the user calls the server operator to have him start the service he wants to connect to.
- C. This is where all the ports are open on the server and the connecting client scans the open port to which he wants to connect to see if it's open and running.
- D. Port knocking is where the port sequence is encrypted with 3DES and only the server has the other key to decrypt the port sequence.

Answer: A

Explanation: The

Answer: Port knocking is where the client will attempt to connect to a predefined set of ports to identify him as an authorized client. The port knocking sequence is used to identify the client as a legitimate user.

The other answers are incorrect

The following reference(s) were/was used to create this question:

<http://www.portknocking.org/>

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### QUESTION 479

You are part of a security staff at a highly profitable bank and each day, all traffic on the network is logged for later review. Every Friday when major deposits are made you're seeing a series of bits placed in the "Urgent Pointer" field of a TCP packet. This is only 16 bits which isn't much but it concerns you because:

- A. This could be a sign of covert channeling in bank network communications and should be investigated.
- B. It could be a sign of a damaged network cable causing the issue.
- C. It could be a symptom of malfunctioning network card or drivers and the source system should be checked for the problem.
- D. It is normal traffic because sometimes the previous fields 16 bit checksum value can over run into the urgent pointer's 16 bit field causing the condition.

Answer: A

Explanation: The Urgent Pointer is used when some information has to reach the server ASAP. When the TCP/IP stack at the other end sees a packet using the Urgent Pointer set, it is duty bound to stop all ongoing activities and immediately send this packet up the stack for immediate processing. Since the packet is plucked out of the processing queue and acted upon immediately,

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it is known as an Out Of Band (OOB) packet and the data is called Out Of Band (OOB) data. The Urgent Pointer is usually used in Telnet, where an immediate response (e.g. the echoing of characters) is desirable.

Covert Channels are not directly synonymous with backdoors. A covert channel is simply using a communication protocol in a way it was not intended to be used or sending data without going through the proper access control mechanisms or channels. For example, in a Mandatory Access Control systems a user at secret has found a way to communicate information to a user at Confidential without going through the normal channels.

In this case the Urgent bit could be used for a few reasons:

1. It could be used to attempt a Denial of service where the host receiving a packet with the Urgent bit set will give immediate attention to the request and will be in wait state until the urgent message is received, if the sender does not send the urgent message then it will simply sit there doing nothing until it times out. Some of the TCP/IP stacks used to have a 600 seconds time out, which means that for 10 minutes nobody could use the port. By sending thousands of packets with the URGENT flag set, it would create a very effective denial of service attack.
2. It could be used as a client server application to transmit data back and forward without going through the proper channels. It would be slow but it is possible to use reserved fields and bits to transmit data outside the normal communication channels.

The other answers are incorrect

The following reference(s) were/was used to create this question:

<http://www.vijaymukhi.com/vmis/tcp.htm>

and

<http://www.fas.org/irp/nsa/rainbow/tg030.htm> document covering the subject of covert channels  
and also see:

<http://gray-world.net/papers.shtml> which is a large collection of documents on Covert Channels

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### QUESTION 480

What would you call the process that takes advantage of the security provided by a transmission protocol by carrying one protocol over another?

- A. Piggy Backing
- B. Steganography
- C. Tunneling
- D. Concealing

Answer: C

Explanation: Computer networks use a tunneling protocol when one network protocol (the delivery protocol) encapsulates a different payload protocol. By using tunneling one can (for example) carry a payload over an incompatible delivery-network, or provide a secure path through an untrusted network.

Tunneling typically contrasts with a layered protocol model such as those of OSI or TCP/IP. The delivery protocol usually (but not always) operates at a higher level in the model than does the payload protocol, or at the same level.

To understand a particular protocol stack, network engineers must understand both the payload and delivery protocol sets.

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As an example of network layer over network layer, Generic Routing Encapsulation (GRE), a protocol running over IP (IP Protocol Number 47), often serves to carry IP packets, with RFC 1918 private addresses, over the Internet using delivery packets with public IP addresses. In this case, the delivery and payload protocols are compatible, but the payload addresses are incompatible with those of the delivery network.

#### Secure Shell tunneling

A Secure Shell (SSH) tunnel consists of an encrypted tunnel created through a SSH protocol connection. Users may set up SSH tunnels to transfer unencrypted traffic over a network through an encrypted channel. For example, Windows machines can share files using the Server Message Block (SMB) protocol, a non-encrypted protocol. If one were to mount a Microsoft Windows filesystem remotely through the Internet, someone snooping on the connection could see transferred files. To mount the Windows file-system securely, one can establish an SSH tunnel that routes all SMB traffic to the remote fileserver through an encrypted channel. Even though the SMB protocol itself contains no encryption, the encrypted SSH channel through which it travels offers security.

#### Tunneling to circumvent firewall policy

Users can also use tunneling to "sneak through" a firewall, using a protocol that the firewall would normally block, but "wrapped" inside a protocol that the firewall does not block, such as HTTP. If the firewall policy does not specifically exclude this kind of "wrapping", this trick can function to get around the intended firewall policy.

Another HTTP-based tunneling method uses the HTTP CONNECT method/command. A client issues the HTTP CONNECT command to a HTTP proxy. The proxy then makes a TCP connection to a particular server:port, and relays data between that server:port and the client connection. Because this creates a security hole, CONNECT-capable HTTP proxies commonly restrict access to the CONNECT method. The proxy allows access only to a whitelist of specific authorized servers.

The following answers are incorrect:

#### Piggy Backing

In security, piggybacking refers to when a person tags along with another person who is authorized to gain entry into a restricted area, or pass a certain. The act may be legal or illegal, authorized or unauthorized, depending on the circumstances. However, the term more often has the connotation of being an illegal or unauthorized act.

To describe the act of an unauthorized person who follows someone to a restricted area without the consent of the authorized person, the term tailgating is also used. "Tailgating" implies without consent (similar to a car tailgating another vehicle on the freeway), while "piggybacking" usually implies consent of the authorized person.

Piggybacking came to the public's attention particularly in 1999, when a series of weaknesses were exposed in airport security. While a study showed that the majority of undercover agents attempting to pass through checkpoints, bring banned items on planes, or board planes without tickets were successful, piggybacking was revealed as one of the methods that was used in order to enter off-limits areas.

#### Steganography

Steganography is the art and science of writing hidden messages in such a way that no one, apart from the sender and intended recipient, suspects the existence of the message, a form of security through obscurity. The word steganography is of Greek origin and means "concealed writing" from the Greek words steganos () meaning "covered or protected", and graphein () meaning "to write".

The first recorded use of the term was in 1499 by Johannes Tritheimius in his Steganographia, a

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treatise on cryptography and steganography disguised as a book on magic. Generally, messages will appear to be something else: images, articles, shopping lists, or some other covertext and, classically, the hidden message may be in invisible ink between the visible lines of a private letter. The advantage of steganography, over cryptography alone, is that messages do not attract attention to themselves. Plainly visible encrypted messages—no matter how unbreakable—will arouse suspicion, and may in themselves be incriminating in countries where encryption is illegal. Therefore, whereas cryptography protects the contents of a message, steganography can be said to protect both messages and communicating parties.

Steganography includes the concealment of information within computer files. In digital steganography, electronic communications may include steganographic coding inside of a transport layer, such as a document file, image file, program or protocol. Media files are ideal for steganographic transmission because of their large size. As a simple example, a sender might start with an innocuous image file and adjust the color of every 100th pixel to correspond to a letter in the alphabet, a change so subtle that someone not specifically looking for it is unlikely to notice it.

#### Concealing

Concealment (also called absconderence or hiding) is obscuring something from view or rendering it inconspicuous, the opposite of exposure. A military term is CCD: camouflage (object looks like its surroundings), concealment (object cannot be seen), and deception (object looks like something else); in a broad sense, all three are forms of concealment.

The objective of hiding is often to keep the presence of an object or person secret, but in other cases not the presence is a secret, but only the location.

The following reference(s) were/was used to create this question:

Ethical Hacking Countermeasures v6.1

Ethical Hacking Countermeasures v7.0

Introduction to Ethical hacking

[http://en.wikipedia.org/wiki/Tunneling\\_protocol](http://en.wikipedia.org/wiki/Tunneling_protocol)

<http://en.wikipedia.org/wiki/Steganography>

[http://en.wikipedia.org/wiki/Piggybacking\\_%28security%29](http://en.wikipedia.org/wiki/Piggybacking_%28security%29)

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### QUESTION 481

At which OSI layer does SSL reside in?

- A. Application
- B. Session
- C. Transport
- D. Network

Answer: C

Explanation:

The following answers are incorrect:

Application - SSL resides in the transport layer.

Session - While SSL does straddle both the session and transport layers, for exam purposes, choose transport.

Network - SSL resides in the transport layer.

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The following reference(s) were/was used to create this question:  
All In One CISSP Exam guide by Shon Harris, Chapter 7, pg 493

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**QUESTION 482**

What is the BEST answer pertaining to the difference between the Session and Transport layers of the OSI model?

- A. The Session layer sets up communication between protocols, while the Transport layer sets up connections between computer systems.
- B. The Transport layer sets up communication between computer systems, while the Session layer sets up connections between applications.
- C. The Session layer sets up communication between computer systems, while the Transport layer sets up connections between protocols.
- D. The Transport layer sets up communication between applications, while the Session layer sets up connections between computer systems.

Answer: B

Explanation: The following answers are incorrect:

The Session layer sets up communication between protocols, while the Transport layer sets up connections between computer systems.

The Session layer sets up communication between computer systems, while the Transport layer sets up connections between protocols.

The Transport layer sets up communication between applications, while the Session layer sets up connections between computer systems.

The following reference(s) were/was used to create this question:

All In One CISSP Exam guide by Shon Harris, Chapter 7, pg 492

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**QUESTION 483**

Which of the following protocols offers native encryption?

- A. IPSEC, SSH, PPTP, SSL, MPLS, L2F, and L2TP
- B. IPSEC, SSH, SSL, TFTP
- C. IPSEC, SSH, SSL, TLS
- D. IPSEC, SSH, PPTP, SSL, MPLS, and L2TP

Answer: C

Explanation: The following answers are incorrect:

IPSEC, SSH, PPTP, SSL, MPLS, and L2TP is incorrect because L2TP and PPTP does NOT offer encryption.

IPSEC, SSH, SSL, TFTP is incorrect because TFTP does not offer encryption.

IPSEC, SSH, PPTP, SSL, MPLS, L2F, and L2TP is incorrect because MPLS, L2F, and L2TP do NOT offer encryption.

NOTE:

PPTP did not provide Encryption natively. It is MPPE from Microsoft that would provide encryption.

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MPPE is an encryption technology developed by Microsoft to encrypt point-to-point links. These PPP connections can be over a dialup line or over a VPN tunnel. MPPE works as a subfeature of Microsoft Point-to-Point Compression (MPPC)

MPPC is a scheme used to compress PPP packets between client devices. The MPPC algorithm is designed to optimize bandwidth utilization in order to support multiple simultaneous connections.

MPPE is negotiated using bits in the MPPC option within the Compression Control Protocol (CCP) MPPC configuration option (CCP configuration option number 18).

MPPE uses the RC4 algorithm with either 40- or 128-bit keys. All keys are derived from the cleartext authentication password of the user. RC4 is stream cipher; therefore, the sizes of the encrypted and decrypted frames are the same size as the original frame. The Cisco implementation of MPPE is fully interoperable with that of Microsoft and uses all available options, including historyless mode. Historyless mode can increase throughput in lossy environments such as VPNs, because neither side needs to send CCP Resets Requests to synchronize encryption contexts when packets are lost.

The following reference(s) were/was used to create this question:

Official (ISC)2 Guide to the CISSP CBK, Third Edition , pages 874 and 355 (IPSEC), 360 (SSH), 359 (PPTP), 362 (SSL), 361 (SOCKS), 360 (L2TP).

and

[http://www.cisco.com/en/US/products/ps6587/products\\_white\\_paper09186a008019bf38.shtml#15190](http://www.cisco.com/en/US/products/ps6587/products_white_paper09186a008019bf38.shtml#15190)

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### QUESTION 484

Of the following, which multiple access method for computer networks does 802.11 Wireless Local Area Network use?

- A. CSMA/CA
- B. CSMA/CD
- C. 802.11 Doesn't support multiple access methods
- D. 802.11 RTS/CTS Exchange

Answer: A

Explanation: Back in the time when network hubs were commonly used in networks all sent packets were received by all stations but only the intended destination MAC address was supposed to listen. (Sniffers respond to all destination MAC addresses and can save those packets for examination.) Hub did not provide for any security or privacy.

Hub networks turned out not to be scalable because of the high amount of frame collisions on the network as the number of nodes and the amount of traffic would increase. Collisions are where two stations speak on the wire at the same time and both frames being sent are damaged and must be re-transmitted.

Wireless networks are like hub networks because all stations "see" all traffic sent on the wire. This situation is mitigated by the CSMA/CA access method. With CSMA/CA the node wishing to send listens to the network to see if anybody is transmitting and if they are they will wait. Otherwise they send their traffic.

CSMA/CA (Carrier Sense Multiple Access/Collision Avoidance) is a protocol for carrier

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transmission in 802.11 networks. Unlike CSMA/CD (Carrier Sense Multiple Access/Collision Detect) which deals with transmissions after a collision has occurred, CSMA/CA acts to prevent collisions before they happen.

In CSMA/CA, as soon as a node receives a packet that is to be sent, it checks to be sure the channel is clear (no other node is transmitting at the time). If the channel is clear, then the packet is sent. If the channel is not clear, the node waits for a randomly chosen period of time, and then checks again to see if the channel is clear. This period of time is called the backoff factor, and is counted down by a backoff counter. If the channel is clear when the backoff counter reaches zero, the node transmits the packet. If the channel is not clear when the backoff counter reaches zero, the backoff factor is set again, and the process is repeated.

The following answers are incorrect:

CSMA/CD: CSMA/CD doesn't support wireless networks well due to the problem of latency and "hidden nodes" are not visible to other nodes but are visible to the AP - Access Point. This means that Collision Detection won't work because control frames won't be received. This is used only on wired networks.

Carrier Sense Multiple Access/Collision Detect (CSMA/CD) is the protocol for carrier transmission access in Ethernet networks. On Ethernet, any device can try to send a frame at any time. Each device senses whether the line is idle and therefore available to be used. If it is, the device begins to transmit its first frame. If another device has tried to send at the same time, a collision is said to occur and the frames are discarded. Each device then waits a random amount of time and retries until successful in getting its transmission sent. CSMA/CD is specified in the IEEE 802.3 standard. 802.11 Doesn't support multiple access methods: This isn't correct. 802.11 wireless supports multiple access to the wireless medium using CSMA/CA.

802.11 RTS/CTS Exchange: This isn't an access control method, rather they're supplemental packets to CSMA/CA where nodes request to send (RTS) clear to send (CTS) Packets exchanged by nodes to enhance signaling.

The following reference(s) were/was used to create this question:

CEH - Certified Ethical Hacker: Sybex, Kimberly Graves - Wiley Publishing, INC 2010

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## QUESTION 485

Layer 2 of the OSI model has two sublayers. What are those sublayers, and what are two IEEE standards that describe technologies at that layer?

- A. LCL and MAC; IEEE 802.2 and 802.3
- B. LCL and MAC; IEEE 802.1 and 802.3
- C. Network and MAC; IEEE 802.1 and 802.3
- D. LLC and MAC; IEEE 802.2 and 802.3

Answer: D

Explanation: The data link layer, or Layer 2, of the OSI model is responsible for adding a header and a trailer to a packet to prepare the packet for the local area network or wide area network technology binary format for proper line transmission.

Layer 2 is divided into two functional sublayers.

The upper sublayer is the Logical Link Control (LLC) and is defined in the IEEE 802.2 specification. It communicates with the network layer, which is immediately above the data link

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layer.

Below the LLC is the Media Access Control (MAC) sublayer, which specifies the interface with the protocol requirements of the physical layer.

Thus, the specification for this layer depends on the technology of the physical layer.

The IEEE MAC specification for Ethernet is 802.3, Token Ring is 802.5, wireless LAN is 802.11, and so on. When you see a reference to an IEEE standard, such as 802.11 or 802.16, it refers to the protocol working at the MAC sublayer of the data link layer of the protocol stack.

The following answers are incorrect:

LCL and MAC; IEEE 802.2 and 802.3 is incorrect because LCL is a distracter. The correct acronym for the upper sublayer of the data link layer is LLC. It stands for the Logical Link Control. By providing multiplexing and flow control mechanisms, the LLC enables the coexistence of network protocols within a multipoint network and their transportation over the same network media.

LCL and MAC; IEEE 802.1 and 802.3 is incorrect because LCL is a distracter. The sublayers of the data link layer are the Logical Link Control (LLC) and the Media Access Control (MAC). Furthermore, the LLC is defined in the IEEE 802.2 specification, not 802.1. The IEEE 802.1 specifications are concerned with protocol layers above the MAC and LLC layers. It addresses LAN/MAN architecture, network management, internetworking between LANs and WANs, and link security, etc.

Network and MAC; IEEE 802.1 and 802.3 is incorrect because network is not a sublayer of the data link layer. The sublayers of the data link layer are the Logical Link Control (LLC) and the Media Access Control (MAC). The LLC sits between the network layer (the layer immediately above the data link layer) and the MAC sublayer. Also, the LLC is defined in the IEEE 802.2 specification, not IEEE 802.1. As just explained, 802.1 standards address areas of LAN/MAN architecture, network management, internetworking between LANs and WANs, and link security. The IEEE 802.1 group's four active task groups are Internetworking, Security, Audio/Video Bridging, and Data Center Bridging.

The following reference(s) were/was used to create this question:

[http://en.wikipedia.org/wiki/OSI\\_model](http://en.wikipedia.org/wiki/OSI_model)

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### QUESTION 486

Which type of attack involves the altering of a systems Address Resolution Protocol (ARP) table so that it contains incorrect IP to MAC address mappings?

- A. Reverse ARP
- B. Poisoning ARP cache
- C. ARP table poisoning
- D. Reverse ARP table poisoning

Answer: C

Explanation: ARP table poisoning, also referred to as ARP cache poisoning, is the process of altering a system's ARP table so that it contains incorrect IP to MAC address mappings. This allows requests to be sent to a different device instead of the one it is actually intended for. It is an excellent way to fool systems into thinking that a certain device has a certain address so that information can be sent to and captured on an attacker's computer.

The following answers are incorrect:

"Reverse ARP" is the process of determining what an IP address is from a known MAC address  
"Poisoning ARP cache" This is not the correct term.  
"Reverse ARP table poisoning" There is no attack that goes by that name.

The following reference(s) were/was used to create this question:

TestPrep Certified Information Systems Security Professional (CISSP) Skillsoft Course

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### QUESTION 487

What is the three way handshake sequence used to initiate TCP connections?

- A. ACK, SYN/ACK, ACK
- B. SYN, SYN/ACK, ACK
- C. SYN, SYN, ACK/ACK
- D. ACK, SYN/ACK, SYN

Answer: B

Explanation: The TCP three way handshake:

1. First, the client sends a SYN segment. This is a request to the server to synchronize the sequence numbers. It specifies its initial sequence number (ISN), which is incremented by 1, and that is sent to the server. To initialize a connection, the client and server must synchronize each other's sequence numbers.
2. Second, the server sends an ACK and a SYN in order to acknowledge the request of the client for synchronization. At the same time, the server is also sending its request to the client for synchronization of its sequence numbers. There is one major difference in this transmission from the first one. The server transmits an acknowledgement number to the client. The acknowledgement is just proof to the client that the ACK is specific to the SYN the client initiated. The process of acknowledging the client's request allows the server to increment the client's sequence number by one and uses it as its acknowledgement number.
3. Third, the client sends an ACK in order to acknowledge the request from the server for synchronization. The client uses the same algorithm the server implemented in providing an acknowledgement number. The client's acknowledgment of the server's request for synchronization completes the process of establishing a reliable connection.

The following answers are incorrect:

All of the other choices were incorrect answers

The following reference(s) were/was used to create this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press (Kindle Locations 5560-5573). Auerbach Publications. Kindle Edition.

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### QUESTION 488

You are using an open source packet analyzer called Wireshark and are sifting through the various conversations to see if anything appears to be out of order.

You are observing a UDP conversation between a host and a router. It was a file transfer between the two on port 69. What protocol was used here to conduct the file transfer?

- A. TFTP

- B. SFTP
- C. FTP
- D. SCP

Answer: A

Explanation: Discussion: TFTP is a curious protocol that doesn't use authentication and is often used to transfer configuration files between an administrator's computer and switch or router. The admin's computer would have the TFTP server software installed on it and he would SSH into the router and run a command that instructs the router to get its configuration from a TFTP server like this:

```
#copy running-config tftp
```

The router would request the IP or name of the host from where to get the config and the name of the config file. It would then be copied down into the running-config (RAM) on the router. This is how wireshark could have seen the file transfer.

It is advisable that you use a more secure means to transfer router configuration files because of their sensitive nature. SCP or Secure Copy can be used on most mainstream routing and switching devices.

The following answers are incorrect:

- SFTP: This isn't correct because SFTP uses TCP and is on port 22.
- FTP: This is not the right answer because FTP uses TCP and ordinarily uses ports 20/21.
- SCP: Good guess but SCP doesn't use UDP or port 69 and even if you did 'see' a file transfer between SCP hosts you wouldn't see the contents of the packets because they're encrypted.

Sorry. Here's more about SCP.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

TFTP

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### QUESTION 489

What sort of attack is described by the following: An attacker has a list of broadcast addresses which it stores into an array, the attacker sends a spoofed icmp echo request to each of those addresses in series and starts again. The spoofed IP address used by the attacker as the source of the packets is the target/victim IP address.

- A. Smurf Attack
- B. Fragle Attack
- C. LAND Attack
- D. Replay Attack

Answer: A

Explanation: The Smurf Attack is a denial-of-service attack in which large numbers of Internet Control Message Protocol (ICMP) packets with the intended victim's spoofed source IP are broadcast to a computer network using an IP Broadcast address.

Most devices on a network will, in their default settings, respond to this by sending a reply to the source IP address. If the number of machines on the network that receive and respond to these

packets is very large, the victim's computer will be flooded with traffic. This can slow down the victim's computer to the point where it becomes impossible to work on.

The name Smurf comes from the file "smurf.c", the source code of the attack program, which was released in 1997 by TFreak.

The author describes the attack as:

The `smurf' attack is quite simple. It has a list of broadcast addresses which it stores into an array, and sends a spoofed icmp echo request to each of those addresses in series and starts again.

The result is a devastating attack upon the spoofed ip with, depending on the amount of broadcast addresses used, many, many computers responding to the echo request.

Mitigation:

- Best method for mitigating this threat is to control access to the physical network infrastructure. If the attacker can't send the attack, this attack will obviously not work.
- Currently the preferred method for controlling access to the network is by using 802.1X - Certificate security.
- Also, modern operating systems don't usually permit a PING to a broadcast address and just returns an error message if you try.

The following answers are incorrect:

- Fragle Attack: Close but not quite right. A Fragle attack uses UDP rather than the ICMP that Smurf Attack uses.
- LAND Attack: Sorry, not correct. A LAND attack is simply a series of packets sent to the target where the source and destination IP Addresses are the same as the victim.
- Replay Attack: This isn't an attack that takes advantage of a system vulnerability so it isn't the correct answer.

The following reference(s) was used to create this question:

[http://en.wikipedia.org/wiki/Smurf\\_attack](http://en.wikipedia.org/wiki/Smurf_attack)

and

<http://searchsecurity.techtarget.com/answer/What-is-a-land-attack>

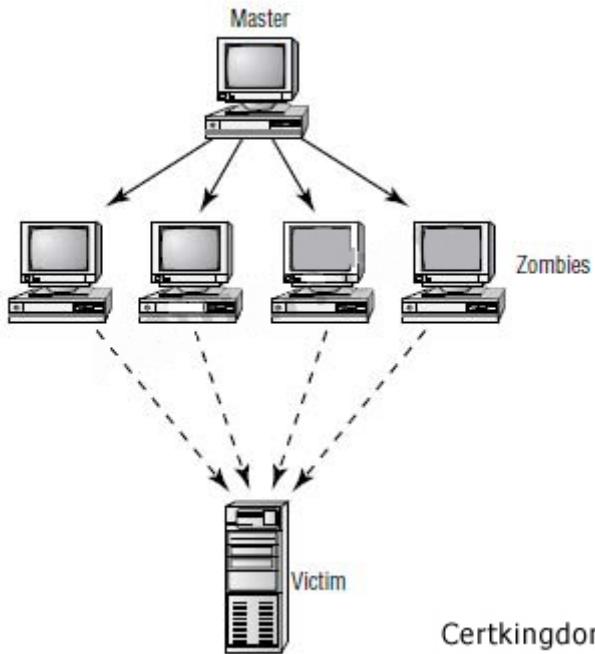
and

<http://www.phreak.org/archives/exploits/denial/smurf.c>

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## QUESTION 490

View the image below and identify the attack



- A. DDoS
- B. DOS
- C. TFN
- D. Reflection Attack

Answer: A

Explanation: The easiest attack to carry out against a network, or so it may seem, is to overload it through excessive traffic or traffic which has been “crafted” to confuse the network into shutting down or slowing to the point of uselessness.

The image depicts a distributed denial of service attack where many computers attack the victim with any type of traffic and render it unable to communicate on the network or provide services. Computers on networks can provide services to other computers. The servers listen on specific TCP or UDP ports and software opens the ports on the server to accept traffic from visitors. Most users of the services on that server behave normally but at times attackers try to attack and take down the server by attacking its services or the operating system via the protocol stack itself. In the case of this question, the victim is being bounded with service requests from the zombies. Commonly it's UDP but more often it can be TCP traffic and unfortunately it is nearly impossible to defeat such an attack.

You might compare this attack to calling someone over and over on their phone that they can't use their own phone but you're not doing anything specifically destructive to the phone. You're just exhausting its resources rendering it useless to the owner.

The following answers are incorrect:

- DOS - Denial of Service: This is almost correct but it is wrong because a simple DOS attack is one computer flooding another computer, not the many to one attack you see with a DDoS.
- TFN - Tribe Flood Network attack: This isn't the correct answer because it isn't specifically what's depicted in the image. TFN is actually software used to conduct DDoS attacks and NOT an attack

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itself. More here.

- Reflection Attack: This isn't the correct answer because a reflection attack is an attack on authentication systems which use the same protocol in both directions and doesn't ordinarily involve zombies.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press (Kindle Locations 8494-8495). Auerbach Publications. Kindle Edition.

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### QUESTION 491

How many bits is the address space reserved for the source IP address within an IPv6 header?

- A. 128
- B. 32
- C. 64
- D. 256

Answer: A

Explanation: Discussion: An IPv6 address space is 128 bits or:

$$2^{128} = 340,282,366,920,938,463,463,374,607,431,768,211,456$$

When IPv4 was conceived in the late 1970s they thought that we would never need 4.3 Billion addresses but we ran out of them years ago. It is not likely that we will ever run out of addresses any time soon with numbers like those.

We've gotten by with IPv4 by using NAT - Network Address Translation where private IP Addresses are used by a single or a few externally routable IP Addresses.

Unfortunately, early on companies were given huge blocks of address spaces like class A networks with 224 or 16,777,216 addresses even when only a small handful were used within the company. Also, 127.0.0.0 loopback wasted as many.

IPv6 addresses are written in 8 groups of 4 hexadecimal digits separated by colons like this:

2001:0db8:85a3:0000:0000:8a2e:0370:7334

What is an IPv6 Header?

An Internet Protocol version 6 (IPv6) data packet comprises of two main parts: the header and the payload. The first 40 bytes/octets ( $40 \times 8 = 320$  bits) of an IPv6 packet comprise of the header (see Figure 1) that contains the following fields:

IPv6

Source address (128 bits) The 128-bit source address field contains the IPv6 address of the originating node of the packet. It is the address of the originator of the IPv6 packet.

Destination address (128 bits) The 128-bit contains the destination address of the recipient node of the IPv6 packet. It is the address of the intended recipient of the IPv6 packet.

Version/IP version (4-bits) The 4-bit version field contains the number 6. It indicates the version of the IPv6 protocol. This field is the same size as the IPv4 version field that contains the number 4.

However, this field has a limited use because IPv4 and IPv6 packets are not distinguished based on the value in the version field but by the protocol type present in the layer 2 envelope.

Packet priority/Traffic class (8 bits) The 8-bit Priority field in the IPv6 header can assume different

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values to enable the source node to differentiate between the packets generated by it by associating different delivery priorities to them. This field is subsequently used by the originating node and the routers to identify the data packets that belong to the same traffic class and distinguish between packets with different priorities.

**Flow Label/QoS management (20 bits)** The 20-bit flow label field in the IPv6 header can be used by a source to label a set of packets belonging to the same flow. A flow is uniquely identified by the combination of the source address and of a non-zero Flow label. Multiple active flows may exist from a source to a destination as well as traffic that are not associated with any flow (Flow label = 0).

The IPv6 routers must handle the packets belonging to the same flow in a similar fashion. The information on handling of IPv6 data packets belonging to a given flow may be specified within the data packets themselves or it may be conveyed by a control protocol such as the RSVP (Resource reSerVation Protocol).

When routers receive the first packet of a new flow, they can process the information carried by the IPv6 header, Routing header, and Hop-by-Hop extension headers, and store the result (e.g. determining the retransmission of specific IPv6 data packets) in a cache memory and use the result to route all other packets belonging to the same flow (having the same source address and the same Flow Label), by using the data stored in the cache memory.

**Payload length in bytes(16 bits)** The 16-bit payload length field contains the length of the data field in octets/bits following the IPv6 packet header. The 16-bit Payload length field puts an upper limit on the maximum packet payload to 64 kilobytes. In case a higher packet payload is required, a Jumbo payload extension header is provided in the IPv6 protocol. A Jumbo payload (Jumbogram) is indicated by the value zero in the Payload Length field. Jumbograms are frequently used in supercomputer communication using the IPv6 protocol to transmit heavy data payload.

**Next Header (8 bits)** The 8-bit Next Header field identifies the type of header immediately following the IPv6 header and located at the beginning of the data field (payload) of the IPv6 packet. This field usually specifies the transport layer protocol used by a packet's payload. The two most common kinds of Next Headers are TCP (6) and UDP (17), but many other headers are also possible. The format adopted for this field is the one proposed for IPv4 by RFC 1700. In case of IPv6 protocol, the Next Header field is similar to the IPv4 Protocol field.

**Time To Live (TTL)/Hop Limit (8 bits)** The 8-bit Hop Limit field is decremented by one, by each node (typically a router) that forwards a packet. If the Hop Limit field is decremented to zero, the packet is discarded. The main function of this field is to identify and to discard packets that are stuck in an indefinite loop due to any routing information errors. The 8-bit field also puts an upper limit on the maximum number of links between two IPv6 nodes. In this way, an IPv6 data packet is allowed a maximum of 255 hops before it is eventually discarded. An IPv6 data packet can pass through a maximum of 254 routers before being discarded.

In case of IPv6 protocol, the fields for handling fragmentation do not form a part of the basic header. They are put into a separate extension header. Moreover, fragmentation is exclusively handled by the sending host. Routers are not employed in the Fragmentation process.

For further details, please see RFC 2460 - Internet Protocol, Version 6 (IPv6) Specification.

The following answers are incorrect:

- 32: This answer would be right if the question was about IPv4 but it isn't so the answer is wrong.
- 32 Bits yields 4,294,967,296 unique IP Address and considering the RFC for that was released in 1981, IPv4 has proven to have a remarkable lifespan. After more than 30 years and the huge growth the internet it's no wonder its lifespan is coming to an end.

- 64: This is only half the size of an IPv6 header address space so this isn't correct. 64 Bits would yield a huge number of addresses which probably would have been enough but designers wanted to be sure to never ever run out of addresses on planet earth with 128-bit address spaces in IPv6.
- 256: This isn't correct because 256 is twice the size of an IPv6 address size, far to many addresses necessary at this or any other point in time.

The following reference(s) was used to create this question:

Gregg, Michael; Haines, Billy (2012-02-16). CASP: CompTIA Advanced Security Practitioner Study Guide Authorized Courseware: Exam CAS-001 (p. 53). Wiley. Kindle Edition.

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### QUESTION 492

Which of the following service is a distributed database that translates host name to IP address to IP address to host name?

- A. DNS
- B. FTP
- C. SSH
- D. SMTP

Answer: A

Explanation: The Domain Name System (DNS) is a hierarchical distributed naming system for computers, services, or any resource connected to the Internet or a private network. It associates information from domain names with each of the assigned entities. Most prominently, it translates easily memorized domain names to the numerical IP addresses needed for locating computer services and devices worldwide. The Domain Name System is an essential component of the functionality of the Internet. This article presents a functional description of the Domain Name System.

For your exam you should know below information general Internet terminology:

Network access point - Internet service providers access internet using net access point.A Network Access Point (NAP) was a public network exchange facility where Internet service providers (ISPs) connected with one another in peering arrangements. The NAPs were a key component in the transition from the 1990s NSFNET era (when many networks were government sponsored and commercial traffic was prohibited) to the commercial Internet providers of today. They were often points of considerable Internet congestion.

Internet Service Provider (ISP) - An Internet service provider (ISP) is an organization that provides services for accessing, using, or participating in the Internet. Internet service providers may be organized in various forms, such as commercial, community-owned, non-profit, or otherwise privately owned. Internet services typically provided by ISPs include Internet access, Internet transit, domain name registration, web hosting, co-location.

Telnet or Remote Terminal Control Protocol -A terminal emulation program for TCP/IP networks such as the Internet. The Telnet program runs on your computer and connects your PC to a server on the network. You can then enter commands through the Telnet program and they will be executed as if you were entering them directly on the server console. This enables you to control the server and communicate with other servers on the network. To start a Telnet session, you must log in to a server by entering a valid username and password. Telnet is a common way to remotely control Web servers.

Internet Link- Internet link is a connection between Internet users and the Internet service provider. Secure Shell or Secure Socket Shell (SSH) - Secure Shell (SSH), sometimes known as Secure Socket Shell, is a UNIX-based command interface and protocol for securely getting access to a remote computer. It is widely used by network administrators to control Web and other kinds of servers remotely. SSH is actually a suite of three utilities - slogin, ssh, and scp - that are secure versions of the earlier UNIX utilities, rlogin, rsh, and rcp. SSH commands are encrypted and secure in several ways. Both ends of the client/server connection are authenticated using a digital certificate, and passwords are protected by being encrypted.

Domain Name System (DNS) - The Domain Name System (DNS) is a hierarchical distributed naming system for computers, services, or any resource connected to the Internet or a private network. It associates information from domain names with each of the assigned entities. Most prominently, it translates easily memorized domain names to the numerical IP addresses needed for locating computer services and devices worldwide. The Domain Name System is an essential component of the functionality of the Internet. This article presents a functional description of the Domain Name System.

File Transfer Protocol (FTP) - The File Transfer Protocol or FTP is a client/server application that is used to move files from one system to another. The client connects to the FTP server, authenticates and is given access that the server is configured to permit. FTP servers can also be configured to allow anonymous access by logging in with an email address but no password. Once connected, the client may move around between directories with commands available

Simple Mail Transport Protocol (SMTP) - SMTP (Simple Mail Transfer Protocol) is a TCP/IP protocol used in sending and receiving e-mail. However, since it is limited in its ability to queue messages at the receiving end, it is usually used with one of two other protocols, POP3 or IMAP, that let the user save messages in a server mailbox and download them periodically from the server. In other words, users typically use a program that uses SMTP for sending e-mail and either POP3 or IMAP for receiving e-mail. On Unix-based systems, send mail is the most widely-used SMTP server for e-mail. A commercial package, Send mail, includes a POP3 server. Microsoft Exchange includes an SMTP server and can also be set up to include POP3 support.

The following answers are incorrect:

SMTP - Simple Mail Transport Protocol (SMTP) - SMTP (Simple Mail Transfer Protocol) is a TCP/IP protocol used in sending and receiving e-mail. However, since it is limited in its ability to queue messages at the receiving end, it is usually used with one of two other protocols, POP3 or IMAP, that let the user save messages in a server mailbox and download them periodically from the server. In other words, users typically use a program that uses SMTP for sending e-mail and either POP3 or IMAP for receiving e-mail. On Unix-based systems, send mail is the most widelyused SMTP server for e-mail. A commercial package, Send mail, includes a POP3 server.

Microsoft Exchange includes an SMTP server and can also be set up to include POP3 support.

FTP - The File Transfer Protocol or FTP is a client/server application that is used to move files from one system to another. The client connects to the FTP server, authenticates and is given access that the server is configured to permit. FTP servers can also be configured to allow anonymous access by logging in with an email address but no password. Once connected, the client may move around between directories with commands available

SSH - Secure Shell (SSH), sometimes known as Secure Socket Shell, is a UNIX-based command interface and protocol for securely getting access to a remote computer. It is widely used by network administrators to control Web and other kinds of servers remotely. SSH is actually a suite of three utilities - slogin, ssh, and scp - that are secure versions of the earlier UNIX utilities, rlogin,

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rsh, and rcp. SSH commands are encrypted and secure in several ways. Both ends of the client/server connection are authenticated using a digital certificate, and passwords are protected by being encrypted.

The following reference(s) were/was used to create this question:

CISA review manual 2014 page number 273 and 274

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### QUESTION 493

Which of the following attack is MOSTLY performed by an attacker to steal the identity information of a user such as credit card number, passwords,etc?

- A. Smurf attack
- B. Traffic analysis
- C. Pharming
- D. Interrupt attack

Answer: C

Explanation: Pharming is a cyber attack intended to redirect a website's traffic to another, bogus site. Pharming can be conducted either by changing the hosts file on a victim's computer or by exploitation of a vulnerability in DNS server software. DNS servers are computers responsible for resolving Internet names into their real IP addresses. Compromised DNS servers are sometimes referred to as "poisoned". Pharming requires unprotected access to target a computer, such as altering a customer's home computer, rather than a corporate business server.

The term "pharming" is a neologism based on the words "farming" and "phishing". Phishing is a type of social-engineering attack to obtain access credentials, such as user names and passwords. In recent years, both pharming and phishing have been used to gain information for online identity theft. Pharming has become of major concern to businesses hosting ecommerce and online banking websites. Sophisticated measures known as anti-pharming are required to protect against this serious threat. Antivirus software and spyware removal software cannot protect against pharming.

For your exam you should know the information below:

Phishing is the attempt to acquire sensitive information such as usernames, passwords, and credit card details (and sometimes, indirectly, money) by masquerading as a trustworthy entity in an electronic communication. Communications purporting to be from popular social web sites, auction sites, banks, online payment processors or IT administrators are commonly used to lure unsuspecting public. Phishing emails may contain links to websites that are infected with malware. Phishing is typically carried out by email spoofing or instant messaging, and it often directs users to enter details at a fake website whose look and feel are almost identical to the legitimate one. Phishing is an example of social engineering techniques used to deceive users, and exploits the poor usability of current web security technologies. Attempts to deal with the growing number of reported phishing incidents include legislation, user training, public awareness, and technical security measures.

Spear phishing - Phishing attempts directed at specific individuals or companies have been termed spearphishing. Attackers may gather personal information about their target to increase their probability of success.

Link manipulation

Most methods of phishing use some form of technical deception designed to make a link in an email (and the spoofed website it leads to) appear to belong to the spoofed organization. Misspelled URLs or the use of subdomains are common tricks used by phishers. In the following example URL, <http://www.yourbank.example.com/>, it appears as though the URL will take you to the example section of the yourbank website; actually this URL points to the "yourbank" (i.e. phishing) section of the example website. Another common trick is to make the displayed text for a link (the text between the ahref tags) suggest a reliable destination, when the link actually goes to the phishers' site. The following example link, //en.wikipedia.org/wiki/Genuine, appears to direct the user to an article entitled "Genuine"; clicking on it will in fact take the user to the article entitled "Deception". In the lower left hand corner of most browsers users can preview and verify where the link is going to take them. Hovering your cursor over the link for a couple of seconds may do a similar thing, but this can still be set by the phisher through the HTML tooltip tag.

#### Website forgery

Once a victim visits the phishing website, the deception is not over. Some phishing scams use JavaScript commands in order to alter the address bar. This is done either by placing a picture of a legitimate URL over the address bar, or by closing the original bar and opening up a new one with the legitimate URL.

An attacker can even use flaws in a trusted website's own scripts against the victim. These types of attacks (known as cross-site scripting) are particularly problematic, because they direct the user to sign in at their bank or service's own web page, where everything from the web address to the security certificates appears correct. In reality, the link to the website is crafted to carry out the attack, making it very difficult to spot without specialist knowledge.

The following answers are incorrect:

Smurf Attack – Occurs when mis-configured network device allow packet to be sent to all hosts on a particular network via the broadcast address of the network

Traffic analysis - is the process of intercepting and examining messages in order to deduce information from patterns in communication. It can be performed even when the messages are encrypted and cannot be decrypted. In general, the greater the number of messages observed, or even intercepted and stored, the more can be inferred from the traffic. Traffic analysis can be performed in the context of military intelligence, counter-intelligence, or pattern-of-life analysis, and is a concern in computer security.

Interrupt attack - Interrupt attack occurs when a malicious action is performed by invoking the operating system to execute a particular system call.

Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 323

Official ISC2 guide to CISSP CBK 3rd Edition Page number 326

<http://en.wikipedia.org/wiki/Phishing>

<http://en.wikipedia.org/wiki/Pharming>

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#### QUESTION 494

Which of the following protocol is PRIMARILY used to provide confidentiality in a web based application thus protecting data sent across a client machine and a server?

- A. SSL
- B. FTP
- C. SSH

## D. S/MIME

Answer: A

Explanation: The Secure Socket Layer (SSL) Protocol is primarily used to provide confidentiality to the information sent across clients and servers.

For your exam you should know the information below:

The Secure Sockets Layer (SSL) is a commonly-used protocol for managing the security of a message transmitted over a public network such as the Internet.

SSL has recently been succeeded by Transport Layer Security (TLS), which is based on SSL.

SSL uses a program layer located between the Internet's Hypertext Transfer Protocol (HTTP) and Transport Control Protocol (TCP) layers.

SSL is included as part of both the Microsoft and Netscape browsers and most Web server products.

Developed by Netscape, SSL also gained the support of Microsoft and other Internet client/server developers as well and became the de facto standard until evolving into Transport Layer Security. The "sockets" part of the term refers to the sockets method of passing data back and forth between a client and a server program in a network or between program layers in the same computer. SSL uses the public-and-private key encryption system from RSA, which also includes the use of a digital certificate. Later on SSL uses a Session Key along a Symmetric Cipher for the bulk of the data.

TLS and SSL are an integral part of most Web browsers (clients) and Web servers. If a Web site is on a server that supports SSL, SSL can be enabled and specific Web pages can be identified as requiring SSL access. Any Web server can be enabled by using Netscape's SSLRef program library which can be downloaded for noncommercial use or licensed for commercial use.

TLS and SSL are not interoperable. However, a message sent with TLS can be handled by a client that handles SSL but not TLS.

The SSL handshake

A HTTP-based SSL connection is always initiated by the client using a URL starting with https:// instead of with http://. At the beginning of an SSL session, an SSL handshake is performed. This handshake produces the cryptographic parameters of the session. A simplified overview of how the SSL handshake is processed is shown in the diagram below.

SSL Handshake

Image Reference - [http://publib.boulder.ibm.com/tividd/td/ITAME/SC32-1363-00/en\\_US/HTML/handshak.gif](http://publib.boulder.ibm.com/tividd/td/ITAME/SC32-1363-00/en_US/HTML/handshak.gif)

The client sends a client "hello" message that lists the cryptographic capabilities of the client (sorted in client preference order), such as the version of SSL, the cipher suites supported by the client, and the data compression methods supported by the client. The message also contains a 28-byte random number.

The server responds with a server "hello" message that contains the cryptographic method (cipher suite) and the data compression method selected by the server, the session ID, and another random number.

Note:

The client and the server must support at least one common cipher suite, or else the handshake fails. The server generally chooses the strongest common cipher suite.

The server sends its digital certificate. (In this example, the server uses X.509 V3 digital

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certificates with SSL.)

If the server uses SSL V3, and if the server application (for example, the Web server) requires a digital certificate for client authentication, the server sends a "digital certificate request" message. In the "digital certificate request" message, the server sends a list of the types of digital certificates supported and the distinguished names of acceptable certificate authorities.

The server sends a server "hello done" message and waits for a client response. Upon receipt of the server "hello done" message, the client (the Web browser) verifies the validity of the server's digital certificate and checks that the server's "hello" parameters are acceptable.

If the server requested a client digital certificate, the client sends a digital certificate, or if no suitable digital certificate is available, the client sends a "no digital certificate" alert. This alert is only a warning, but the server application can fail the session if client authentication is mandatory. The client sends a "client key exchange" message. This message contains the pre-master secret, a 46-byte random number used in the generation of the symmetric encryption keys and the message authentication code (MAC) keys, encrypted with the public key of the server.

If the client sent a digital certificate to the server, the client sends a "digital certificate verify" message signed with the client's private key. By verifying the signature of this message, the server can explicitly verify the ownership of the client digital certificate.

Note:

An additional process to verify the server digital certificate is not necessary. If the server does not have the private key that belongs to the digital certificate, it cannot decrypt the pre-master secret and create the correct keys for the symmetric encryption algorithm, and the handshake fails.

The client uses a series of cryptographic operations to convert the pre-master secret into a master secret, from which all key material required for encryption and message authentication is derived. Then the client sends a "change cipher spec" message to make the server switch to the newly negotiated cipher suite. The next message sent by the client (the "finished" message) is the first message encrypted with this cipher method and keys.

The server responds with a "change cipher spec" and a "finished" message of its own.

The SSL handshake ends, and encrypted application data can be sent.

The following answers are incorrect:

FTP - File Transfer Protocol (FTP) is a standard Internet protocol for transmitting files between computers on the Internet. Like the Hypertext Transfer Protocol (HTTP), which transfers displayable Web pages and related files, and the Simple Mail Transfer Protocol (SMTP), which transfers e-mail, FTP is an application protocol that uses the Internet's TCP/IP protocols. FTP is commonly used to transfer Web page files from their creator to the computer that acts as their server for everyone on the Internet. It's also commonly used to download programs and other files to your computer from other servers.

SSH - Secure Shell (SSH) is a cryptographic network protocol for secure data communication, remote command-line login, remote command execution, and other secure network services between two networked computers. It connects, via a secure channel over an insecure network, a server and a client running SSH server and SSH client programs, respectively.

S/MIME - S/MIME (Secure Multi-Purpose Internet Mail Extensions) is a secure method of sending e-mail that uses the Rivest-Shamir-Adleman encryption system. S/MIME is included in the latest versions of the Web browsers from Microsoft and Netscape and has also been endorsed by other vendors that make messaging products. RSA has proposed S/MIME as a standard to the Internet Engineering Task Force (IETF).

Following reference(s) were/was used to create this question:

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CISA review manual 2014 Page number 352

Official ISC2 guide to CISSP CBK 3rd Edition Page number 256

[http://publib.boulder.ibm.com/tividd/td/ITAME/SC32-1363-00/en\\_US/HTML/ss7aumst18.htm](http://publib.boulder.ibm.com/tividd/td/ITAME/SC32-1363-00/en_US/HTML/ss7aumst18.htm)

(Information Security Governance and Risk Management)

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### QUESTION 495

Which one of the following represents an ALE calculation?

- A. single loss expectancy x annualized rate of occurrence.
- B. gross loss expectancy x loss frequency.
- C. actual replacement cost - proceeds of salvage.
- D. asset value x loss expectancy.

Answer: A

Explanation: Single Loss Expectancy (SLE) is the dollar amount that would be lost if there was a loss of an asset. Annualized Rate of Occurrence (ARO) is an estimated possibility of a threat to an asset taking place in one year (for example if there is a chance of a flood occurring once in 10 years the ARO would be .1, and if there was a chance of a flood occurring once in 100 years then the ARO would be .01).

The following answers are incorrect:

gross loss expectancy x loss frequency. Is incorrect because this is a distractor.

actual replacement cost - proceeds of salvage. Is incorrect because this is a distractor.

asset value x loss expectancy. Is incorrect because this is a distractor.

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### QUESTION 496

The control of communications test equipment should be clearly addressed by security policy for which of the following reasons?

- A. Test equipment is easily damaged.
- B. Test equipment can be used to browse information passing on a network.
- C. Test equipment is difficult to replace if lost or stolen.
- D. Test equipment must always be available for the maintenance personnel.

Answer: B

Explanation: Test equipment must be secured. There are equipment and other tools that if in the wrong hands could be used to "sniff" network traffic and also be used to commit fraud. The storage and use of this equipment should be detailed in the security policy for this reason.

The following answers are incorrect:

Test equipment is easily damaged. Is incorrect because it is not the best answer, and from a security point of view not relevant.

Test equipment is difficult to replace if lost or stolen. Is incorrect because it is not the best answer, and from a security point of view not relevant.

Test equipment must always be available for the maintenance personnel. Is incorrect because it is not the best answer, and from a security point of view not relevant.

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**References:**

OIG CBK Operations Security (pages 642 - 643)

**QUESTION 497**

In discretionary access environments, which of the following entities is authorized to grant information access to other people?

- A. Manager
- B. Group Leader
- C. Security Manager
- D. Data Owner

Answer: D

Explanation: In Discretionary Access Control (DAC) environments, the user who creates a file is also considered the owner and has full control over the file including the ability to set permissions for that file.

The following answers are incorrect:

manager. Is incorrect because in Discretionary Access Control (DAC) environments it is the owner/user that is authorized to grant information access to other people.

group leader. Is incorrect because in Discretionary Access Control (DAC) environments it is the owner/user that is authorized to grant information access to other people.

security manager. Is incorrect because in Discretionary Access Control (DAC) environments it is the owner/user that is authorized to grant information access to other people.

**IMPORTANT NOTE:**

The term Data Owner is also used within Classifications as well. Under the subject of classification the Data Owner is a person from management who has been entrusted with a data set that belongs to the company. For example it could be the Chief Financial Officer (CFO) who is entrusted with all of the financial data for a company. As such the CFO would determine the classification of the financial data and who can access as well. The Data Owner would then tell the Data Custodian (a technical person) what the classification and need to know is on the specific set of data.

The term Data Owner under DAC simply means whoever created the file and as the creator of the file the owner has full access and can grant access to other subjects based on their identity.

**QUESTION 498**

Which of the following groups represents the leading source of computer crime losses?

- A. Hackers
- B. Industrial saboteurs
- C. Foreign intelligence officers
- D. Employees

Answer: D

Explanation: There are some conflicting figures as to which group is a bigger threat hackers or

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employees. Employees are still considered to be the leading source of computer crime losses. Employees often have an easier time gaining access to systems or source code than outsiders or other means of creating computer crimes.

A word of caution is necessary: although the media has tended to portray the threat of cybercrime as existing almost exclusively from the outside, external to a company, reality paints a much different picture. Often the greatest risk of cybercrime comes from the inside, namely, criminal insiders. Information security professionals must be particularly sensitive to the phenomena of the criminal or dangerous insider, as these individuals usually operate under the radar, inside of the primarily outward/external facing security controls, thus significantly increasing the impact of their crimes while leaving few, if any, audit trails to follow and evidence for prosecution.

Some of the large scale crimes committed against banks lately has shown that Internal Threats are the worst and they are more common than one would think. The definition of what a hacker is can vary greatly from one country to another but in some of the states in the USA a hacker is defined as Someone who is using resources in a way that is not authorized. A recent case in Ohio involved an internal employee who was spending most of his day on dating websites looking for the love of his life. The employee was taken to court for hacking the company resources.

The following answers are incorrect:

hackers. Is incorrect because while hackers represent a very large problem and both the frequency of attacks and overall losses have grown, hackers are considered to be a small segment of combined computer fraudsters.

industrial saboteurs. Is incorrect because industrial saboteurs tend to go after trade secrets. While the loss to the organization can be great, they still fall short when compared to the losses created by employees. Often it is an employee that was involved in industrial sabotage.

foreign intelligence officers. Is incorrect because the losses tend to be national secrets. You really can't put a cost on this and the number of frequency and occurrences of this is less than that of employee related losses.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press (Kindle Locations 22327-22331). Auerbach Publications. Kindle Edition.

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## QUESTION 499

Which of the following is the best reason for the use of an automated risk analysis tool?

- A. Much of the data gathered during the review cannot be reused for subsequent analysis.
- B. Automated methodologies require minimal training and knowledge of risk analysis.
- C. Most software tools have user interfaces that are easy to use and does not require any training.
- D. Information gathering would be minimized and expedited due to the amount of information already built into the tool.

Answer: D

Explanation: The use of tools simplifies this process. Not only do they usually have a database of assets, threats, and vulnerabilities but they also speed up the entire process.

Using Automated tools for performing a risk assessment can reduce the time it takes to perform them and can simplify the process as well. The better types of these tools include a well-researched threat population and associated statistics. Using one of these tools virtually ensures

that no relevant threat is overlooked, and associated risks are accepted as a consequence of the threat being overlooked.

In most situations, the assessor will turn to the use of a variety of automated tools to assist in the vulnerability assessment process. These tools contain extensive databases of specific known vulnerabilities as well as the ability to analyze system and network configuration information to predict where a particular system might be vulnerable to different types of attacks. There are many different types of tools currently available to address a wide variety of vulnerability assessment needs. Some tools will examine a system from the viewpoint of the network, seeking to determine if a system can be compromised by a remote attacker exploiting available services on a particular host system. These tools will test for open ports listening for connections, known vulnerabilities in common services, and known operating system exploits.

Michael Gregg says:

Automated tools are available that minimize the effort of the manual process. These programs enable users to rerun the analysis with different parameters to answer "what-ifs." They perform calculations quickly and can be used to estimate future expected losses easier than performing the calculations manually.

Shon Harris in her latest book says:

The gathered data can be reused, greatly reducing the time required to perform subsequent analyses. The risk analysis team can also print reports and comprehensive graphs to present to management.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 4655-4661). Auerbach Publications. Kindle Edition.

and

CISSP Exam Cram 2 by Michael Gregg

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 2333-2335). McGraw-Hill. Kindle Edition.

The following answers are incorrect:

Much of the data gathered during the review cannot be reused for subsequent analysis. Is incorrect because the data can be reused for later analysis.

Automated methodologies require minimal training and knowledge of risk analysis. Is incorrect because it is not the best answer. While a minimal amount of training and knowledge is needed, the analysis should still be performed by skilled professionals.

Most software tools have user interfaces that are easy to use and does not require any training. Is incorrect because it is not the best answer. While many of the user interfaces are easy to use it is better if the tool already has information built into it. There is always a training curve when any product is being used for the first time.

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## QUESTION 500

Who is ultimately responsible for the security of computer based information systems within an organization?

- A. The tech support team
- B. The Operation Team.
- C. The management team.

D. The training team.

Answer: C

Explanation: If there is no support by management to implement, execute, and enforce security policies and procedure, then they won't work. Senior management must be involved in this because they have an obligation to the organization to protect the assets. The requirement here is for management to show "due diligence" in establishing an effective compliance, or security program.

The following answers are incorrect:

The tech support team. Is incorrect because the ultimate responsibility is with management for the security of computer-based information systems.

The Operation Team. Is incorrect because the ultimate responsibility is with management for the security of computer-based information systems.

The Training Team. Is incorrect because the ultimate responsibility is with management for the security of computer-based information systems.

Reference(s) used for this question:

OIG CBK Information Security Management and Risk Management (page 20 - 22)

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### **QUESTION 501**

The major objective of system configuration management is which of the following?

- A. system maintenance.
- B. system stability.
- C. system operations.
- D. system tracking.

Answer: B

Explanation: A major objective with Configuration Management is stability. The changes to the system are controlled so that they don't lead to weaknesses or faults in the system.

The following answers are incorrect:

system maintenance. Is incorrect because it is not the best answer. Configuration Management does control the changes to the system but it is not as important as the overall stability of the system.

system operations. Is incorrect because it is not the best answer, the overall stability of the system is much more important.

system tracking. Is incorrect because while tracking changes is important, it is not the best answer. The overall stability of the system is much more important.

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### **QUESTION 502**

Who should measure the effectiveness of Information System security related controls in an organization?

- A. The local security specialist
- B. The business manager

- C. The systems auditor
- D. The central security manager

Answer: C

Explanation: It is the systems auditor that should lead the effort to ensure that the security controls are in place and effective. The audit would verify that the controls comply with policies, procedures, laws, and regulations where applicable. The findings would provide these to senior management.

The following answers are incorrect:

the local security specialist. Is incorrect because an independent review should take place by a third party. The security specialist might offer mitigation strategies but it is the auditor that would ensure the effectiveness of the controls

the business manager. Is incorrect because the business manager would be responsible that the controls are in place, but it is the auditor that would ensure the effectiveness of the controls.

the central security manager. Is incorrect because the central security manager would be responsible for implementing the controls, but it is the auditor that is responsible for ensuring their effectiveness.

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### QUESTION 503

A deviation from an organization-wide security policy requires which of the following?

- A. Risk Acceptance
- B. Risk Assignment
- C. Risk Reduction
- D. Risk Containment

Answer: A

Explanation: A deviation from an organization-wide security policy requires you to manage the risk. If you deviate from the security policy then you are required to accept the risks that might occur.

In some cases, it may be prudent for an organization to simply accept the risk that is presented in certain scenarios. Risk acceptance is the practice of accepting certain risk(s), typically based on a business decision that may also weigh the cost versus the benefit of dealing with the risk in another way.

The OIG defines Risk Management as: This term characterizes the overall process.

The first phase of risk assessment includes identifying risks, risk-reducing measures, and the budgetary impact of implementing decisions related to the acceptance, avoidance, or transfer of risk.

The second phase of risk management includes the process of assigning priority to, budgeting, implementing, and maintaining appropriate risk-reducing measures.

Risk management is a continuous process of ever-increasing complexity. It is how we evaluate the impact of exposures and respond to them. Risk management minimizes loss to information assets due to undesirable events through identification, measurement, and control. It encompasses the overall security review, risk analysis, selection and evaluation of safeguards, cost-benefit analysis,

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management decision, and safeguard identification and implementation, along with ongoing effectiveness review.

Risk management provides a mechanism to the organization to ensure that executive management knows current risks, and informed decisions can be made to use one of the risk management principles: risk avoidance, risk transfer, risk mitigation, or risk acceptance.

The 4 ways of dealing with risks are: Avoidance, Transfer, Mitigation, Acceptance

The following answers are incorrect:

Risk assignment. Is incorrect because it is a distractor, assignment is not one of the ways to manage risk.

Risk reduction. Is incorrect because there was a deviation of the security policy. You could have some additional exposure by the fact that you deviated from the policy.

Risk containment. Is incorrect because it is a distractor, containment is not one of the ways to manage risk.

Reference(s) used for this question

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 8882-8886). Auerbach Publications. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 10206-10208). Auerbach Publications. Kindle Edition.

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## QUESTION 504

Which must bear the primary responsibility for determining the level of protection needed for information systems resources?

- A. IS security specialists
- B. Senior Management
- C. Senior security analysts
- D. systems Auditors

Answer: B

Explanation: If there is no support by senior management to implement, execute, and enforce security policies and procedure, then they won't work. Senior management must be involved in this because they have an obligation to the organization to protect the assets. The requirement here is for management to show "due diligence" in establishing an effective compliance, or security program. It is senior management that could face legal repercussions if they do not have sufficient controls in place.

The following answers are incorrect:

IS security specialists. Is incorrect because it is not the best answer. Senior management bears the primary responsibility for determining the level of protection needed.

Senior security analysts. Is incorrect because it is not the best answer. Senior management bears the primary responsibility for determining the level of protection needed.

systems auditors. Is incorrect because it is not the best answer, system auditors are responsible that the controls in place are effective. Senior management bears the primary responsibility for determining the level of protection needed.

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**QUESTION 505**

Within the realm of IT security, which of the following combinations best defines risk?

- A. Threat coupled with a breach
- B. Threat coupled with a vulnerability
- C. Vulnerability coupled with an attack
- D. Threat coupled with a breach of security

Answer: B

Explanation: The

Answer: Threat coupled with a vulnerability. Threats are circumstances or actions with the ability to harm a system. They can destroy or modify data or result in a DoS. Threats by themselves are not acted upon unless there is a vulnerability that can be taken advantage of. Risk enters the equation when a vulnerability (Flaw or weakness) exists in policies, procedures, personnel management, hardware, software or facilities and can be exploited by a threat agent. Vulnerabilities do not cause harm, but they leave the system open to harm. The combination of a threat with a vulnerability increases the risk to the system of an intrusion.

The following answers are incorrect:

Threat coupled with a breach. A threat is the potential that a particular threat-source will take advantage of a vulnerability. Breaches get around security. It does not matter if a breach is discovered or not, it has still occurred and is not a risk of something occurring. A breach would quite often be termed as an incident or intrusion.

Vulnerability coupled with an attack. Vulnerabilities are weaknesses (flaws) in policies, procedures, personnel management, hardware, software or facilities that may result in a harmful intrusion to an IT system. An attack takes advantage of the flaw or vulnerability. Attacks are explicit attempts to violate security, and are more than risk as they are active.

Threat coupled with a breach of security. This is a detractor. Although a threat agent may take advantage of (Breach) vulnerabilities or flaws in systems security. A threat coupled with a breach of security is more than a risk as this is active.

The following reference(s) may be used to research the topics in this question:

ISC2 OIG, 2007 p. 66-67

Shon Harris AIO v3 p. 71-72

**QUESTION 506**

Which of the following is considered the weakest link in a security system?

- A. People
- B. Software
- C. Communications
- D. Hardware

Answer: A

Explanation: The

Answer: People. The other choices can be strengthened and counted on (For

the most part) to remain consistent if properly protected. People are fallible and unpredictable. Most security intrusions are caused by employees. People get tired, careless, and greedy. They are not always reliable and may falter in following defined guidelines and best practices. Security professionals must install adequate prevention and detection controls and properly train all systems users. Proper hiring and firing practices can eliminate certain risks. Security Awareness training is key to ensuring people are aware of risks and their responsibilities.

The following answers are incorrect:

- Software. Although software exploits are major threat and cause for concern, people are the weakest point in a security posture. Software can be removed, upgraded or patched to reduce risk.

- Communications. Although many attacks from inside and outside an organization use communication methods such as the network infrastructure, this is not the weakest point in a security posture. Communications can be monitored, devices installed or upgraded to reduce risk and react to attack attempts.

- Hardware. Hardware components can be a weakness in a security posture, but they are not the weakest link of the choices provided. Access to hardware can be minimized by such measures as installing locks and monitoring access in and out of certain areas.

The following reference(s) were/was used to create this question:

Shon Harris AIO v.3 P.19, 107-109

ISC2 OIG 2007, p.51-55

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## QUESTION 507

The ISO/IEC 27001:2005 is a standard for:

- A. Information Security Management System
- B. Implementation and certification of basic security measures
- C. Evaluation criteria for the validation of cryptographic algorithms
- D. Certification of public key infrastructures

Answer: A

Explanation: The ISO 27000 Directory at: <http://www.27000.org/index.htm> has great coverage of the ISO 27000 series. The text below was extracted from their website.

As mentioned by Belinda the ISO 27001 standard is the certification controls criteria while ISO 27002 is the actual standard. ISO 27002 used to be called ISO 17799 before being renamed.

### An Introduction To ISO 27001 (ISO27001)

The ISO 27001 standard was published in October 2005, essentially replacing the old BS7799-2 standard. It is the specification for an ISMS, an Information Security Management System.

BS7799 itself was a long standing standard, first published in the nineties as a code of practice. As this matured, a second part emerged to cover management systems. It is this against which certification is granted. Today in excess of a thousand certificates are in place, across the world. ISO 27001 enhanced the content of BS7799-2 and harmonized it with other standards. A scheme has been introduced by various certification bodies for conversion from BS7799 certification to ISO27001 certification.

The objective of the standard itself is to "provide a model for establishing, implementing, operating, monitoring, reviewing, maintaining, and improving an Information Security Management System". Regarding its adoption, this should be a strategic decision. Further, "The design and

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implementation of an organization's ISMS is influenced by their needs and objectives, security requirements, the process employed and the size and structure of the organization".

The standard defines its 'process approach' as "The application of a system of processes within an organization, together with the identification and interactions of these processes, and their management". It employs the PDCA, Plan-Do-Check-Act model to structure the processes, and reflects the principles set out in the OECG guidelines (see oecd.org).

### THE CONTENTS OF ISO 27001

The content sections of the standard are:

Management Responsibility

Internal Audits

ISMS Improvement

Annex A - Control objectives and controls

Annex B - OECD principles and this international standard

Annex C - Correspondence between ISO 9001, ISO 14001 and this standard

Introduction To ISO 27002 (ISO27002)

The ISO 27002 standard is the rename of the ISO 17799 standard, and is a code of practice for information security. It basically outlines hundreds of potential controls and control mechanisms, which may be implemented, in theory, subject to the guidance provided within ISO 27001.

The standard "established guidelines and general principles for initiating, implementing, maintaining, and improving information security management within an organization". The actual controls listed in the standard are intended to address the specific requirements identified via a formal risk assessment. The standard is also intended to provide a guide for the development of "organizational security standards and effective security management practices and to help build confidence in inter-organizational activities".

The basis of the standard was originally a document published by the UK government, which became a standard 'proper' in 1995, when it was re-published by BSI as BS7799. In 2000 it was again re-published, this time by ISO ,as ISO 17799. A new version of this appeared in 2005, along with a new publication, ISO 27001. These two documents are intended to be used together, with one complimenting the other.

ISO's future plans for this standard are focused largely around the development and publication of industry specific versions (for example: health sector, manufacturing, and so on). Note that this is a lengthy process, so the new standards will take some time to appear

### THE CONTENTS OF ISO 17799 / 27002

The content sections are:

Structure

Risk Assessment and Treatment

Security Policy

Organization of Information Security

Asset Management

Human Resources Security

Physical Security

Communications and Ops Management

Access Control

Information Systems Acquisition, Development, Maintenance

Information Security Incident management

Business Continuity

**Compliance**

[http://www.iso.org/iso/catalogue\\_detail?csnumber=42103](http://www.iso.org/iso/catalogue_detail?csnumber=42103)

and

The ISO 27000 Directory at <http://www.27000.org/index.htm>

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**QUESTION 508**

What would be the Annualized Rate of Occurrence (ARO) of the threat "user input error", in the case where a company employs 100 data entry clerks and every one of them makes one input error each month?

- A. 100
- B. 120
- C. 1
- D. 1200

Answer: D

Explanation: If every one of the 100 clerks makes 1 error 12 times per year, it makes a total of 1200 errors. The Annualized Rate of Occurrence (ARO) is a value that represents the estimated frequency in which a threat is expected to occur. The range can be from 0.0 to a large number. Having an average of 1200 errors per year means an ARO of 1200.

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**QUESTION 509**

How is Annualized Loss Expectancy (ALE) derived from a threat?

- A. ARO x (SLE - EF)
- B. SLE x ARO
- C. SLE/EF
- D. AV x EF

Answer: B

Explanation: Three steps are undertaken in a quantitative risk assessment:

Initial management approval

Construction of a risk assessment team, and

The review of information currently available within the organization.

There are a few formulas that you MUST understand for the exam. See them below:

**SLE (Single Loss Expectancy)**

Single loss expectancy (SLE) must be calculated to provide an estimate of loss. SLE is defined as the difference between the original value and the remaining value of an asset after a single exploit. The formula for calculating SLE is as follows:  $SLE = \text{asset value (in \$)} \times \text{exposure factor (loss due to successful threat exploit, as a \%)}$

Losses can include lack of availability of data assets due to data loss, theft, alteration, or denial of service (perhaps due to business continuity or security issues).

**ALE (Annualized Loss Expectancy)**

Next, the organization would calculate the annualized rate of occurrence (ARO).

This is done to provide an accurate calculation of annualized loss expectancy (ALE).

ARO is an estimate of how often a threat will be successful in exploiting a vulnerability over the period of a year.

When this is completed, the organization calculates the annualized loss expectancy (ALE).

The ALE is a product of the yearly estimate for the exploit (ARO) and the loss in value of an asset after an SLE.

The calculation follows  $ALE = SLE \times ARO$

Note that this calculation can be adjusted for geographical distances using the local annual frequency estimate (LAFE) or the standard annual frequency estimate (SAFE). Given that there is now a value for SLE, it is possible to determine what the organization should spend, if anything, to apply a countermeasure for the risk in question.

Remember that no countermeasure should be greater in cost than the risk it mitigates, transfers, or avoids.

Countermeasure cost per year is easy and straightforward to calculate. It is simply the cost of the countermeasure divided by the years of its life (i.e., use within the organization). Finally, the organization is able to compare the cost of the risk versus the cost of the countermeasure and make some objective decisions regarding its countermeasure selection.

The following were incorrect answers:

All of the other choices were incorrect.

The following reference(s) were used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press (Kindle Locations 10048-10069). Auerbach Publications. Kindle Edition.

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## QUESTION 510

What does "residual risk" mean?

- A. The security risk that remains after controls have been implemented
- B. Weakness of an assets which can be exploited by a threat
- C. Risk that remains after risk assessment has been performed
- D. A security risk intrinsic to an asset being audited, where no mitigation has taken place.

Answer: A

Explanation: Residual risk is "The security risk that remains after controls have been implemented" ISO/IEC TR 13335-1 Guidelines for the Management of IT Security (GMITS), Part 1: Concepts and Models for IT Security, 1996. "Weakness of an assets which can be exploited by a threat" is vulnerability. "The result of unwanted incident" is impact. Risk that remains after risk analysis has been performed is a distracter.

Risk can never be eliminated nor avoided, but it can be mitigated, transferred or accepted. Even after applying a countermeasure like for example putting up an Antivirus. But still it is not 100% that systems will be protected by antivirus.

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## QUESTION 511

Preservation of confidentiality within information systems requires that the information is not disclosed to:

- A. Authorized person
- B. Unauthorized persons or processes.
- C. Unauthorized persons.
- D. Authorized persons and processes

Answer: B

Explanation: Confidentiality assures that the information is not disclosed to unauthorized persons or processes.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 31.

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### QUESTION 512

Which of the following is not one of the three goals of Integrity addressed by the Clark-Wilson model?

- A. Prevention of the modification of information by unauthorized users.
- B. Prevention of the unauthorized or unintentional modification of information by authorized users.
- C. Preservation of the internal and external consistency.
- D. Prevention of the modification of information by authorized users.

Answer: D

Explanation: There is no need to prevent modification from authorized users. They are authorized and allowed to make the changes. On top of this, it is also NOT one of the goal of Integrity within Clark-Wilson.

As it turns out, the Biba model addresses only the first of the three integrity goals which is Prevention of the modification of information by unauthorized users. Clark-Wilson addresses all three goals of integrity.

The Clark-Wilson model improves on Biba by focusing on integrity at the transaction level and addressing three major goals of integrity in a commercial environment. In addition to preventing changes by unauthorized subjects, Clark and Wilson realized that high-integrity systems would also have to prevent undesirable changes by authorized subjects and to ensure that the system continued to behave consistently. It also recognized that it would need to ensure that there is constant mediation between every subject and every object if such integrity was going to be maintained.

Integrity is addressed through the following three goals:

1. Prevention of the modification of information by unauthorized users.
2. Prevention of the unauthorized or unintentional modification of information by authorized users.
3. Preservation of the internal and external consistency.

The following reference(s) were used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 17689-17694). Auerbach Publications. Kindle Edition.  
and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 31.

**QUESTION 513**

What is called an event or activity that has the potential to cause harm to the information systems or networks?

- A. Vulnerability
- B. Threat agent
- C. Weakness
- D. Threat

Answer: D

Explanation:

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Pages 16, 32.

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**QUESTION 514**

A weakness or lack of a safeguard, which may be exploited by a threat, causing harm to the information systems or networks is called a?

- A. Vulnerability
- B. Risk
- C. Threat
- D. Overflow

Answer: A

Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Pages 16, 32.

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**QUESTION 515**

What is called the probability that a threat to an information system will materialize?

- A. Threat
- B. Risk
- C. Vulnerability
- D. Hole

Answer: B

Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Pages 16, 32.

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**QUESTION 516**

Risk mitigation and risk reduction controls for providing information security are classified within three main categories, which of the following are being used?

- A. preventive, corrective, and administrative
- B. detective, corrective, and physical
- C. Physical, technical, and administrative
- D. Administrative, operational, and logical

Answer: C

Explanation: Security is generally defined as the freedom from danger or as the condition of safety. Computer security, specifically, is the protection of data in a system against unauthorized disclosure, modification, or destruction and protection of the computer system itself against unauthorized use, modification, or denial of service. Because certain computer security controls inhibit productivity, security is typically a compromise toward which security practitioners, system users, and system operations and administrative personnel work to achieve a satisfactory balance between security and productivity.

Controls for providing information security can be physical, technical, or administrative. These three categories of controls can be further classified as either preventive or detective. Preventive controls attempt to avoid the occurrence of unwanted events, whereas detective controls attempt to identify unwanted events after they have occurred. Preventive controls inhibit the free use of computing resources and therefore can be applied only to the degree that the users are willing to accept. Effective security awareness programs can help increase users' level of tolerance for preventive controls by helping them understand how such controls enable them to trust their computing systems. Common detective controls include audit trails, intrusion detection methods, and checksums.

Three other types of controls supplement preventive and detective controls. They are usually described as deterrent, corrective, and recovery.

Deterrent controls are intended to discourage individuals from intentionally violating information security policies or procedures. These usually take the form of constraints that make it difficult or undesirable to perform unauthorized activities or threats of consequences that influence a potential intruder to not violate security (e.g., threats ranging from embarrassment to severe punishment).

Corrective controls either remedy the circumstances that allowed the unauthorized activity or return conditions to what they were before the violation. Execution of corrective controls could result in changes to existing physical, technical, and administrative controls.

Recovery controls restore lost computing resources or capabilities and help the organization recover monetary losses caused by a security violation.

Deterrent, corrective, and recovery controls are considered to be special cases within the major categories of physical, technical, and administrative controls; they do not clearly belong in either preventive or detective categories. For example, it could be argued that deterrence is a form of prevention because it can cause an intruder to turn away; however, deterrence also involves detecting violations, which may be what the intruder fears most. Corrective controls, on the other hand, are not preventive or detective, but they are clearly linked with technical controls when antiviral software eradicates a virus or with administrative controls when backup procedures enable restoring a damaged data base. Finally, recovery controls are neither preventive nor detective but are included in administrative controls as disaster recovery or contingency plans.

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Reference(s) used for this question

Handbook of Information Security Management, Hal Tipton,

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### QUESTION 517

Which of the following would be best suited to oversee the development of an information security policy?

- A. System Administrators
- B. End User
- C. Security Officers
- D. Security administrators

Answer: C

Explanation: The security officer would be the best person to oversee the development of such policies.

Security officers and their teams have typically been charged with the responsibility of creating the security policies. The policies must be written and communicated appropriately to ensure that they can be understood by the end users. Policies that are poorly written, or written at too high of an education level (common industry practice is to focus the content for general users at the sixth- to eighth-grade reading level), will not be understood.

Implementing security policies and the items that support them shows due care by the company and its management staff. Informing employees of what is expected of them and the consequences of noncompliance can come down to a liability issue.

While security officers may be responsible for the development of the security policies, the effort should be collaborative to ensure that the business issues are addressed.

The security officers will get better corporate support by including other areas in policy development. This helps build buy-in by these areas as they take on a greater ownership of the final product. Consider including areas such as HR, legal, compliance, various IT areas and specific business area representatives who represent critical business units.

When policies are developed solely within the IT department and then distributed without business input, they are likely to miss important business considerations. Once policy documents have been created, the basis for ensuring compliance is established. Depending on the organization, additional documentation may be necessary to support policy. This support may come in the form of additional controls described in standards, baselines, or procedures to help personnel with compliance. An important step after documentation is to make the most current version of the documents readily accessible to those who are expected to follow them. Many organizations place the documents on their intranets or in shared file folders to facilitate their accessibility. Such placement of these documents plus checklists, forms, and sample documents can make awareness more effective.

For your exam you should know the information below:

**End User** - The end user is responsible for protecting information assets on a daily basis through adherence to the security policies that have been communicated.

**Executive Management/Senior Management** - Executive management maintains the overall responsibility for protection of the information assets. The business operations are dependent upon information being available, accurate, and protected from individuals without a need to know.

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Security Officer - The security officer directs, coordinates, plans, and organizes information security activities throughout the organization. The security officer works with many different individuals, such as executive management, management of the business units, technical staff, business partners, auditors, and third parties such as vendors. The security officer and his or her team are responsible for the design, implementation, management, and review of the organization's security policies, standards, procedures, baselines, and guidelines.

Information Systems Security Professional- Drafting of security policies, standards and supporting guidelines, procedures, and baselines is coordinated through these individuals. Guidance is provided for technical security issues, and emerging threats are considered for the adoption of new policies. Activities such as interpretation of government regulations and industry trends and analysis of vendor solutions to include in the security architecture that advances the security of the organization are performed in this role.

Data/Information/Business/System Owners - A business executive or manager is typically responsible for an information asset. These are the individuals that assign the appropriate classification to information assets. They ensure that the business information is protected with appropriate controls. Periodically, the information asset owners need to review the classification and access rights associated with information assets. The owners, or their delegates, may be required to approve access to the information. Owners also need to determine the criticality, sensitivity, retention, backups, and safeguards for the information. Owners or their delegates are responsible for understanding the risks that exist with regards to the information that they control.

Data/Information Custodian/Steward - A data custodian is an individual or function that takes care of the information on behalf of the owner. These individuals ensure that the information is available to the end users and is backed up to enable recovery in the event of data loss or corruption. Information may be stored in files, databases, or systems whose technical infrastructure must be managed, by systems administrators. This group administers access rights to the information assets.

Information Systems Auditor- IT auditors determine whether users, owners, custodians, systems, and networks are in compliance with the security policies, procedures, standards, baselines, designs, architectures, management direction, and other requirements placed on systems. The auditors provide independent assurance to the management on the appropriateness of the security controls. The auditor examines the information systems and determines whether they are designed, configured, implemented, operated, and managed in a way ensuring that the organizational objectives are being achieved. The auditors provide top company management with an independent view of the controls and their effectiveness.

Business Continuity Planner - Business continuity planners develop contingency plans to prepare for any occurrence that could have the ability to impact the company's objectives negatively. Threats may include earthquakes, tornadoes, hurricanes, blackouts, changes in the economic/political climate, terrorist activities, fire, or other major actions potentially causing significant harm. The business continuity planner ensures that business processes can continue through the disaster and coordinates those activities with the business areas and information technology personnel responsible for disaster recovery.

Information Systems/ Technology Professionals- These personnel are responsible for designing security controls into information systems, testing the controls, and implementing the systems in production environments through agreed upon operating policies and procedures. The information systems professionals work with the business owners and the security professionals to ensure that the designed solution provides security controls commensurate with the acceptable criticality,

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sensitivity, and availability requirements of the application.

Security Administrator - A security administrator manages the user access request process and ensures that privileges are provided to those individuals who have been authorized for access by application/system/data owners. This individual has elevated privileges and creates and deletes accounts and access permissions. The security administrator also terminates access privileges when individuals leave their jobs or transfer between company divisions. The security administrator maintains records of access request approvals and produces reports of access rights for the auditor during testing in an access controls audit to demonstrate compliance with the policies.

Network/Systems Administrator - A systems administrator (sysadmin/netadmin) configures network and server hardware and the operating systems to ensure that the information can be available and accessible. The administrator maintains the computing infrastructure using tools and utilities such as patch management and software distribution mechanisms to install updates and test patches on organization computers. The administrator tests and implements system upgrades to ensure the continued reliability of the servers and network devices. The administrator provides vulnerability management through either commercial off the shelf (COTS) and/or non-COTS solutions to test the computing environment and mitigate vulnerabilities appropriately.

Physical Security - The individuals assigned to the physical security role establish relationships with external law enforcement, such as the local police agencies, state police, or the Federal Bureau of Investigation (FBI) to assist in investigations. Physical security personnel manage the installation, maintenance, and ongoing operation of the closed circuit television (CCTV) surveillance systems, burglar alarm systems, and card reader access control systems. Guards are placed where necessary as a deterrent to unauthorized access and to provide safety for the company employees. Physical security personnel interface with systems security, human resources, facilities, and legal and business areas to ensure that the practices are integrated.

Security Analyst - The security analyst role works at a higher, more strategic level than the previously described roles and helps develop policies, standards, and guidelines, as well as set various baselines. Whereas the previous roles are “in the weeds” and focus on pieces and parts of the security program, a security analyst helps define the security program elements and follows through to ensure the elements are being carried out and practiced properly. This person works more at a design level than at an implementation level.

Administrative Assistants/Secretaries - This role can be very important to information security; in many companies of smaller size, this may be the individual who greets visitors, signs packages in and out, recognizes individuals who desire to enter the offices, and serves as the phone screener for executives. These individuals may be subject to social engineering attacks, whereby the potential intruder attempts to solicit confidential information that may be used for a subsequent attack. Social engineers prey on the goodwill of the helpful individual to gain entry. A properly trained assistant will minimize the risk of divulging useful company information or of providing unauthorized entry.

Help Desk Administrator - As the name implies, the help desk is there to field questions from users that report system problems. Problems may include poor response time, potential virus infections, unauthorized access, inability to access system resources, or questions on the use of a program. The help desk is also often where the first indications of security issues and incidents will be seen. A help desk individual would contact the computer security incident response team (CIRT) when a situation meets the criteria developed by the team. The help desk resets passwords, resynchronizes/reinitializes tokens and smart cards, and resolves other problems with access

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control.

Supervisor - The supervisor role, also called user manager, is ultimately responsible for all user activity and any assets created and owned by these users. For example, suppose Kathy is the supervisor of ten employees. Her responsibilities would include ensuring that these employees understand their responsibilities with respect to security; making sure the employees' account information is up-to-date; and informing the security administrator when an employee is fired, suspended, or transferred. Any change that pertains to an employee's role within the company usually affects what access rights they should and should not have, so the user manager must inform the security administrator of these changes immediately.

Change Control Analyst Since the only thing that is constant is change, someone must make sure changes happen securely. The change control analyst is responsible for approving or rejecting requests to make changes to the network, systems, or software. This role must make certain that the change will not introduce any vulnerabilities, that it has been properly tested, and that it is properly rolled out. The change control analyst needs to understand how various changes can affect security, interoperability, performance, and productivity. Or, a company can choose to just roll out the change and see what happens.

The following answers are incorrect:

Systems Administrator - A systems administrator (sysadmin/netadmin) configures network and server hardware and the operating systems to ensure that the information can be available and accessible. The administrator maintains the computing infrastructure using tools and utilities such as patch management and software distribution mechanisms to install updates and test patches on organization computers. The administrator tests and implements system upgrades to ensure the continued reliability of the servers and network devices. The administrator provides vulnerability management through either commercial off the shelf (COTS) and/or non-COTS solutions to test the computing environment and mitigate vulnerabilities appropriately.

End User - The end user is responsible for protecting information assets on a daily basis through adherence to the security policies that have been communicated.

Security Administrator - A security administrator manages the user access request process and ensures that privileges are provided to those individuals who have been authorized for access by application/system/data owners. This individual has elevated privileges and creates and deletes accounts and access permissions. The security administrator also terminates access privileges when individuals leave their jobs or transfer between company divisions. The security administrator maintains records of access request approvals and produces reports of access rights for the auditor during testing in an access controls audit to demonstrate compliance with the policies.

Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 109

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 108). McGraw-Hill. Kindle Edition.

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## QUESTION 518

Which of the following is the MOST important aspect relating to employee termination?

- A. The details of employee have been removed from active payroll files.
- B. Company property provided to the employee has been returned.
- C. User ID and passwords of the employee have been deleted.

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- D. The appropriate company staff are notified about the termination.

Answer: D

Explanation: Even though Logical access to information by a terminated employee is possible if the ID and password of the terminated employee has not been deleted this is only one part of the termination procedures. If user ID is not disabled or deleted, it could be possible for the employee without physical access to visit the companies networks remotely and gain access to the information.

Please note that this can also be seen in a different way: the most important thing to do could also be to inform others of the person's termination, because even if user ID's and passwords are deleted, a terminated individual could simply socially engineer their way back in by calling an individual he/she used to work with and ask them for access. He could intrude on the facility or use other weaknesses to gain access to information after he has been terminated.

By notifying the appropriate company staff about the termination, they would in turn initiate account termination, ask the employee to return company property, and all credentials would be withdrawn for the individual concerned. This answer is more complete than simply disabling account.

It seems harsh and cold when this actually takes place , but too many companies have been hurt by vengeful employees who have lashed out at the company when their positions were revoked for one reason or another. If an employee is disgruntled in any way, or the termination is unfriendly, that employee's accounts should be disabled right away, and all passwords on all systems changed.

For your exam you should know the information below:

#### Employee Termination Processes

Employees join and leave organizations every day. The reasons vary widely, due to retirement, reduction in force, layoffs, termination with or without cause, relocation to another city, career opportunities with other employers, or involuntary transfers. Terminations may be friendly or unfriendly and will need different levels of care as a result.

#### Friendly Terminations

Regular termination is when there is little or no evidence or reason to believe that the termination is not agreeable to both the company and the employee. A standard set of procedures, typically maintained by the human resources department, governs the dismissal of the terminated employee to ensure that company property is returned, and all access is removed. These procedures may include exit interviews and return of keys, identification cards, badges, tokens, and cryptographic keys. Other property, such as laptops, cable locks, credit cards, and phone cards, are also collected. The user manager notifies the security department of the termination to ensure that access is revoked for all platforms and facilities. Some facilities choose to immediately delete the accounts, while others choose to disable the accounts for a policy defined period, for example, 30 days, to account for changes or extensions in the final termination date. The termination process should include a conversation with the departing associate about their continued responsibility for confidentiality of information.

#### Unfriendly Terminations

Unfriendly terminations may occur when the individual is fired, involuntarily transferred, laid off, or when the organization has reason to believe that the individual has the means and intention to potentially cause harm to the system. Individuals with technical skills and higher levels of access,

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such as the systems administrators, computer programmers, database administrators, or any individual with elevated privileges, may present higher risk to the environment. These individuals could alter files, plant logic bombs to create system file damage at a future date, or remove sensitive information. Other disgruntled users could enter erroneous data into the system that may not be discovered for several months. In these situations, immediate termination of systems access is warranted at the time of termination or prior to notifying the employee of the termination. Managing the people aspect of security, from pre-employment to postemployment, is critical to ensure that trustworthy, competent resources are employed to further the business objectives that will protect company information. Each of these actions contributes to preventive, detective, or corrective personnel controls.

The following answers are incorrect:

The other options are less important.

Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 99

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 129). McGraw-Hill. Kindle Edition.

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### QUESTION 519

Making sure that only those who are supposed to access the data can access is which of the following?

- A. confidentiality.
- B. capability.
- C. integrity.
- D. availability.

Answer: A

Explanation: From the published (ISC)2 goals for the Certified Information Systems Security Professional candidate, domain definition. Confidentiality is making sure that only those who are supposed to access the data can access it.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 59.

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### QUESTION 520

Related to information security, confidentiality is the opposite of which of the following?

- A. closure
- B. disclosure
- C. disposal
- D. disaster

Answer: B

Explanation: Confidentiality is the opposite of disclosure.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 59.

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**QUESTION 521**

Related to information security, integrity is the opposite of which of the following?

- A. abstraction
- B. alteration
- C. accreditation
- D. application

Answer: B

Explanation: Integrity is the opposite of "alteration."

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 59.

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**QUESTION 522**

Making sure that the data is accessible when and where it is needed is which of the following?

- A. confidentiality
- B. integrity
- C. acceptability
- D. availability

Answer: D

Explanation: Availability is making sure that the data is accessible when and where it is needed.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 59.

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**QUESTION 523**

Related to information security, availability is the opposite of which of the following?

- A. delegation
- B. distribution
- C. documentation
- D. destruction

Answer: D

Explanation: Availability is the opposite of "destruction."

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 59.

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**QUESTION 524**

Related to information security, the prevention of the intentional or unintentional unauthorized disclosure of contents is which of the following?

- A. Confidentiality
- B. Integrity
- C. Availability
- D. capability

Answer: A

Explanation: Confidentiality is the prevention of the intentional or unintentional unauthorized disclosure of contents.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 60.

**QUESTION 525**

Related to information security, the guarantee that the message sent is the message received with the assurance that the message was not intentionally or unintentionally altered is an example of which of the following?

- A. integrity
- B. confidentiality
- C. availability
- D. identity

Answer: A

Explanation: Integrity is the guarantee that the message sent is the message received, and that the message was not intentionally or unintentionally altered.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 60.

**QUESTION 526**

One of these statements about the key elements of a good configuration process is NOT true

- A. Accommodate the reuse of proven standards and best practices
- B. Ensure that all requirements remain clear, concise, and valid
- C. Control modifications to system hardware in order to prevent resource changes
- D. Ensure changes, standards, and requirements are communicated promptly and precisely

Answer: C

Explanation: Configuration management isn't about preventing change but ensuring the integrity of IT resources by preventing unauthorised or improper changes.

According to the Official ISC2 guide to the CISSP exam, a good CM process is one that can:

- 
- (1) accommodate change;
  - (2) accommodate the reuse of proven standards and best practices;
  - (3) ensure that all requirements remain clear, concise, and valid;
  - (4) ensure changes, standards, and requirements are communicated promptly and precisely; and
  - (5) ensure that the results conform to each instance of the product.

#### Configuration management

Configuration management (CM) is the detailed recording and updating of information that describes an enterprise's computer systems and networks, including all hardware and software components. Such information typically includes the versions and updates that have been applied to installed software packages and the locations and network addresses of hardware devices.

Special configuration management software is available. When a system needs a hardware or software upgrade, a computer technician can access the configuration management program and database to see what is currently installed. The technician can then make a more informed decision about the upgrade needed.

An advantage of a configuration management application is that the entire collection of systems can be reviewed to make sure any changes made to one system do not adversely affect any of the other systems.

Configuration management is also used in software development, where it is called Unified Configuration Management (UCM). Using UCM, developers can keep track of the source code, documentation, problems, changes requested, and changes made.

#### Change management

In a computer system environment, change management refers to a systematic approach to keeping track of the details of the system (for example, what operating system release is running on each computer and which fixes have been applied).

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#### QUESTION 527

Which of the following is NOT an administrative control?

- A. Logical access control mechanisms
- B. Screening of personnel
- C. Development of policies, standards, procedures and guidelines
- D. Change control procedures

Answer: A

Explanation: It is considered to be a technical control.

Logical is synonymous with Technical Control. That was the easy answer.

There are three broad categories of access control: Administrative, Technical, and Physical.

Each category has different access control mechanisms that can be carried out manually or automatically. All of these access control mechanisms should work in concert with each other to protect an infrastructure and its data.

Each category of access control has several components that fall within it, as shown here:

#### Administrative Controls

- Policy and procedures
- Personnel controls
- Supervisory structure

- 
- Security-awareness training

- Testing

Physical Controls

- Network segregation
- Perimeter security
- Computer controls
- Work area separation
- Data backups

Technical Controls

- System access
- Network architecture
- Network access
- Encryption and protocols
- Control zone
- Auditing

The following answers are incorrect :

Screening of personnel is considered to be an administrative control

Development of policies, standards, procedures and guidelines is considered to be an administrative control

Change control procedures is considered to be an administrative control.

Reference : Shon Harris AIO v3 , Chapter - 3 : Security Management Practices , Page : 52-54

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### QUESTION 528

Which of the following is NOT a technical control?

- A. Password and resource management
- B. Identification and authentication methods
- C. Monitoring for physical intrusion
- D. Intrusion Detection Systems

Answer: C

Explanation: It is considered to be a 'Physical Control'

There are three broad categories of access control: administrative, technical, and physical. Each category has different access control mechanisms that can be carried out manually or automatically. All of these access control mechanisms should work in concert with each other to protect an infrastructure and its data.

Each category of access control has several components that fall within it, a partial list is shown here. Not all controls fall into a single category, many of the controls will be in two or more categories. Below you have an example with backups where it is in all three categories:

- Administrative Controls
- Policy and procedures
- A backup policy would be in place
- Personnel controls
- Supervisory structure
- Security-awareness training

- Testing
- Physical Controls
- Network segregation
- Perimeter security
- Computer controls
- Work area separation
- Data backups (actual storage of the media, i.e. Offsite Storage Facility)
- Cabling
- Technical Controls
- System access
- Network architecture
- Network access
- Encryption and protocols
- Control zone
- Auditing
- Backup (Actual software doing the backups)

The following answers are incorrect :

Password and resource management is considered to be a logical or technical control.

Identification and authentication methods is considered to be a logical or technical control.

Intrusion Detection Systems is considered to be a logical or technical control.

Reference : Shon Harris , AIO v3 , Chapter - 4 : Access Control , Page : 180 - 185

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### QUESTION 529

Which of the following is BEST defined as a physical control?

- A. Monitoring of system activity
- B. Fencing
- C. Identification and authentication methods
- D. Logical access control mechanisms

Answer: B

Explanation: Physical controls are items put into place to protect facility, personnel, and resources. Examples of physical controls are security guards, locks, fencing, and lighting.

The following answers are incorrect answers:

Monitoring of system activity is considered to be administrative control.

Identification and authentication methods are considered to be a technical control.

Logical access control mechanisms is also considered to be a technical control.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 1280-1282). McGraw-Hill. Kindle Edition.

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### QUESTION 530

Which of the following would NOT violate the Due Diligence concept?

- A. Security policy being outdated

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- B. Data owners not laying out the foundation of data protection
  - C. Network administrator not taking mandatory two-week vacation as planned
  - D. Latest security patches for servers being installed as per the Patch Management process

Answer: D

Explanation: To be effective a patch management program must be in place (due diligence) and detailed procedures would specify how and when the patches are applied properly (Due Care). Remember, the question asked for NOT a violation of Due Diligence, in this case, applying patches demonstrates due care and the patch management process in place demonstrates due diligence.

Due diligence is the act of investigating and understanding the risks the company faces. A company practices by developing and implementing security policies, procedures, and standards. Detecting risks would be based on standards such as ISO 2700, Best Practices, and other published standards such as NIST standards for example.

Due Diligence is understanding the current threats and risks. Due diligence is practiced by activities that make sure that the protection mechanisms are continually maintained and operational where risks are constantly being evaluated and reviewed. The security policy being outdated would be an example of violating the due diligence concept.

Due Care is implementing countermeasures to provide protection from those threats. Due care is when the necessary steps to help protect the company and its resources from possible risks that have been identified. If the information owner does not lay out the foundation of data protection (doing something about it) and ensure that the directives are being enforced (actually being done and kept at an acceptable level), this would violate the due care concept.

If a company does not practice due care and due diligence pertaining to the security of its assets, it can be legally charged with negligence and held accountable for any ramifications of that negligence. Liability is usually established based on Due Diligence and Due Care or the lack of either.

A good way to remember this is using the first letter of both words within Due Diligence (DD) and Due Care (DC).

Due Diligence = Due Detect

Steps you take to identify risks based on best practices and standards.

Due Care = Due Correct.

Action you take to bring the risk level down to an acceptable level and maintaining that level over time.

The Following answer were wrong:

Security policy being outdated:

While having and enforcing a security policy is the right thing to do (due care), if it is outdated, you are not doing it the right way (due diligence). This questions violates due diligence and not due care.

Data owners not laying out the foundation for data protection:

Data owners are not recognizing the "right thing" to do. They don't have a security policy.

Network administrator not taking mandatory two week vacation:

The two week vacation is the "right thing" to do, but not taking the vacation violates due diligence (not doing the right thing the right way)

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Reference(s) used for this question:

Shon Harris, CISSP All In One, Version 5, Chapter 3, pg 110

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### QUESTION 531

Which of the following would BEST be defined as an absence or weakness of safeguard that could be exploited?

- A. A threat
- B. A vulnerability
- C. A risk
- D. An exposure

Answer: B

Explanation: It is a software , hardware or procedural weakness that may provide an attacker the open door he is looking for to enter a computer or network and have unauthorized access to resources within the environment. A vulnerability characterizes the absence or weakness of a safeguard that could be exploited. This vulnerability may be a service running on a server, unpatched applications or operating system software etc.

The following answers are incorrect because:

Threat: A threat is defined as a potential danger to information or systems. The threat is someone or something will identify a specific vulnerability and use it against the company or individual. The entity that takes advantage of a vulnerability is referred to as a 'Threat Agent'. A threat agent could be an intruder accessing the network through a port on the firewall , a process accessing data that violates the security policy.

Risk: A risk is the likelihood of a threat agent taking advantage of a vulnerability and the corresponding business impact. If a firewall has several ports open , there is a higher likelihood that an intruder will use one to access the network in an unauthorized method.

Exposure: An exposure is an instance of being exposed to losses from a threat agent.

REFERENCES:

SHON HARRIS , ALL IN ONE THIRD EDITION : Chapter 3 : Security Management Practices ,  
Pages: 57-59

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### QUESTION 532

Which of the following could be BEST defined as the likelihood of a threat agent taking advantage of a vulnerability?

- A. A risk
- B. A residual risk
- C. An exposure
- D. A countermeasure

Answer: A

Explanation: Risk is the likelihood of a threat agent taking advantage of a vulnerability and the corresponding business impact. If a firewall has several ports open , there is a higher likelihood

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that an intruder will use one to access the network in an unauthorized method.

The following answers are incorrect :

Residual Risk is very different from the notion of total risk. Residual Risk would be the risks that still exists after countermeasures have been implemented. Total risk is the amount of risk a company faces if it chooses not to implement any type of safeguard.

Exposure: An exposure is an instance of being exposed to losses from a threat agent.

Countermeasure: A countermeasure or a safeguard is put in place to mitigate the potential risk.

Examples of countermeasures include strong password management , a security guard.

REFERENCES : SHON HARRIS ALL IN ONE 3rd EDITION

Chapter - 3: Security Management Practices , Pages : 57-59

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### QUESTION 533

Which approach to a security program ensures people responsible for protecting the company's assets are DRIVING the program?

- A. The Delphi approach
- B. The top-down approach
- C. The bottom-up approach
- D. The technology approach

Answer: B

Explanation: A security program should use a top-down approach, meaning that the initiation, support, and direction come from top management; work their way through middle management; and then reach staff members.

In contrast, a bottom-up approach refers to a situation in which staff members (usually IT ) try to develop a security program without getting proper management support and direction. A bottomup approach is commonly less effective, not broad enough to address all security risks, and doomed to fail.

A top-down approach makes sure the people actually responsible for protecting the company's assets (senior management) are driving the program.

The following are incorrect answers:

The Delphi approach is incorrect as this is for a brainstorming technique.

The bottom-up approach is also incorrect as this approach would be if the IT department tried to develop a security program without proper support from upper management.

The technology approach is also incorrect as it does not fit into the category of best answer.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 63). McGraw-Hill. Kindle Edition.

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### QUESTION 534

Which of the following is NOT a part of a risk analysis?

- A. Identify risks
- B. Quantify the impact of potential threats
- C. Provide an economic balance between the impact of the risk and the cost of the associated

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countermeasure

D. Choose the best countermeasure

Answer: D

Explanation: This step is not a part of RISK ANALYSIS.

A risk analysis has three main goals: identify risks, quantify the impact of potential threats, and provide an economic balance between the impact of the risk and the cost of the associated countermeasure. Choosing the best countermeasure is not part of the risk analysis.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 3: Security Management Practices (page 73).

HARRIS, Shon, Mike Meyers' CISSP(R) Certification Passport, 2002, McGraw-Hill, page 12.

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### QUESTION 535

How should a risk be HANDLED when the cost of the countermeasure OUTWEIGHS the cost of the risk?

- A. Reject the risk
- B. Perform another risk analysis
- C. Accept the risk
- D. Reduce the risk

Answer: C

Explanation: Which means the company understands the level of risk it is faced.

The following answers are incorrect because :

Reject the risk is incorrect as it means ignoring the risk which is dangerous.

Perform another risk analysis is also incorrect as the existing risk analysis has already shown the results.

Reduce the risk is incorrect is applicable after implementing the countermeasures.

Reference : Shon Harris AIO v3 , Chapter-3: Security Management Practices , Page : 39

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### QUESTION 536

Which of the following is given the responsibility of the maintenance and protection of the data?

- A. Data owner
- B. Data custodian
- C. User
- D. Security administrator

Answer: B

Explanation: It is usually responsible for maintaining and protecting the data.

The following answers are incorrect:

Data owner is usually a member of management , in charge of a specific business unit and is ultimately responsible for the protection and use of the information.

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User is any individual who routinely uses the data for work-related tasks.

Security administrator's tasks include creating new system user accounts , implementing new security software.

References : Shon Harris AIO v3 , Chapter - 3: Security Management Practices , Pages : 99 - 103

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### QUESTION 537

Who should DECIDE how a company should approach security and what security measures should be implemented?

- A. Senior management
- B. Data owner
- C. Auditor
- D. The information security specialist

Answer: A

Explanation: They are responsible for security of the organization and the protection of its assets.  
The following answers are incorrect because :

Data owner is incorrect as data owners should not decide as to what security measures should be applied.

Auditor is also incorrect as auditor cannot decide as to what security measures should be applied.  
The information security specialist is also incorrect as they may have the technical knowledge of how security measures should be implemented and configured , but they should not be in a position of deciding what measures should be applied.

Reference : Shon Harris AIO v3 , Chapter-3: Security Management Practices , Page : 51.

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### QUESTION 538

Which of the following is responsible for MOST of the security issues?

- A. Outside espionage
- B. Hackers
- C. Personnel
- D. Equipment failure

Answer: C

Explanation: Personnel cause more security issues than hacker attacks, outside espionage, or equipment failure.

The following answers are incorrect because:

Outside espionage is incorrect as it is not the best answer.

Hackers is also incorrect as it is not the best answer.

Equipment failure is also incorrect as it is not the best answer.

Reference : Shon Harris AIO v3 , Chapter-3: Security Management Practices , Page : 56

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### QUESTION 539

What are the three FUNDAMENTAL principles of security?

- A. Accountability, confidentiality and integrity
- B. Confidentiality, integrity and availability
- C. Integrity, availability and accountability
- D. Availability, accountability and confidentiality

Answer: B

Explanation: The following answers are incorrect because:

Accountability, confidentiality and integrity is not the correct answer as Accountability is not one of the fundamental principle of security.

Integrity, availability and accountability is not the correct answer as Accountability is not one of the fundamental principle of security.

Availability, accountability and confidentiality is not the correct answer as Accountability is not one of the fundamental objective of security.

References : Shon Harris AIO v3 , Chapter - 3: Security Management Practices , Pages : 49-52

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### QUESTION 540

What would BEST define risk management?

- A. The process of eliminating the risk
- B. The process of assessing the risks
- C. The process of reducing risk to an acceptable level
- D. The process of transferring risk

Answer: C

Explanation: This is the basic process of risk management.

Risk is the possibility of damage happening and the ramifications of such damage should it occur. Information risk management (IRM) is the process of identifying and assessing risk, reducing it to an acceptable level, and implementing the right mechanisms to maintain that level. There is no such thing as a 100 percent secure environment. Every environment has vulnerabilities and threats to a certain degree.

The skill is in identifying these threats, assessing the probability of them actually occurring and the damage they could cause, and then taking the right steps to reduce the overall level of risk in the environment to what the organization identifies as acceptable.

Proper risk management requires a strong commitment from senior management, a documented process that supports the organization's mission, an information risk management (IRM) policy and a delegated IRM team. Once you've identified your company's acceptable level of risk, you need to develop an information risk management policy.

The IRM policy should be a subset of the organization's overall risk management policy (risks to a company include more than just information security issues) and should be mapped to the organizational security policies, which lay out the acceptable risk and the role of security as a whole in the organization. The IRM policy is focused on risk management while the security policy is very high-level and addresses all aspects of security. The IRM policy should address the following items:

## Objectives of IRM team

Level of risk the company will accept and what is considered an acceptable risk (as defined in the previous article)

### Formal processes of risk identification

Connection between the IRM policy and the organization's strategic planning processes

Responsibilities that fall under IRM and the roles that are to fulfill them

### Mapping of risk to internal controls

Approach for changing staff behaviors and resource allocation in response to risk analysis

Mapping of risks to performance targets and budgets

Key indicators to monitor the effectiveness of controls

Shon Harris provides a 10,000-foot view of the risk management process below:

A big question that companies have to deal with is, "What is enough security?" This can be restated as, "What is our acceptable risk level?" These two questions have an inverse relationship. You can't know what constitutes enough security unless you know your necessary baseline risk level.

To set an enterprise-wide acceptable risk level for a company, a few things need to be investigated and understood. A company must understand its federal and state legal requirements, its regulatory requirements, its business drivers and objectives, and it must carry out a risk and threat analysis. (I will dig deeper into formalized risk analysis processes in a later article, but for now we will take a broad approach.) The result of these findings is then used to define the company's acceptable risk level, which is then outlined in security policies, standards, guidelines and procedures.

Although there are different methodologies for enterprise risk management, the core components of any risk analysis is made up of the following:

Identify company assets

Assign a value to each asset

Identify each asset's vulnerabilities and associated threats

Calculate the risk for the identified assets

Once these steps are finished, then the risk analysis team can identify the necessary countermeasures to mitigate the calculated risks, carry out cost/benefit analysis for these countermeasures and report to senior management their findings.

When we look at information security, there are several types of risk a corporation needs to be aware of and address properly. The following items touch on the major categories:

- Physical damage Fire, water, vandalism, power loss, and natural disasters
- Human interaction Accidental or intentional action or inaction that can disrupt productivity
- Equipment malfunction Failure of systems and peripheral devices
- Inside and outside attacks Hacking, cracking, and attacking
- Misuse of data Sharing trade secrets, fraud, espionage, and theft
- Loss of data Intentional or unintentional loss of information through destructive means
- Application error Computation errors, input errors, and buffer overflows

The following answers are incorrect:

The process of eliminating the risk is not the best answer as risk cannot be totally eliminated.

The process of assessing the risks is also not the best answer.

The process of transferring risk is also not the best answer and is one of the ways of handling a risk after a risk analysis has been performed.

References:

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Shon Harris , AIO v3 , Chapter 3: Security Management Practices , Page: 66-68  
and  
<http://searchsecurity.techtarget.com/tip/Understanding-risk>

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**QUESTION 541**

Within the context of the CBK, which of the following provides a MINIMUM level of security ACCEPTABLE for an environment?

- A. A baseline
- B. A standard
- C. A procedure
- D. A guideline

Answer: A

Explanation: Baselines provide the minimum level of security necessary throughout the organization.

Standards specify how hardware and software products should be used throughout the organization.

Procedures are detailed step-by-step instruction on how to achieve certain tasks.

Guidelines are recommendation actions and operational guides to personnel when a specific standard does not apply.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 3: Security Management Practices (page 94).

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**QUESTION 542**

According to private sector data classification levels, how would salary levels and medical information be classified?

- A. Public.
- B. Internal Use Only.
- C. Restricted.
- D. Confidential.

Answer: D

Explanation: Typically there are three to four levels of information classification used by most organizations:

Confidential: Information that, if released or disclosed outside of the organization, would create severe problems for the organization. For example, information that provides a competitive advantage is important to the technical or financial success (like trade secrets, intellectual property, or research designs), or protects the privacy of individuals would be considered confidential. Information may include payroll information, health records, credit information, formulas, technical designs, restricted regulatory information, senior management internal correspondence, or business strategies or plans. These may also be called top secret, privileged, personal, sensitive, or highly confidential. In other words this information is ok within a defined

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group in the company such as marketing or sales, but is not suited for release to anyone else in the company without permission.

The following answers are incorrect:

**Public:** Information that may be disclosed to the general public without concern for harming the company, employees, or business partners. No special protections are required, and information in this category is sometimes referred to as unclassified. For example, information that is posted to a company's public Internet site, publicly released announcements, marketing materials, cafeteria menus, and any internal documents that would not present harm to the company if they were disclosed would be classified as public. While there is little concern for confidentiality, integrity and availability should be considered.

**Internal Use Only:** Information that could be disclosed within the company, but could harm the company if disclosed externally. Information such as customer lists, vendor pricing, organizational policies, standards and procedures, and internal organization announcements would need baseline security protections, but do not rise to the level of protection as confidential information. In other words, the information may be used freely within the company but any unapproved use outside the company can pose a chance of harm.

**Restricted:** Information that requires the utmost protection or, if discovered by unauthorized personnel, would cause irreparable harm to the organization would have the highest level of classification. There may be very few pieces of information like this within an organization, but data classified at this level requires all the access control and protection mechanisms available to the organization. Even when information classified at this level exists, there will be few copies of it.

Reference(s) Used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 952-976). Auerbach Publications. Kindle Edition.

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### QUESTION 543

Which of the following would be the best criterion to consider in determining the classification of an information asset?

- A. Value
- B. Age
- C. Useful life
- D. Personal association

Answer: A

**Explanation:** Information classification should be based on the value of the information to the organization and its sensitivity (reflection of how much damage would accrue due to disclosure). Age is incorrect. While age might be a consideration in some cases, the guiding principles should be value and sensitivity.

Useful life. While useful lifetime is relevant to how long data protections should be applied, the classification is based on information value and sensitivity.

Personal association is incorrect. Information classification decisions should be based on value of the information and its sensitivity.

References:

CBK, pp. 101 - 102.

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**QUESTION 544**

Which of the following is not a responsibility of an information (data) owner?

- A. Determine what level of classification the information requires.
- B. Periodically review the classification assignments against business needs.
- C. Delegate the responsibility of data protection to data custodians.
- D. Running regular backups and periodically testing the validity of the backup data.

Answer: D

Explanation: This responsibility would be delegated to a data custodian rather than being performed directly by the information owner.

"Determine what level of classification the information requires" is incorrect. This is one of the major responsibilities of an information owner.

"Periodically review the classification assignments against business needs" is incorrect. This is one of the major responsibilities of an information owner.

"Delegates responsibility of maintenance of the data protection mechanisms to the data custodian" is incorrect. This is a responsibility of the information owner.

References:

CBK p. 105.

AIO3, p. 53-54, 960

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**QUESTION 545**

Which of the following embodies all the detailed actions that personnel are required to follow?

- A. Standards
- B. Guidelines
- C. Procedures
- D. Baselines

Answer: C

Explanation: Procedures are step-by-step instructions in support of the policies, standards, guidelines and baselines. The procedure indicates how the policy will be implemented and who does what to accomplish the tasks."

Standards is incorrect. Standards are a "Mandatory statement of minimum requirements that support some part of a policy, the standards in this case is your own company standards and not standards such as the ISO standards"

Guidelines is incorrect. "Guidelines are discretionary or optional controls used to enable individuals to make judgments with respect to security actions."

Baselines is incorrect. Baselines "are a minimum acceptable level of security. This minimum is implemented using specific rules necessary to implement the security controls in support of the policy and standards." For example, requiring a password of at least 8 characters would be an example. Requiring all users to have a minimum of an antivirus, a personal firewall, and an anti-spyware tool could be another example.

**References:**

CBK, pp. 12 - 16. Note especially the discussion of the "hammer policy" on pp. 16-17 for the differences between policy, standard, guideline and procedure.  
AIO3, pp. 88-93.

**QUESTION 546**

Who is responsible for providing reports to the senior management on the effectiveness of the security controls?

- A. Information systems security professionals
- B. Data owners
- C. Data custodians
- D. Information systems auditors

Answer: D

Explanation: IT auditors determine whether systems are in compliance with the security policies, procedures, standards, baselines, designs, architectures, management direction and other requirements" and "provide top company management with an independent view of the controls that have been designed and their effectiveness."

"Information systems security professionals" is incorrect. Security professionals develop the security policies and supporting baselines, etc.

"Data owners" is incorrect. Data owners have overall responsibility for information assets and assign the appropriate classification for the asset as well as ensure that the asset is protected with the proper controls.

"Data custodians" is incorrect. Data custodians care for an information asset on behalf of the data owner.

**References;**

CBK, pp. 38 - 42.  
AIO3. pp. 99 - 104

**QUESTION 547**

What is the highest amount a company should spend annually on countermeasures for protecting an asset valued at \$1,000,000 from a threat that has an annualized rate of occurrence (ARO) of once every five years and an exposure factor (EF) of 30% ?

- A. \$300,000
- B. \$150,000
- C. \$60,000
- D. \$1,500

Answer: C

Explanation: The cost of a countermeasure should not be greater in cost than the risk it mitigates (ALE). For a quantitative risk assessment, the equation is  $ALE = ARO \times SLE$  where the SLE is calculated as the product of asset value x exposure factor. An event that happen once every five

years would have an ARO of .2 (1 divided by 5).

SLE = Asset Value (AV) x Exposure Fact (EF)

SLE = 1,000,000 x .30 = 300,000

ALE = SLE x Annualized Rate of Occurrence (ARO)

ALE = 300,000 x .2 = 60,000

Know your acronyms:

ALE -- Annual loss expectancy

ARO -- Annual rate of occurrence

SLE -- Single loss expectancy

The following are incorrect answers:

\$300,000 is incorrect. See the explanation of the correct answer for the correct calculation.

\$150,000 is incorrect. See the explanation of the correct answer for the correct calculation.

\$1,500 is incorrect. See the explanation of the correct answer for the correct calculation.

Reference(s) used for this question:

Mc Graw Hill, Shon Harris, CISSP All In One (AIO) book, Sixth Edition , Pages 87-88

and

Official ISC2 Guide to the CISSP Exam, (OIG), Pages 60-61

### QUESTION 548

Which of the following statements pertaining to quantitative risk analysis is false?

- A. Portion of it can be automated
- B. It involves complex calculations
- C. It requires a high volume of information
- D. It requires little experience to apply

Answer: D

Explanation: Assigning the values for the inputs to a purely quantitative risk assessment requires both a lot of time and significant experience on the part of the assessors. The most experienced employees or representatives from each of the departments would be involved in the process. It is NOT an easy task if you wish to come up with accurate values.

"It can be automated" is incorrect. There are a number of tools on the market that automate the process of conducting a quantitative risk assessment.

"It involves complex calculations" is incorrect. The calculations are simple for basic scenarios but could become fairly complex for large cases. The formulas have to be applied correctly.

"It requires a high volume of information" is incorrect. Large amounts of information are required in order to develop reasonable and defensible values for the inputs to the quantitative risk assessment.

References:

CBK, pp. 60-61

AIO3, p. 73, 78

The Cissp Prep Guide - Mastering The Ten Domains Of Computer Security - 2001, page 24

### QUESTION 549

Which property ensures that only the intended recipient can access the data and nobody else?

- A. Confidentiality
- B. Capability
- C. Integrity
- D. Availability

Answer: A

Explanation: Confidentiality is defined as the property that ensures that only the intended recipient can access the data and nobody else. It is usually achieved using cryptographic methods, tools, and protocols.

Confidentiality supports the principle of “least privilege” by providing that only authorized individuals, processes, or systems should have access to information on a need-to-know basis. The level of access that an authorized individual should have is at the level necessary for them to do their job. In recent years, much press has been dedicated to the privacy of information and the need to protect it from individuals, who may be able to commit crimes by viewing the information. Identity theft is the act of assuming one’s identity through knowledge of confidential information obtained from various sources.

The following are incorrect answers:

Capability is incorrect. Capability is relevant to access control. Capability-based security is a concept in the design of secure computing systems, one of the existing security models. A capability (known in some systems as a key) is a communicable, unforgeable token of authority. It refers to a value that references an object along with an associated set of access rights. A user program on a capability-based operating system must use a capability to access an object.

Capability-based security refers to the principle of designing user programs such that they directly share capabilities with each other according to the principle of least privilege, and to the operating system infrastructure necessary to make such transactions efficient and secure.

Integrity is incorrect. Integrity protects information from unauthorized modification or loss.

Availability is incorrect. Availability assures that information and services are available for use by authorized entities according to the service level objective.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 9345-9349). Auerbach Publications. Kindle Edition.

[http://en.wikipedia.org/wiki/Capability-based\\_security](http://en.wikipedia.org/wiki/Capability-based_security)

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## QUESTION 550

Making sure that the data has not been changed unintentionally, due to an accident or malice is:

- A. Integrity.
- B. Confidentiality.
- C. Availability.
- D. Auditability.

Answer: A

Explanation: Integrity refers to the protection of information from unauthorized modification or

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deletion.

Confidentiality is incorrect. Confidentiality refers to the protection of information from unauthorized disclosure.

Availability is incorrect. Availability refers to the assurance that information and services will be available to authorized users in accordance with the service level objective.

Auditability is incorrect. Auditability refers to the ability to trace an action to the identity that performed it and identify the date and time at which it occurred.

References:

CBK, pp. 5 - 6

AIO3, pp. 56 - 57

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### QUESTION 551

Which of the following are the steps usually followed in the development of documents such as security policy, standards and procedures?

- A. design, development, publication, coding, and testing.
- B. design, evaluation, approval, publication, and implementation.
- C. initiation, evaluation, development, approval, publication, implementation, and maintenance.
- D. feasibility, development, approval, implementation, and integration.

Answer: C

Explanation: The common steps used the development of security policy are initiation of the project, evaluation, development, approval, publication, implementation, and maintenance. The other choices listed are the phases of the software development life cycle and not the step used to develop documents such as Policies, Standards, etc...

Reference: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 3, 2002, Auerbach Publications.

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### QUESTION 552

What is the goal of the Maintenance phase in a common development process of a security policy?

- A. to review the document on the specified review date
- B. publication within the organization
- C. to write a proposal to management that states the objectives of the policy
- D. to present the document to an approving body

Answer: A

Explanation: "publication within the organization" is the goal of the Publication Phase "write a proposal to management that states the objectives of the policy" is part of Initial and Evaluation Phase "Present the document to an approving body" is part of Approval Phase.

Reference: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 3, 2002, Auerbach Publications.

Also: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains

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of Computer Security, John Wiley & Sons, 2001, Chapter 8: Business Continuity Planning and Disaster Recovery Planning (page 286).

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**QUESTION 553**

What is the difference between Advisory and Regulatory security policies?

- A. there is no difference between them
- B. regulatory policies are high level policy, while advisory policies are very detailed
- C. Advisory policies are not mandated. Regulatory policies must be implemented.
- D. Advisory policies are mandated while Regulatory policies are not

Answer: C

Explanation: Advisory policies are security policies that are not mandated to be followed but are strongly suggested, perhaps with serious consequences defined for failure to follow them (such as termination, a job action warning, and so forth). A company with such policies wants most employees to consider these policies mandatory.

Most policies fall under this broad category.

Advisory policies can have many exclusions or application levels. Thus, these policies can control some employees more than others, according to their roles and responsibilities within that organization. For example, a policy that requires a certain procedure for transaction processing might allow for an alternative procedure under certain, specified conditions.

#### Regulatory

Regulatory policies are security policies that an organization must implement due to compliance, regulation, or other legal requirements. These companies might be financial institutions, public utilities, or some other type of organization that operates in the public interest. These policies are usually very detailed and are specific to the industry in which the organization operates.

Regulatory policies commonly have two main purposes:

1. To ensure that an organization is following the standard procedures or base practices of operation in its specific industry
2. To give an organization the confidence that it is following the standard and accepted industry policy

#### Informative

Informative policies are policies that exist simply to inform the reader. There are no implied or specified requirements, and the audience for this information could be certain internal (within the organization) or external parties. This does not mean that the policies are authorized for public consumption but that they are general enough to be distributed to external parties (vendors accessing an extranet, for example) without a loss of confidentiality.

#### References:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Page 12, Chapter 1: Security Management Practices.

also see:

The CISSP Prep Guide:Mastering the Ten Domains of Computer Security by Ronald L. Krutz, Russell Dean Vines, Edward M. Stroz

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also see:

<http://i-data-recovery.com/information-security/information-security-policies-standards-guidelinesand-procedures>

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### QUESTION 554

In regards to information classification what is the main responsibility of information (data) owner?

- A. determining the data sensitivity or classification level
- B. running regular data backups
- C. audit the data users
- D. periodically check the validity and accuracy of the data

Answer: A

Explanation: Making the determination to decide what level of classification the information requires is the main responsibility of the data owner.

The data owner within classification is a person from Management who has been entrusted with a data set that belong to the company. It could be for example the Chief Financial Officer (CFO) who has been entrusted with all financial date or it could be the Human Resource Director who has been entrusted with all Human Resource data. The information owner will decide what classification will be applied to the data based on Confidentiality, Integrity, Availability, Criticality, and Sensitivity of the data.

The Custodian is the technical person who will implement the proper classification on objects in accordance with the Data Owner. The custodian DOES NOT decide what classification to apply, it is the Data Owner who will dictate to the Custodian what is the classification to apply.

NOTE:

The term Data Owner is also used within Discretionary Access Control (DAC). Within DAC it means the person who has created an object. For example, if I create a file on my system then I am the owner of the file and I can decide who else could get access to the file. It is left to my discretion. Within DAC access is granted based solely on the Identity of the subject, this is why sometimes DAC is referred to as Identity Based Access Control.

The other choices were not the best answer

Running regular backups is the responsibility of custodian.

Audit the data users is the responsibility of the auditors

Periodically check the validity and accuracy of the data is not one of the data owner responsibility

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Page 14, Chapter 1: Security Management Practices.

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### QUESTION 555

What is the main purpose of Corporate Security Policy?

- A. To transfer the responsibility for the information security to all users of the organization
- B. To communicate management's intentions in regards to information security
- C. To provide detailed steps for performing specific actions

- 
- D. To provide a common framework for all development activities

Answer: B

Explanation: A Corporate Security Policy is a high level document that indicates what are management's intentions in regard to Information Security within the organization. It is high level in purpose, it does not give you details about specific products that would be used, specific steps, etc..

The organization's requirements for access control should be defined and documented in its security policies. Access rules and rights for each user or group of users should be clearly stated in an access policy statement. The access control policy should minimally consider:

Statements of general security principles and their applicability to the organization

Security requirements of individual enterprise applications, systems, and services

Consistency between the access control and information classification policies of different systems and networks

Contractual obligations or regulatory compliance regarding protection of assets

Standards defining user access profiles for organizational roles

Details regarding the management of the access control system

As a Certified Information System Security Professional (CISSP) you would be involved directly in the drafting and coordination of security policies, standards and supporting guidelines, procedures, and baselines.

Guidance provided by the CISSP for technical security issues, and emerging threats are considered for the adoption of new policies. Activities such as interpretation of government regulations and industry trends and analysis of vendor solutions to include in the security architecture that advances the security of the organization are performed by the CISSP as well.

The following are incorrect answers:

To transfer the responsibility for the information security to all users of the organization is bogus.

You CANNOT transfer responsibility, you can only transfer authority. Responsibility will also sit with upper management. The keywords ALL and USERS is also an indication that it is the wrong choice.

To provide detailed steps for performing specific actions is also a bogus detractor. A step by step document is referred to as a procedure. It details how to accomplish a specific task.

To provide a common framework for all development activities is also an invalid choice. Security Policies are not restricted only to development activities.

Reference Used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 1551-1565). Auerbach Publications. Kindle Edition.  
and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 9109-9112). Auerbach Publications. Kindle Edition.

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## QUESTION 556

Which of the following is not a component of a Operations Security "triples"?

- A. Asset  
B. Threat

- C. Vulnerability
- D. Risk

Answer: D

Explanation: The Operations Security domain is concerned with triples - threats, vulnerabilities and assets.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 216.

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### QUESTION 557

The absence of a safeguard, or a weakness in a system that may possibly be exploited is called a(n)?

- A. Threat
- B. Exposure
- C. Vulnerability
- D. Risk

Answer: C

Explanation: A vulnerability is a weakness in a system that can be exploited by a threat.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 237.

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### QUESTION 558

In the CIA triad, what does the letter A stand for?

- A. Auditability
- B. Accountability
- C. Availability
- D. Authentication

Answer: C

Explanation: The CIA triad stands for Confidentiality, Integrity and Availability.

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### QUESTION 559

Controls are implemented to:

- A. eliminate risk and reduce the potential for loss
- B. mitigate risk and eliminate the potential for loss
- C. mitigate risk and reduce the potential for loss
- D. eliminate risk and eliminate the potential for loss

Answer: C

Explanation: Controls are implemented to mitigate risk and reduce the potential for loss. Preventive controls are put in place to inhibit harmful occurrences; detective controls are established to discover harmful occurrences; corrective controls are used to restore systems that are victims of harmful attacks.

It is not feasible and possible to eliminate all risks and the potential for loss as risk/threats are constantly changing.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 32.

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### QUESTION 560

What can be described as a measure of the magnitude of loss or impact on the value of an asset?

- A. Probability
- B. Exposure factor
- C. Vulnerability
- D. Threat

Answer: B

Explanation: The exposure factor is a measure of the magnitude of loss or impact on the value of an asset.

The probability is the chance or likelihood, in a finite sample, that an event will occur or that a specific loss value may be attained should the event occur.

A vulnerability is the absence or weakness of a risk-reducing safeguard.

A threat is event, the occurrence of which could have an undesired impact.

Source: ROTHKE, Ben, CISSP CBK Review presentation on domain 3, August 1999.

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### QUESTION 561

Computer security should be first and foremost which of the following:

- A. Cover all identified risks
- B. Be cost-effective.
- C. Be examined in both monetary and non-monetary terms.
- D. Be proportionate to the value of IT systems.

Answer: B

Explanation: Computer security should be first and foremost cost-effective.

As for any organization, there is a need to measure their cost-effectiveness, to justify budget usage and provide supportive arguments for their next budget claim. But organizations often have difficulties to accurately measure the effectiveness and the cost of their information security activities.

The classical financial approach for ROI calculation is not particularly appropriate for measuring security-related initiatives: Security is not generally an investment that results in a profit. Security is more about loss prevention. In other terms, when you invest in security, you don't expect

benefits; you expect to reduce the risks threatening your assets.

The concept of the ROI calculation applies to every investment. Security is no exception.

Executive decision-makers want to know the impact security is having on the bottom line. In order to know how much they should spend on security, they need to know how much is the lack of security costing to the business and what are the most cost-effective solutions.

Applied to security, a Return On Security Investment (ROSI) calculation can provide quantitative answers to essential financial questions:

- Is an organization paying too much for its security?
- What financial impact on productivity could have lack of security?
- When is the security investment enough?
- Is this security product/organisation beneficial?

The following are other concerns about computer security but not the first and foremost:

The costs and benefits of security should be carefully examined in both monetary and nonmonetary terms to ensure that the cost of controls does not exceed expected benefits.

Security should be appropriate and proportionate to the value of and degree of reliance on the IT systems and to the severity, probability, and extent of potential harm.

Requirements for security vary, depending upon the particular IT system. Therefore it does not make sense for computer security to cover all identified risks when the cost of the measures exceeds the value of the systems they are protecting.

Reference(s) used for this question:

SWANSON, Marianne & GUTTMAN, Barbara, National Institute of Standards and Technology (NIST), NIST Special Publication 800-14, Generally Accepted Principles and Practices for Securing Information Technology Systems, September 1996 (page 6).

and

<http://www.enisa.europa.eu/activities/cert/other-work/introduction-to-return-on-security-investment>

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## QUESTION 562

Which of the following best allows risk management results to be used knowledgeably?

- A. A vulnerability analysis
- B. A likelihood assessment
- C. An uncertainty analysis
- D. A threat identification

Answer: C

Explanation: Risk management consists of two primary and one underlying activity; risk assessment and risk mitigation are the primary activities and uncertainty analysis is the underlying one. After having performed risk assessment and mitigation, an uncertainty analysis should be performed. Risk management must often rely on speculation, best guesses, incomplete data, and many unproven assumptions. A documented uncertainty analysis allows the risk management results to be used knowledgeably. A vulnerability analysis, likelihood assessment and threat identification are all parts of the collection and analysis of data part of the risk assessment, one of the primary activities of risk management.

Source: SWANSON, Marianne & GUTTMAN, Barbara, National Institute of Standards and

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Technology (NIST), NIST Special Publication 800-14, Generally Accepted Principles and Practices for Securing Information Technology Systems, September 1996 (pages 19-21).

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**QUESTION 563**

Who is responsible for initiating corrective measures and capabilities used when there are security violations?

- A. Information systems auditor
- B. Security administrator
- C. Management
- D. Data owners

Answer: C

Explanation: Management is responsible for protecting all assets that are directly or indirectly under their control.

They must ensure that employees understand their obligations to protect the company's assets, and implement security in accordance with the company policy. Finally, management is responsible for initiating corrective actions when there are security violations.

Source: HARE, Chris, Security management Practices CISSP Open Study Guide, version 1.0, april 1999.

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**QUESTION 564**

What can best be defined as high-level statements, beliefs, goals and objectives?

- A. Standards
- B. Policies
- C. Guidelines
- D. Procedures

Answer: B

Explanation: Policies are high-level statements, beliefs, goals and objectives and the general means for their attainment for a specific subject area. Standards are mandatory activities, action, rules or regulations designed to provide policies with the support structure and specific direction they require to be effective. Guidelines are more general statements of how to achieve the policies objectives by providing a framework within which to implement procedures. Procedures spell out the specific steps of how the policy and supporting standards and how guidelines will be implemented.

Source: HARE, Chris, Security management Practices CISSP Open Study Guide, version 1.0, april 1999.

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**QUESTION 565**

In an organization, an Information Technology security function should:

- A. Be a function within the information systems function of an organization.

- 
- B. Report directly to a specialized business unit such as legal, corporate security or insurance.
  - C. Be lead by a Chief Security Officer and report directly to the CEO.
  - D. Be independent but report to the Information Systems function.

Answer: C

Explanation: In order to offer more independence and get more attention from management, an IT security function should be independent from IT and report directly to the CEO. Having it report to a specialized business unit (e.g. legal) is not recommended as it promotes a low technology view of the function and leads people to believe that it is someone else's problem.

Source: HARE, Chris, Security management Practices CISSP Open Study Guide, version 1.0, april 1999.

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### QUESTION 566

IT security measures should:

- A. Be complex
- B. Be tailored to meet organizational security goals.
- C. Make sure that every asset of the organization is well protected.
- D. Not be developed in a layered fashion.

Answer: B

Explanation: In general, IT security measures are tailored according to an organization's unique needs. While numerous factors, such as the overriding mission requirements, and guidance, are to be considered, the fundamental issue is the protection of the mission or business from IT securityrelated, negative impacts. Because IT security needs are not uniform, system designers and security practitioners should consider the level of trust when connecting to other external networks and internal sub-domains. Recognizing the uniqueness of each system allows a layered security strategy to be used - implementing lower assurance solutions with lower costs to protect less critical systems and higher assurance solutions only at the most critical areas.

The more complex the mechanism, the more likely it may possess exploitable flaws. Simple mechanisms tend to have fewer exploitable flaws and require less maintenance. Further, because configuration management issues are simplified, updating or replacing a simple mechanism becomes a less intensive process.

Security designs should consider a layered approach to address or protect against a specific threat or to reduce a vulnerability. For example, the use of a packet-filtering router in conjunction with an application gateway and an intrusion detection system combine to increase the work-factor an attacker must expend to successfully attack the system. Adding good password controls and adequate user training improves the system's security posture even more.

The need for layered protections is especially important when commercial-off-the-shelf (COTS) products are used. Practical experience has shown that the current state-of-the-art for security quality in COTS products does not provide a high degree of protection against sophisticated attacks. It is possible to help mitigate this situation by placing several controls in series, requiring additional work by attackers to accomplish their goals.

Source: STONEBURNER, Gary & al, National Institute of Standards and Technology (NIST), NIST

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Special Publication 800-27, Engineering Principles for Information Technology Security (A Baseline for Achieving Security), June 2001 (pages 9-10).

**QUESTION 567**

What can be best defined as the examination of threat sources against system vulnerabilities to determine the threats for a particular system in a particular operational environment?

- A. Risk management
- B. Risk analysis
- C. Threat analysis
- D. Due diligence

Answer: C

Explanation: Threat analysis is the examination of threat sources against system vulnerabilities to determine the threats for a particular system in a particular operational environment.

The following answers are incorrect:

Risk analysis is the process of identifying the risks to system security and determining the probability of occurrence, the resulting impact, and the additional safeguards that mitigate this impact.

Risk analysis is synonymous with risk assessment and part of risk management, which is the ongoing process of assessing the risk to mission/business as part of a risk-based approach used to determine adequate security for a system by analyzing the threats and vulnerabilities and selecting appropriate, cost-effective controls to achieve and maintain an acceptable level of risk. Due Diligence is identifying possible risks that could affect a company based on best practices and standards.

Reference(s) used for this question:

STONEBURNER, Gary & al, National Institute of Standards and Technology (NIST), NIST Special Publication 800-27, Engineering Principles for Information Technology Security (A Baseline for Achieving Security), June 2001 (page B-3).

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**QUESTION 568**

Which of the following is NOT a common integrity goal?

- A. Prevent unauthorized users from making modifications.
- B. Maintain internal and external consistency.
- C. Prevent authorized users from making improper modifications.
- D. Prevent paths that could lead to inappropriate disclosure.

Answer: D

Explanation: Inappropriate disclosure is a confidentiality, not an integrity goal.

All of the other choices above are integrity goals addressed by the Clark-Wilson integrity model.

The Clark-Wilson model is an integrity model that addresses all three integrity goals:

1. prevent unauthorized users from making modifications,
2. prevent authorized users from making improper modifications, and

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3. maintain internal and external consistency through auditing.

NOTE: Biba address only the first goal of integrity above

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 1384). McGraw-Hill. Kindle Edition.

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### QUESTION 569

Who of the following is responsible for ensuring that proper controls are in place to address integrity, confidentiality, and availability of IT systems and data?

- A. Business and functional managers
- B. IT Security practitioners
- C. System and information owners
- D. Chief information officer

Answer: C

Explanation: The system and information owners are responsible for ensuring that proper controls are in place to address integrity, confidentiality, and availability of the IT systems and data they own. IT security practitioners are responsible for proper implementation of security requirements in their IT systems.

Source: STONEBURNER, Gary et al., NIST Special publication 800-30, Risk management Guide for Information Technology Systems, 2001 (page 6).

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### QUESTION 570

Which of the following is an advantage of a qualitative over a quantitative risk analysis?

- A. It prioritizes the risks and identifies areas for immediate improvement in addressing the vulnerabilities.
- B. It provides specific quantifiable measurements of the magnitude of the impacts.
- C. It makes a cost-benefit analysis of recommended controls easier.
- D. It can easily be automated.

Answer: A

Explanation: The main advantage of the qualitative impact analysis is that it prioritizes the risks and identifies areas for immediate improvement in addressing the vulnerabilities. It does not provide specific quantifiable measurements of the magnitude of the impacts, therefore making a cost-analysis of any recommended controls difficult. Since it involves a consensus of export and some guesswork based on the experience of Subject Matter Experts (SME's), it can not be easily automated.

Reference used for this question:

STONEBURNER, Gary et al., NIST Special publication 800-30, Risk management Guide for Information Technology Systems, 2001 (page 23).

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**QUESTION 571**

An effective information security policy should not have which of the following characteristic?

- A. Include separation of duties
- B. Be designed with a short- to mid-term focus
- C. Be understandable and supported by all stakeholders
- D. Specify areas of responsibility and authority

Answer: B

Explanation: An effective information security policy should be designed with a long-term focus.

All other characteristics apply.

Source: ALLEN, Julia H., The CertKingdom to System and Network Security Practices, Addison-Wesley, 2001, Appendix B, Practice-Level Policy Considerations (page 397).

**QUESTION 572**

Which of the following choice is NOT normally part of the questions that would be asked in regards to an organization's information security policy?

- A. Who is involved in establishing the security policy?
- B. Where is the organization's security policy defined?
- C. What are the actions that need to be performed in case of a disaster?
- D. Who is responsible for monitoring compliance to the organization's security policy?

Answer: C

Explanation: Only personnel implicated in the plan should have a copy of the Disaster Recovery Plan whereas everyone should be aware of the contents of the organization's information security policy.

Source: ALLEN, Julia H., The CertKingdom to System and Network Security Practices, Addison-Wesley, 2001, Appendix B, Practice-Level Policy Considerations (page 398).

**QUESTION 573**

The property of a system or a system resource being accessible and usable upon demand by an authorized system entity, according to performance specifications for the system is referred to as?

- A. Confidentiality
- B. Availability
- C. Integrity
- D. Reliability

Answer: B

Explanation: A company security program must:

1) assure that systems and applications operate effectively and provide appropriate confidentiality, integrity, and availability;

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2) protect information commensurate with the level of risk and magnitude of harm resulting from loss, misuse, unauthorized access, or modification.

The property of a system or a system resource being accessible and usable upon demand by an authorized system entity, according to performance specifications for the system; i.e., a system is available if it provides services according to the system design whenever users request them.

The following are incorrect answers:

Confidentiality - The information requires protection from unauthorized disclosure and only the INTENDED recipient should have access to the meaning of the data either in storage or in transit.

Integrity - The information must be protected from unauthorized, unanticipated, or unintentional modification. This includes, but is not limited to:

Authenticity – A third party must be able to verify that the content of a message has not been changed in transit.

Non-repudiation – The origin or the receipt of a specific message must be verifiable by a third party.

Accountability - A security goal that generates the requirement for actions of an entity to be traced uniquely to that entity.

Reference used for this question:

RFC 2828

and

SWANSON, Marianne, NIST Special Publication 800-26, Security Self-Assessment Guide for Information Technology Systems, November 2001 (page 5).

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### QUESTION 574

Which of the following would best classify as a management control?

- A. Review of security controls
- B. Personnel security
- C. Physical and environmental protection
- D. Documentation

Answer: A

Explanation: Management controls focus on the management of the IT security system and the management of risk for a system.

They are techniques and concerns that are normally addressed by management.

Routine evaluations and response to identified vulnerabilities are important elements of managing the risk of a system, thus considered management controls.

**SECURITY CONTROLS:** The management, operational, and technical controls (i.e., safeguards or countermeasures) prescribed for an information system to protect the confidentiality, integrity, and availability of the system and its information.

**SECURITY CONTROL BASELINE:** The set of minimum security controls defined for a low-impact, moderate-impact, or high-impact information system.

The following are incorrect answers:

Personnel security, physical and environmental protection and documentation are forms of operational controls.

Reference(s) used for this question:

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<http://csrc.nist.gov/publications/drafts/800-53-rev4/sp800-53-rev4-ipd.pdf>

and

FIPS PUB 200 at <http://csrc.nist.gov/publications/fips/fips200/FIPS-200-final-march.pdf>

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### QUESTION 575

What can be defined as an event that could cause harm to the information systems?

- A. A risk
- B. A threat
- C. A vulnerability
- D. A weakness

Answer: B

Explanation: A threat is an event or activity that has the potential to cause harm to the information systems. A risk is the probability that a threat will materialize. A vulnerability, or weakness, is a lack of a safeguard, which may be exploited by a threat, causing harm to the information systems.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 1: Access Control Systems (page 32).

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### QUESTION 576

Which of the following statements pertaining to a security policy is incorrect?

- A. Its main purpose is to inform the users, administrators and managers of their obligatory requirements for protecting technology and information assets.
- B. It specifies how hardware and software should be used throughout the organization.
- C. It needs to have the acceptance and support of all levels of employees within the organization in order for it to be appropriate and effective.
- D. It must be flexible to the changing environment.

Answer: B

Explanation: A security policy would NOT define how hardware and software should be used throughout the organization. A standard or a procedure would provide such details but not a policy.

A security policy is a formal statement of the rules that people who are given access to an organization's technology and information assets must abide. The policy communicates the security goals to all of the users, the administrators, and the managers. The goals will be largely determined by the following key tradeoffs: services offered versus security provided, ease of use versus security, and cost of security versus risk of loss.

The main purpose of a security policy is to inform the users, the administrators and the managers of their obligatory requirements for protecting technology and information assets.

The policy should specify the mechanisms through which these requirements can be met. Another purpose is to provide a baseline from which to acquire, configure and audit computer systems and networks for compliance with the policy. In order for a security policy to be appropriate and

effective, it needs to have the acceptance and support of all levels of employees within the organization. A good security policy must:

- Be able to be implemented through system administration procedures, publishing of acceptable use guidelines, or other appropriate methods
- Be able to be enforced with security tools, where appropriate, and with sanctions, where actual prevention is not technically feasible
- Clearly define the areas of responsibility for the users, the administrators, and the managers
- Be communicated to all once it is established
- Be flexible to the changing environment of a computer network since it is a living document

Reference(s) used for this question:

National Security Agency, Systems and Network Attack Center (SNAC), The 60 Minute Network Security Guide, February 2002, page 7.

or

A local copy is kept at:

<https://www.freepRACTICETESTS.org/documents/The%2060%20Minute%20Network%20Security%20Guide.pdf>

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### QUESTION 577

Which of the following best defines add-on security?

- A. Physical security complementing logical security measures.
- B. Protection mechanisms implemented as an integral part of an information system.
- C. Layer security.
- D. Protection mechanisms implemented after an information system has become operational.

Answer: D

Explanation: The Internet Security Glossary (RFC2828) defines add-on security as "The retrofitting of protection mechanisms, implemented by hardware or software, after the [automatic data processing] system has become operational."

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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### QUESTION 578

The preliminary steps to security planning include all of the following EXCEPT which of the following?

- A. Establish objectives.
- B. List planning assumptions.
- C. Establish a security audit function.
- D. Determine alternate courses of action

Answer: C

Explanation: The keyword within the question is: preliminary

This means that you are starting your effort, you cannot audit if your infrastructure is not even in place.

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Reference used for this question:

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 579

Step-by-step instructions used to satisfy control requirements is called a:

- A. policy
- B. standard
- C. guideline
- D. procedure

Answer: D

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 580

One purpose of a security awareness program is to modify:

- A. employee's attitudes and behaviors towards enterprise's security posture
- B. management's approach towards enterprise's security posture
- C. attitudes of employees with sensitive data
- D. corporate attitudes about safeguarding data

Answer: A

Explanation: Security-awareness training is performed to modify employees' behavior and attitude toward security. This can best be achieved through a formalized process of security awareness training.

It is used to increase the overall awareness of security throughout the company. It is targeted to every single employee and not only to one group of users.

Unfortunately you cannot apply a patch to a human being, the only thing you can do is to educate employees and make them more aware of security issues and threats. Never underestimate human stupidity.

Reference(s) used for this question:

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

also see:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 130). McGraw-Hill. Kindle Edition.

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### QUESTION 581

Whose role is it to assign classification level to information?

- A. Security Administrator
- B. User
- C. Owner
- D. Auditor

Answer: C

Explanation:

The Data/Information Owner is ultimately responsible for the protection of the data. It is the Data/Information Owner that decides upon the classifications of that data they are responsible for. The data owner decides upon the classification of the data he is responsible for and alters that classification if the business need arises.

The following answers are incorrect:

Security Administrator. Is incorrect because this individual is responsible for ensuring that the access right granted are correct and support the policies and directives that the Data/Information Owner defines.

User. Is Incorrect because the user uses/access the data according to how the Data/Information Owner defined their access.

Auditor. Is incorrect because the Auditor is responsible for ensuring that the access levels are appropriate. The Auditor would verify that the Owner classified the data properly.

References:

CISSP All In One Third Edition, Shon Harris, Page 121

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### QUESTION 582

Which type of security control is also known as "Logical" control?

- A. Physical
- B. Technical
- C. Administrative
- D. Risk

Answer: B

Explanation: The following answers are incorrect:

Physical: This is a type of security control, but does not have an alternate name.

Administrative: This is a type of security control, but does not have an alternate name.

Risk: This is not a type of security control.

The following reference(s) were/was used to create this question:

Shon Harris AIO 4th Edition, Chapter 3, Page 57

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### QUESTION 583

What is surreptitious transfer of information from a higher classification compartment to a lower classification compartment without going through the formal communication channels?

- A. Object Reuse
- B. Covert Channel
- C. Security domain
- D. Data Transfer

Answer: B

Explanation: In computer security, a covert channel is a type of computer security attack that creates a capability to transfer information objects between processes that are not supposed to be allowed to communicate by the computer security policy. The term, originated in 1973 by Lampson is defined as (channels) not intended for information transfer at all, such as the service program's effect on system load, to distinguish it from Legitimate channels that are subjected to access controls by COMPUSEC.

For more details see: [http://en.wikipedia.org/wiki/Covert\\_channel](http://en.wikipedia.org/wiki/Covert_channel)

The following answers are incorrect:

Object Reuse

Security Domain

Data Transfer

The following reference(s) were/was used to create this question:

ISC2 Review V 8.00 page 440

[http://en.wikipedia.org/wiki/Covert\\_channel](http://en.wikipedia.org/wiki/Covert_channel)

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### QUESTION 584

The owner of a system should have the confidence that the system will behave according to its specifications. This is termed as :

- A. Integrity
- B. Accountability
- C. Assurance
- D. Availability

Answer: C

Explanation: The owner of a system should have the confidence that the system will behave according to its specifications. This is termed as Assurance

The following answers are incorrect:

Integrity

Accountability

Availability

The following reference(s) were/was used to create this question:

Ethical hacking countermeasures

Introduction to Ethical hacking

Orange Book

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### QUESTION 585

Which of the following is best practice to employ in order to reduce the risk of collusion?

- A. Least Privilege
- B. Job Rotation
- C. Separation of Duties
- D. Mandatory Vacations

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Answer: B

Explanation: The practice of Job Rotation can reduce the risk of collusion of activities between individuals. Job Rotation can be used to detect illegal activities or fraud within the system by having a new person filling up specific roles at regular interval. It is often times combined with Separation of duties as well.

Least Privilege and Separation of Duties are usually what would entice people to work in Collusion. It is not preventing collusion as such, it is preventing abuse where a critical task cannot be performed by one person alone. Both are based on Split Knowledge, where only a portion of the knowledge is known by each person involved.

Collusion means that at least two people are working together to cause some type of destruction or fraud. If people work together for a long period of time, then the chances of collusion are a lot more likely as they know each other very well and could decide to commit abuse or fraud.

Based on the 4 choices presented, Job Rotation is certainly the best choice.

The following answers are incorrect:

Separation of Duties - ensures one individual does not have the capability to execute all of the required steps required to complete a critical task. This control forces people to work in collusion if they wish to attempt bypassing the controls in place. This process does not reduce the likelihood that collusion will take place, it is the opposite where people are forced to work in collusion if they wish to abuse of the system.

Mandatory Vacation - Provides similar benefits to Job Rotation, but the primary purpose is to identify and detect fraudulent activities of individuals while they are on leave and someone else is doing their duties. This practice is short term in focus and thus job rotation is the BEST practice to detect collusion as it is long term in focus.

Least Privilege - the principle of providing the most restrictive access possible and still allow subjects to perform authorized tasks.

The following reference(s) were/was used to create this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press (Kindle Locations 671-673). Auerbach Publications. Kindle Edition.

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## QUESTION 586

Which of the following is not classified as a "Security and Audit Frameworks and Methodologies"

- A. Bell LaPadula
- B. Committee of Sponsoring Organizations of the Treadway Commission (COSO)
- C. IT Infrastructure Library (ITIL)
- D. Control Objectives for Information and related Technology (COBIT)

Answer: A

Explanation: From the official Guide, second edition: Bell LaPadula is a Security Model.

"In general, most security models will focus on defining allowed interactions between subjects (active parties) and objects (passive parties) at a particular moment in time."

The remaining three listed would all be classified as frameworks.

"Multiple frameworks and methodologies have been created to support security, auditing, and risk assessment of implemented security controls. These resources are valuable to assist in the design

and testing of a security program. The following frameworks and methodologies have each gained a degree of acceptance within the auditing or information security community and assist with information security and auditing. Although the origins of several of them were not specifically designed to support information security, many of the processes within these practices help security professionals identify and implement controls in support of confidentiality, integrity, and availability."

The following reference(s) were/was used to create this question:

Tipton, Harold F. (2010-04-20). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) Chapter 3, Information Security Governance and Risk Management, Pages 514-516

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### QUESTION 587

Which Security and Audit Framework has been adopted by some organizations working towards Sarbanes—Oxley Section 404 compliance?

- A. Committee of Sponsoring Organizations of the Treadway Commission (COSO)
- B. BIBA
- C. National Institute of Standards and Technology Special Publication 800-66 (NIST SP 800-66)
- D. CCTA Risk Analysis and Management Method (CRAMM)

Answer: A

Explanation: From the official Guide, third edition:

"The Committee of Sponsoring Organizations of the Treadway Commission (COSO) was formed in 1985 to sponsor the National Commission on Fraudulent Financial Reporting, which studied factors that lead to fraudulent financial reporting and produced recommendations for public companies, their auditors, the Securities Exchange Commission, and other regulators. COSO identifies five areas of internal control necessary to meet the financial reporting and disclosure objectives. These include (1) control environment, (2) risk assessment, (3) control activities, (4) information and communication, and (5) monitoring. The COSO internal control model has been adopted as a framework by some organizations working toward Sarbanes—Oxley Section 404 compliance."

The following answers are incorrect:

Biba is a security model.

National Institute of Standards and Technology Special Publication 800-66 (NIST SP 800-66) and CCTA Risk Analysis and Management Method (CRAMM) are both Risk Assessment Methodologies. NIST SP 800-66 was written specifically with HIPAA clients in mind.

The following reference(s) were/was used to create this question:

Tipton, Harold F. & Steven Hernandez. Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) Chapter 3, Information Security Governance and Risk Management, Page 514-515

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### QUESTION 588

The Widget company decided to take their company public and while they were in the process of doing so had an external auditor come and look at their company. As part of the external audit they brought in an technology expert, who incidentally was a new CISSP. The auditor's expert asked to see their last risk analysis from the technology manager. The technology manager did not get back to him for a few days and then the Chief Financial Officer gave the auditors a 2 page

risk assesment that was signed by both the Chief Financial Officer and the Technology Manager. While reviewing it, the auditor noticed that only parts of their financial data were being backed up on site and no where else; the Chief Financial Officer accepted the risk of only partial financial data being backed up with no off-site copies available.

Who owns the risk with regards to the data that is being backed up and where it is stored?

- A. Only the Chief Financial Officer
- B. Only the most Senior Management such as the Chief Executive Officer
- C. Both the Chief Financial Officer and Technology Manager
- D. Only The Technology Manager

Answer: A

Explanation: One of the more important questions that face people working within an organization is who owns the risk?

The answer really isn't straightforward because it depends upon the situation and what kind of risk is being discussed. Senior management owns the risk present during the operation of the organization, but there may be times when senior management also relies upon data custodians or business units managers to conduct work, and it is during these times that these other elements of the organization also shoulder some of the responsibility of risk ownership.

What does Risk Owner mean:

According to the ISO Guide 73:2009, definition 3.5.1.5 and the vocabulary of the ISO31000 standard, risk owner is defined as "person or entity with the accountability and authority to manage a risk".

So senior management would be ultimately responsible because responsibilities cannot be delegated. However, management can assign department manager who are accountable and have the authority to manage the risk.

Dissecting this question:

This question makes you think a bit because normally, it would be the Chief Executive Officer. However, in this scenario it was pretty clear that they drafted a quick report and put something down to make it look like they spent time on it. Because the Chief Financial Officer was the one that signed off on it, they are the one that stuck their neck out legally and would be the one ultimately responsible (unless of course the Chief Financial Officer could prove in a court of law that the other company officers knew about the false report).

The Chief Executive Officer could theoretically be held responsible, but the Chief Financial Officer signed off on it instead and accepted the risks.

The Technology Manager, while clearly in collusion with the Chief Financial Officer to draft a quick report, is not an officer of the company and in turn would not be legally responsible. The Manager in fact did alert management of the risk and it was up to them to accept it.

NOTE ABOUT TERMINOLOGY:

One of our very active contributor (Jason), has sent us the following feedback:

Hi, One to watch out for relating to this question in the exam, with the recent ISO27001 updates in 2013, there is a replacement of 'asset ownership' terminology with the new term 'risk ownership'.

The Chief Financial Officer is the 'risk owner' according to the new updated ISO27001 standard.

See link for year 2013 revisions for ISO27001

<http://www.neupart.com/media/138936/iso27001rev2013riskmgmtprocess.pdf> Note on page 3: 'In

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the new version 'asset owner' is renamed 'risk owner' and you are only required to identify risks in relation to the confidentiality, integrity and availability. Cheers Jason.

My reply: Unfortunately ISC2 does not use up to the minute content on their current exam. The CBK has been updated only every 3 years or more in the past. So do not expect the new terminology from the latest ISO Standards to show up on your exam yet. Maybe in the future but for sure not in 2014.

The following answers are incorrect:

- Senior Management such as the Chief Executive Officer
- Both the Chief Financial Officer and Technology Manager
- Only The Technology Manager

The following reference(s) were/was used to create this question:

Reference: Harris, Shon (2010-01-15). CISSP All-in-One Exam Guide, Fifth Edition (p. 78). McGraw-Hill. Kindle Edition.

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### QUESTION 589

Common Criteria 15408 generally outlines assurance and functional requirements through a security evaluation process concept of \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ for Evaluated Assurance Levels (EALs) to certify a product or system.

- A. EAL, Security Target, Target of Evaluation
- B. SFR, Protection Profile, Security Target
- C. Protection Profile, Target of Evaluation, Security Target
- D. SFR, Security Target, Target of Evaluation

Answer: C

Explanation: Common Criteria 15408 generally outlines assurance and functional requirements through a security evaluation process concept of Protection Profile (PP), Target of Evaluation (TOE), and Security Target (ST) for Evaluated Assurance Levels (EALs) to certify a product or system.

This lists the correct sequential order of these applied concepts to formally conduct tests that evaluate a product or system for the certification for federal global information systems.

Common Criteria evaluations are performed on computer security products and systems. There are many terms related to Common Criteria and you must be familiar with them.

Target Of Evaluation (TOE) – the product or system that is the subject of the evaluation.

The evaluation serves to validate claims made about the target. To be of practical use, the evaluation must verify the target's security features. This is done through the following:

Protection Profile (PP) – a document, typically created by a user or user community, which identifies security requirements for a class of security devices (for example, smart cards used to provide digital signatures, or network firewalls) relevant to that user for a particular purpose.

Product vendors can choose to implement products that comply with one or more PPs, and have their products evaluated against those PPs. In such a case, a PP may serve as a template for the product's ST (Security Target, as defined below), or the authors of the ST will at least ensure that all requirements in relevant PPs also appear in the target's ST document. Customers looking for particular types of products can focus on those certified against the PP that meets their requirements.

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Security Target (ST) – the document that identifies the security properties of the target of evaluation. It is what the vendor claim the product can do. It may refer to one or more PPs. The TOE is evaluated against the SFRs (see below) established in its ST, no more and no less. This allows vendors to tailor the evaluation to accurately match the intended capabilities of their product. This means that a network firewall does not have to meet the same functional requirements as a database management system, and that different firewalls may in fact be evaluated against completely different lists of requirements. The ST is usually published so that potential customers may determine the specific security features that have been certified by the evaluation.

The evaluation process also tries to establish the level of confidence that may be placed in the product's security features through quality assurance processes:

Security Assurance Requirements (SARs) – descriptions of the measures taken during development and evaluation of the product to assure compliance with the claimed security functionality. For example, an evaluation may require that all source code is kept in a change management system, or that full functional testing is performed. The Common Criteria provides a catalogue of these, and the requirements may vary from one evaluation to the next. The requirements for particular targets or types of products are documented in the ST and PP, respectively.

Evaluation Assurance Level (EAL) – the numerical rating describing the depth and rigor of an evaluation. Each EAL corresponds to a package of security assurance requirements (SARs, see above) which covers the complete development of a product, with a given level of strictness. Common Criteria lists seven levels, with EAL 1 being the most basic (and therefore cheapest to implement and evaluate) and EAL 7 being the most stringent (and most expensive). Normally, an ST or PP author will not select assurance requirements individually but choose one of these packages, possibly 'augmenting' requirements in a few areas with requirements from a higher level. Higher EALs do not necessarily imply "better security", they only mean that the claimed security assurance of the TOE has been more extensively verified.

Security Functional Requirements (SFRs) – specify individual security functions which may be provided by a product. The Common Criteria presents a standard catalogue of such functions. For example, a SFR may state how a user acting a particular role might be authenticated. The list of SFRs can vary from one evaluation to the next, even if two targets are the same type of product. Although Common Criteria does not prescribe any SFRs to be included in an ST, it identifies dependencies where the correct operation of one function (such as the ability to limit access according to roles) is dependent on another (such as the ability to identify individual roles). So far, most PPs and most evaluated STs/certified products have been for IT components (e.g., firewalls, operating systems, smart cards). Common Criteria certification is sometimes specified for IT procurement. Other standards containing, e.g., interoperation, system management, user training, supplement CC and other product standards. Examples include the ISO/IEC 17799 (Or more properly BS 7799-1, which is now ISO/IEC 27002) or the German IT-Grundschutzhandbuch. Details of cryptographic implementation within the TOE are outside the scope of the CC. Instead, national standards, like FIPS 140-2 give the specifications for cryptographic modules, and various standards specify the cryptographic algorithms in use.

More recently, PP authors are including cryptographic requirements for CC evaluations that would typically be covered by FIPS 140-2 evaluations, broadening the bounds of the CC through scheme-specific interpretations.

The following answers are incorrect:

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1. Protection Profile, Security Target, Target of Evaluation
  2. SFR, Protection Profile, Security Target, Target of Evaluation
  4. SFR, Security Target, Protection Profile, Target of Evaluation

The following reference(s) were/was used to create this question:

ISO/IEC 15408 Common Criteria for IT Security Evaluations

and

[http://en.wikipedia.org/wiki/Common\\_Criteria](http://en.wikipedia.org/wiki/Common_Criteria)

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### QUESTION 590

What are the four domains that make up CobiT?

- A. Plan and Organize, Maintain and Implement, Deliver and Support, and Monitor and Evaluate
- B. Plan and Organize, Acquire and Implement, Support and Purchase, and Monitor and Evaluate
- C. Acquire and Implement, Deliver and Support, Monitor, and Evaluate
- D. Plan and Organize, Acquire and Implement, Deliver and Support, and Monitor and Evaluate

Answer: D

Explanation: CobiT has four domains: Plan and Organize, Acquire and Implement, Deliver and Support, and Monitor and Evaluate.

Each category drills down into subcategories. For example, Acquire and Implement contains the following subcategories:

- Acquire and Maintain Application Software
- Acquire and Maintain Technology Infrastructure
- Develop and Maintain Procedures
- Install and Accredit Systems
- Manage Changes

The following answers are incorrect:

Plan and Organize, Maintain and Implement, Deliver and Support, and Monitor and Evaluate

Plan and Organize, Acquire and Implement, Support and Purchase, and Monitor and Evaluate

Acquire and Implement, Deliver and Support, and Monitor and Evaluate

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 55). McGraw-Hill. Kindle Edition

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### QUESTION 591

CobiT was developed from the COSO framework. Which of the choices below best describe the COSO's main objectives and purpose?

- A. COSO main purpose is to help ensure fraudulent financial reporting cannot take place in an organization
- B. COSO main purpose is to define a sound risk management approach within financial companies.
- C. COSO addresses corporate culture and policy development.
- D. COSO is risk management system used for the protection of federal systems.

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Answer: A

Explanation: The Committee of Sponsoring Organizations of the Treadway Commission (COSO)<sup>2</sup> was formed in 1985 to sponsor the National Commission on Fraudulent Financial Reporting, which studied factors that lead to fraudulent financial reporting and produced recommendations for public companies, their auditors, the Securities Exchange Commission, and other regulators.

COSO identifies five areas of internal control necessary to meet the financial reporting and disclosure objectives.

These include:

- (1) control environment,
- (2) risk assessment,
- (3) control activities,
- (4) information and communication, and
- (5) monitoring.

The COSO internal control model has been adopted as a framework by some organizations working toward Sarbanes–Oxley Section 404 compliance.

COSO deals more at the strategic level, while CobiT focuses more at the operational level. CobiT is a way to meet many of the COSO objectives, but only from the IT perspective.

COSO deals with non-IT items also, as in company culture, financial accounting principles, board of director responsibility, and internal communication structures.

Its main purpose is to help ensure fraudulent financial reporting cannot take place in an organization.

#### COBIT

Control Objectives for Information and related Technology (COBIT)<sup>4</sup> is published by the IT Governance Institute and integrates the following IT and risk frameworks:

CobiT 4.1

Val IT 2.0

Risk IT

#### IT Assurance Framework (ITAF)

#### Business Model for Information Security (BMIS)

The COBIT framework examines the effectiveness, efficiency, confidentiality, integrity, availability, compliance, and reliability aspects of the high-level control objectives. The framework provides an overall structure for information technology control and includes control objectives that can be utilized to determine effective security control objectives that are driven from the business needs.

The Information Systems Audit and Control Association (ISACA) dedicates numerous resources to the support and understanding of COBIT.

The following answers are incorrect:

COSO main purpose if to define a sound risk management approach within financial companies.

COSO addresses corporate culture and policy development.

COSO is risk management system used for the protection of federal systems.

The following reference(s) were/was used to create this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)<sup>2</sup> Guide to the CISSP CBK, Third Edition ((ISC)<sup>2</sup> Press) (Kindle Locations 9791-9800). Auerbach Publications. Kindle Edition.

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**QUESTION 592**

Which of the following answers is the BEST example of Risk Transference?

- A. Insurance
- B. Results of Cost Benefit Analysis
- C. Acceptance
- D. Not hosting the services at all

Answer: A

Explanation: When we operate an organizational information system we are accepting a tolerable level of risk to allow the business functions to operate.

There may be risks you are not qualified to accept or risks you would be better off having undertaken by an outside entity.

A classic example is having your popular web server hosted by a web hosting agency which completely relieves you of the risks associated with that.

Another example is insurance where you offload the risk to an insurance agency and pay them to accept the risk.

When we transfer risk we are giving the risk to someone else to accept and it could be for a number of reasons. Expense primarily but it could also be performance, offers of better service elsewhere, legal reasons and other reasons.

The following answers are incorrect:

- Results of Cost Benefit Analysis: This might be involved in the process of Risk Mitigation but it isn't part of Risk Transference. Sorry, wrong answer.
- Acceptance: This isn't correct because accepting the risk is the opposite of transferring the risk to someone else.
- Not hosting the services at all: Sorry, this defines Risk Avoidance.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

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**QUESTION 593**

Which of the following answer BEST relates to the type of risk analysis that involves committees, interviews, opinions and subjective input from staff?

- A. Qualitative Risk Analysis
- B. Quantitative Risk Analysis
- C. Interview Approach to Risk Analysis
- D. Managerial Risk Assessment

Answer: A

Explanation: The two main types of risk assessment involve either hard values and numbers or subjective opinions of staff members.

Qualitative Risk Assessment: This type of risk assessment revolves more around the opinion of individuals or committees of individuals in the organization. Interviews are conducted, surveys administered and estimates derived from the results for the assessment.

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Quantitative Risk Assessment: Involves collection and assessment of data and the hard values they provide like costs, average rates of occurrence, single loss expectancy, replacement costs etc. In other words specific numbers to provide answers in the risk analysis process

The following answers are incorrect:

- Quantitative Risk Analysis: This isn't a correct answer because this type of risk analysis involves hard values and numbers to assist in addressing risk.
- Interview Approach to Risk Analysis: This isn't a known risk analysis term but it does relate to a qualitative risk assessment because that type includes interviews.
- Managerial Risk Assessment: Sorry, this is not a common term associated with the risk assessment process.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 4595-4596). Auerbach Publications. Kindle Edition.

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## QUESTION 594

Regarding risk reduction, which of the following answers is BEST defined by the process of giving only just enough access to information necessary for them to perform their job functions?

- A. Least Privilege Principle
- B. Minimum Privilege Principle
- C. Mandatory Privilege Requirement
- D. Implicit Information Principle

Answer: A

Explanation: Discussion: When we manage information and access to it, it is sensible to apply a standard that defines how much access the users is to get.

The best guide to use is the Least Privilege Principle because anything less restrictive is taking a risk that is unnecessary to your organization and therefore unwise.

When a users has ONLY access to information and resources necessary for his or her job functions you limit the damage that can be done with the users access.

Consider how, when a computer is infected and operations can be undertaken using that user's account and if it is malicious, much damage can ensue.

Also, you can contain the theft of your information resources by limiting access of the users. Least Privilege Principle is a good standard to manage your access for users.

The following answers are incorrect:

- Minimum Privilege Principle: Almost but not quite the correct term. The words Minimum and Least are similar but the common term is Least Privilege.
- Mandatory Privilege Requirement: This isn't a correct answer but might look that way because it sounds official. Sorry.
- Implicit Information Principle: Also an incorrect term that looks pretty official.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

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**QUESTION 595**

Which term BEST describes a practice used to detect fraud for users or a user by forcing them to be away from the workplace for a while?

- A. Mandatory Vacations
- B. Least Privilege Principle
- C. Obligatory Separation
- D. Job Rotation

Answer: A

Explanation: Discussion: Mandatory vacations are used to detect fraud by individuals who conceal their fraudulent activities but are unable to do so while they are on vacation.

Replacement workers undertake the original worker's position and are in a good position to detect and uncover fraud of that person's position.

The following answers are incorrect:

- Least Privilege: This is a good term to know but not a correct answer here. Least Privilege principle means that users are only given access to a small set of data so as to prevent mass theft or damage by malware using their account.
- Obligatory Separation: This isn't a valid term, sorry.
- Job Rotation: This isn't the correct answer but it is a good term with which to be familiar. Job rotation is where employees are moved from position to position to detect and mitigate fraud.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

**QUESTION 596**

Which of the following is a fraud detection method whereby employees are moved from position to position?

- A. Job Rotation
- B. Mandatory Rotation
- C. Mandatory Vacations
- D. Mandatory Job Duties

Answer: A

Explanation: Discussion: Job Rotation is the practice of moving employees from position to position in order to prevent any single user from perpetrating fraudulent activities without being detected by management.

It is a common practice and can help an organization achieve certain corporate accreditation certifications.

The following answers are incorrect:

- Mandatory Rotation: This isn't the right answer. There isn't a commonly-used term called mandatory rotation.
- Mandatory Vacations: This isn't the right answer here but it is a good term with which to be familiar.

- Mandatory Job Duties: This is an incorrect answer because it isn't a method to detect fraud by employees.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

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### QUESTION 597

Which answer BEST describes information access permissions where, unless the user is specifically given access to certain data they are denied any access by default?

- A. Implicit Deny
- B. Explicit Deny
- C. Implied Permissions
- D. Explicit Permit

Answer: A

Explanation: Discussion: Implicit Deny is a method of controlling access to data by denying access to ALL data then granting only to what the user needs to do their jobs.

The converse being Explicit Deny where you only deny access for users for a smaller set of data and permit access to all other data. (Worst practice)

Similar to the term of least privilege where users are only given access to data they must have in order to carry out their job duties, Implicit Deny principle denies by default access to information. More simply put, access to ALL data is denied by default and only necessary access is given to data so they employee can carry out their job duties.

This term is common to firewalls or other filtering devices where, unless traffic is specifically permitted it is denied by default to enhance security.

The following answers are incorrect:

- Explicit Deny: Sorry, this is incorrect. Explicit Deny means users are given access to ALL data and only denied to a smaller subset of data. This a dangerous practice for information security.
- Implied Permissions: Sorry, incorrect answer. This isn't a commonly used term in risk reduction methodology.
- Explicit Permit: Sorry, also incorrect. Explicit means users are specifically given access but isn't used normally with the permit rule.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

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### QUESTION 598

Which of the following activities would not be included in the contingency planning process phase?

- A. Prioritization of applications
- B. Development of test procedures
- C. Assessment of threat impact on the organization
- D. Development of recovery scenarios

Answer: B

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Explanation: All of the answers except Development of test procedures would all be part of the contingency planning phase.

Risk management minimizes loss to information assets due to undesirable events through identification, measurement, and control. It encompasses the overall security review, risk analysis, selection and evaluation of safeguards, cost-benefit analysis, management decision, and safeguard identification and implementation, along with ongoing effectiveness review.

In many organizations, contingency planning is a necessity that has turned out to be beneficial in more ways than ever expected. Contingency planning helps to ensure an organization's viability during and following a disaster.

Another benefit of contingency planning is significant improvements in the daily operations of many organizations. Researching and documenting contingency plans can discover numerous single points of failure (SPOF). A SPOF is any single input to a process that, if missing, would cause the process or several processes to be unable to function. Once identified, these SPOFs can often easily be eliminated or have their damaging potential reduced.

Many organizations have also witnessed process improvements as a direct result of their contingency planning efforts, particularly while exercising their DR and BCPs.

The following answers are incorrect as they are all part of Contingency Planning:

prioritization of apps = asset valuation

assessment of threat impact = threat modeling

development of recovery scenarios = risk mitigation

The following reference(s) were/was used to create this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 8882-8884). Auerbach Publications. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 20749-20756). Auerbach Publications. Kindle Edition.

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### QUESTION 599

In terms of Risk Analysis and dealing with risk, which of the four common ways listed below seek to eliminate involvement with the risk being evaluated?

- A. Avoidance
- B. Acceptance
- C. Transference
- D. Mitigation

Answer: A

Explanation: There are four common ways for addressing risk: Avoidance, Acceptance, Transference and Mitigation.

In this case, when we eliminate risk or just avoid it altogether it is called Risk Avoidance. No surprise there but this answer is distinct from the others.

Risk avoidance is the practice of coming up with alternatives so that the risk in question is not realized. For example, have you ever heard a friend, or parents of a friend, complain about the costs of insuring an underage driver? How about the risks that many of these children face as they become mobile? Some of these families will decide that the child in question will not be allowed to

drive the family car, but will rather wait until he or she is of legal age (i.e., 18 years of age) before committing to owning, insuring, and driving a motor vehicle. In this case, the family has chosen to avoid the risks (and any associated benefits) associated with an underage driver, such as poor driving performance or the cost of insurance for the child. Although this choice may be available for some situations, it is not available for all. Imagine a global retailer who, knowing the risks associated with doing business on the Internet, decides to avoid the practice. This decision will likely cost the company a significant amount of its revenue (if, indeed, the company has products or services that consumers wish to purchase). In addition, the decision may require the company to build or lease a site in each of the locations, globally, for which it wishes to continue business. This could have a catastrophic effect on the company's ability to continue business operations. Examine the incorrect answers below to see the differences.

The following answers are incorrect:

**Acceptance:** This means that the risk is identified and understood and evaluated to be acceptable in order to conduct business operations. It is incorrect because you are accepting that the risk is present and conducting business anyhow. Avoidance is where you just don't undertake the risk at all and conduct business without the identified risk.

**Transference:** When we transfer risk, we pay someone else to undertake the risk on our behalf so that we may conduct operations, benefit from the risk but don't undertake the risky operation ourselves. This is not the same as avoiding risk so this is incorrect.

**Mitigation:** Mitigating risk means you accept it AND work around the risk to benefit from it. A good example could be a locked down web server or firewall. You benefit from the service they provide but mitigate risks involved by technical measures.

The following reference(s) was used to create this question:

Gregg, Michael; Haines, Billy (2012-02-16). CASP: CompTIA Advanced Security Practitioner Study Guide Authorized Courseware: Exam CAS-001 (p. 217-218). Wiley. Kindle Edition.  
and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 10171-10182). Auerbach Publications. Kindle Edition.

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## QUESTION 600

Of the multiple methods of handling risks which we must undertake to carry out business operations, which one involves using controls to reduce the risk?

- A. Mitigation
- B. Avoidance
- C. Acceptance
- D. Transference

Answer: A

**Explanation:** Risk mitigation is the practice of the elimination of, or the significant decrease in the level of risk presented. Mitigating risk means you work around the risk with measures to reduce the risk. A good example could be a locked down web server or firewall. You benefit from the service they provide but mitigate risks involved by technical measures.

Another example of risk mitigation can be seen in everyday life and are readily apparent in the information technology world. For example, to lessen the risk of exposing personal and financial

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information that is highly sensitive and confidential organizations put countermeasures in place, such as firewalls, intrusion detection/prevention systems, and other mechanisms, to deter malicious outsiders from accessing this highly sensitive information.

Understand that conducting business in a computing world means assumption of risk. You have to make a management decision on whether to avoid, mitigate, transfer or simply accept it as a risk of doing business.

The following answers are incorrect:

Avoid: Risk with avoidance is when we eliminate the risk by avoiding it altogether. No surprise there but this answer is distinct from the others because you simply don't undertake the risky process. It is incorrect here because you're not reducing the risk with controls as with mitigation.

Acceptance: This means that the risk is identified and understood and evaluated to be acceptable in order to conduct business operations. It is incorrect because you are accepting that the risk is present and conducting business anyhow but don't mitigate risk with controls like in the question here.

Transference: When we transfer risk, we pay someone else to undertake the risk on our behalf so that we may conduct operations and benefit from the risk but don't undertake the risky operation ourselves. This is not the same as mitigation so it is incorrect.

The following reference(s) was used to create this question:

Gregg, Michael; Haines, Billy (2012-02-16). CASP: CompTIA Advanced Security Practitioner Study Guide Authorized Courseware: Exam CAS-001 (p. 217-218). Wiley. Kindle Edition.  
and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 10183-10195). Auerbach Publications. Kindle Edition.

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## QUESTION 601

There is no way to completely abolish or avoid risks, you can only manage them. A risk free environment does not exist. If you have risks that have been identified, understood and evaluated to be acceptable in order to conduct business operations. What is this approach to risk management called?

- A. Risk Acceptance
- B. Risk Avoidance
- C. Risk Transference
- D. Risk Mitigation

Answer: A

Explanation: Risk management provides a mechanism to the organization to ensure that executive management knows current risks, and informed decisions can be made to use one of the risk management principles: risk avoidance, risk transfer, risk mitigation, or risk acceptance. Risk Acceptance is when the risk has been identified, understood and evaluated to be acceptable in order to conduct business operations. Acceptance goes hand-in-hand with mitigation but they're slightly different.

At the end of the day, there is always a particle of risk we must undertake to perform business in a complex computing world. Whether it is operating a website, hosting a VPN connection or connections for employees to the open internet, there is risk.

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Managers can either accept, avoid or transfer risk to another party. Either way, risk must be dealt with to conduct business operations.

The following answers are incorrect:

Risk Avoidance: Avoiding risk is when we avoid it altogether to deal with the risk. Whether it is by not hosting a website, not operating your own web proxy or any other computing task. Choosing not to perform the process is risk avoidance. This isn't correct because accepting risk is clearly not avoiding the risk.

Risk Transference: When we transfer risk, we pay someone else to undertake the risk on our behalf so that we may conduct operations, benefit from the risk but don't undertake the risky operation ourselves. Accepting the risk is different from transferring the risk to another organization apart from your own in that you're not accepting it at all. Someone else does for you.

Risk Mitigation: Mitigating risk means you accept it AND work around the risk to benefit from it. A good example could be a locked down web server or firewall. You benefit from the service they provide but mitigate risks involved by technical measures. Mitigation is incorrect because it goes beyond merely accepting the risk by mitigating the risk to make it more acceptable.

The following reference(s) was used to create this question:

Gregg, Michael; Haines, Billy (2012-02-16). CASP: CompTIA Advanced Security Practitioner Study Guide Authorized Courseware: Exam CAS-001 (p. 218). Wiley. Kindle Edition.  
and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 8884-8886). Auerbach Publications. Kindle Edition.

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## QUESTION 602

John is the product manager for an information system. His product has undergone under security review by an IS auditor. John has decided to apply appropriate security controls to reduce the security risks suggested by an IS auditor. Which of the following technique is used by John to treat the identified risk provided by an IS auditor?

- A. Risk Mitigation
- B. Risk Acceptance
- C. Risk Avoidance
- D. Risk transfer

Answer: A

Explanation: Risk mitigation is the practice of the elimination of, or the significant decrease in the level of risk presented.

For your exam you should know below information about risk assessment and treatment:

A risk assessment, which is a tool for risk management, is a method of identifying vulnerabilities and threats and assessing the possible impacts to determine where to implement security controls. A risk assessment is carried out, and the results are analyzed. Risk analysis is used to ensure that security is cost-effective, relevant, timely, and responsive to threats. Security can be quite complex, even for well-versed security professionals, and it is easy to apply too much security, not enough security, or the wrong security controls, and to spend too much money in the process without attaining the necessary objectives. Risk analysis helps companies prioritize their risks and shows

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management the amount of resources that should be applied to protecting against those risks in a sensible manner.

A risk analysis has four main goals:

- Identify assets and their value to the organization.
- Identify vulnerabilities and threats.
- Quantify the probability and business impact of these potential threats.
- Provide an economic balance between the impact of the threat and the cost of the countermeasure.

### Treating Risk

#### Risk Mitigation

Risk mitigation is the practice of the elimination of, or the significant decrease in the level of risk presented. Examples of risk mitigation can be seen in everyday life and are readily apparent in the information technology world. Risk Mitigation involves applying appropriate control to reduce risk. For example, to lessen the risk of exposing personal and financial information that is highly sensitive and confidential organizations put countermeasures in place, such as firewalls, intrusion detection/prevention systems, and other mechanisms, to deter malicious outsiders from accessing this highly sensitive information. In the underage driver example, risk mitigation could take the form of driver education for the youth or establishing a policy not allowing the young driver to use a cell phone while driving, or not letting youth of a certain age have more than one friend in the car as a passenger at any given time.

#### Risk Transfer

Risk transfer is the practice of passing on the risk in question to another entity, such as an insurance company. Let us look at one of the examples that were presented above in a different way. The family is evaluating whether to permit an underage driver to use the family car. The family decides that it is important for the youth to be mobile, so it transfers the financial risk of a youth being in an accident to the insurance company, which provides the family with auto insurance.

It is important to note that the transfer of risk may be accompanied by a cost. This is certainly true for the insurance example presented earlier, and can be seen in other insurance instances, such as liability insurance for a vendor or the insurance taken out by companies to protect against hardware and software theft or destruction. This may also be true if an organization must purchase and implement security controls in order to make their organization less desirable to attack. It is important to remember that not all risk can be transferred. While financial risk is simple to transfer through insurance, reputational risk may almost never be fully transferred.

#### Risk Avoidance

Risk avoidance is the practice of coming up with alternatives so that the risk in question is not realized. For example, have you ever heard a friend, or parents of a friend, complain about the costs of insuring an underage driver? How about the risks that many of these children face as they become mobile? Some of these families will decide that the child in question will not be allowed to drive the family car, but will rather wait until he or she is of legal age (i.e., 18 years of age) before committing to owning, insuring, and driving a motor vehicle.

In this case, the family has chosen to avoid the risks (and any associated benefits) associated with an underage driver, such as poor driving performance or the cost of insurance for the child.

Although this choice may be available for some situations, it is not available for all. Imagine a global retailer who, knowing the risks associated with doing business on the Internet, decides to avoid the practice. This decision will likely cost the company a significant amount of its revenue (if,

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indeed, the company has products or services that consumers wish to purchase). In addition, the decision may require the company to build or lease a site in each of the locations, globally, for which it wishes to continue business. This could have a catastrophic effect on the company's ability to continue business operations

#### Risk Acceptance

In some cases, it may be prudent for an organization to simply accept the risk that is presented in certain scenarios. Risk acceptance is the practice of accepting certain risk(s), typically based on a business decision that may also weigh the cost versus the benefit of dealing with the risk in another way.

For example, an executive may be confronted with risks identified during the course of a risk assessment for their organization. These risks have been prioritized by high, medium, and low impact to the organization. The executive notes that in order to mitigate or transfer the low-level risks, significant costs could be involved. Mitigation might involve the hiring of additional highly skilled personnel and the purchase of new hardware, software, and office equipment, while transference of the risk to an insurance company would require premium payments. The executive then further notes that minimal impact to the organization would occur if any of the reported low-level threats were realized. Therefore, he or she (rightly) concludes that it is wiser for the organization to forgo the costs and accept the risk. In the young driver example, risk acceptance could be based on the observation that the youngster has demonstrated the responsibility and maturity to warrant the parent's trust in his or her judgment.

The following answers are incorrect:

**Risk Transfer** - Risk transfer is the practice of passing on the risk in question to another entity, such as an insurance company. Let us look at one of the examples that were presented above in a different way.

**Risk Avoidance** - Risk avoidance is the practice of coming up with alternatives so that the risk in question is not realized.

**Risk Acceptance** - Risk acceptance is the practice of accepting certain risk(s), typically based on a business decision that may also weigh the cost versus the benefit of dealing with the risk in another way.

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 51

Official ISC2 guide to CISSP CBK 3rd edition page number 383,384 and 385

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#### QUESTION 603

Sam is the security Manager of an financial institute. Senior management has requested he performs a risk analysis on all critical vulnerabilities reported by an IS auditor. After completing the risk analysis, Sam has observed that for a few of the risks, the cost benefit analysis shows that risk mitigation cost (countermeasures, controls, or safeguard) is more than the potential lost that could be incurred. What kind of a strategy should Sam recommend to the senior management to treat these risks?

- A. Risk Mitigation
- B. Risk Acceptance
- C. Risk Avoidance
- D. Risk transfer

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Answer: B

Explanation: Risk acceptance is the practice of accepting certain risk(s), typically based on a business decision that may also weigh the cost versus the benefit of dealing with the risk in another way.

For your exam you should know below information about risk assessment and treatment:

A risk assessment, which is a tool for risk management, is a method of identifying vulnerabilities and threats and assessing the possible impacts to determine where to implement security controls. A risk assessment is carried out, and the results are analyzed. Risk analysis is used to ensure that security is cost-effective, relevant, timely, and responsive to threats. Security can be quite complex, even for well-versed security professionals, and it is easy to apply too much security, not enough security, or the wrong security controls, and to spend too much money in the process without attaining the necessary objectives. Risk analysis helps companies prioritize their risks and shows

management the amount of resources that should be applied to protecting against those risks in a sensible manner.

A risk analysis has four main goals:

- Identify assets and their value to the organization.
- Identify vulnerabilities and threats.
- Quantify the probability and business impact of these potential threats.
- Provide an economic balance between the impact of the threat and the cost of the countermeasure.

Treating Risk

Risk Mitigation

Risk mitigation is the practice of the elimination of, or the significant decrease in the level of risk presented. Examples of risk mitigation can be seen in everyday life and are readily apparent in the information technology world. Risk Mitigation involves applying appropriate control to reduce risk.

For example, to lessen the risk of exposing personal and financial information that is highly sensitive and confidential organizations put countermeasures in place, such as firewalls, intrusion detection/prevention systems, and other mechanisms, to deter malicious outsiders from accessing this highly sensitive information. In the underage driver example, risk mitigation could take the form of driver education for the youth or establishing a policy not allowing the young driver to use a cell phone while driving, or not letting youth of a certain age have more than one friend in the car as a passenger at any given time.

Risk Transfer

Risk transfer is the practice of passing on the risk in question to another entity, such as an insurance company. Let us look at one of the examples that were presented above in a different way. The family is evaluating whether to permit an underage driver to use the family car. The family decides that it is important for the youth to be mobile, so it transfers the financial risk of a youth being in an accident to the insurance company, which provides the family with auto insurance.

It is important to note that the transfer of risk may be accompanied by a cost. This is certainly true for the insurance example presented earlier, and can be seen in other insurance instances, such as liability insurance for a vendor or the insurance taken out by companies to protect against hardware and software theft or destruction. This may also be true if an organization must purchase and implement security controls in order to make their organization less desirable to attack. It is

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important to remember that not all risk can be transferred. While financial risk is simple to transfer through insurance, reputational risk may almost never be fully transferred.

#### Risk Avoidance

Risk avoidance is the practice of coming up with alternatives so that the risk in question is not realized. For example, have you ever heard a friend, or parents of a friend, complain about the costs of insuring an underage driver? How about the risks that many of these children face as they become mobile? Some of these families will decide that the child in question will not be allowed to drive the family car, but will rather wait until he or she is of legal age (i.e., 18 years of age) before committing to owning, insuring, and driving a motor vehicle.

In this case, the family has chosen to avoid the risks (and any associated benefits) associated with an underage driver, such as poor driving performance or the cost of insurance for the child.

Although this choice may be available for some situations, it is not available for all. Imagine a global retailer who, knowing the risks associated with doing business on the Internet, decides to avoid the practice. This decision will likely cost the company a significant amount of its revenue (if, indeed, the company has products or services that consumers wish to purchase). In addition, the decision may require the company to build or lease a site in each of the locations, globally, for which it wishes to continue business. This could have a catastrophic effect on the company's ability to continue business operations

#### Risk Acceptance

In some cases, it may be prudent for an organization to simply accept the risk that is presented in certain scenarios. Risk acceptance is the practice of accepting certain risk(s), typically based on a business decision that may also weigh the cost versus the benefit of dealing with the risk in another way.

For example, an executive may be confronted with risks identified during the course of a risk assessment for their organization. These risks have been prioritized by high, medium, and low impact to the organization. The executive notes that in order to mitigate or transfer the low-level risks, significant costs could be involved. Mitigation might involve the hiring of additional highly skilled personnel and the purchase of new hardware, software, and office equipment, while transference of the risk to an insurance company would require premium payments. The executive then further notes that minimal impact to the organization would occur if any of the reported low-level threats were realized. Therefore, he or she (rightly) concludes that it is wiser for the organization to forgo the costs and accept the risk. In the young driver example, risk acceptance could be based on the observation that the youngster has demonstrated the responsibility and maturity to warrant the parent's trust in his or her judgment.

The following answers are incorrect:

**Risk Transfer** - Risk transfer is the practice of passing on the risk in question to another entity, such as an insurance company. Let us look at one of the examples that were presented above in a different way.

**Risk Avoidance** - Risk avoidance is the practice of coming up with alternatives so that the risk in question is not realized.

**Risk Mitigation** - Risk mitigation is the practice of the elimination of, or the significant decrease in the level of risk presented.

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 51

and

Official ISC2 guide to CISSP CBK 3rd edition page number 534-539

**QUESTION 604**

Which of the following risk handling technique involves the practice of being proactive so that the risk in question is not realized?

- A. Risk Mitigation
- B. Risk Acceptance
- C. Risk Avoidance
- D. Risk transfer

Answer: C

Explanation: Risk avoidance is the practice of coming up with alternatives so that the risk in question is not realized.

For your exam you should know below information about risk assessment and treatment:

A risk assessment, which is a tool for risk management, is a method of identifying vulnerabilities and threats and assessing the possible impacts to determine where to implement security controls. A risk assessment is carried out, and the results are analyzed. Risk analysis is used to ensure that security is cost-effective, relevant, timely, and responsive to threats. Security can be quite complex, even for well-versed security professionals, and it is easy to apply too much security, not enough security, or the wrong security controls, and to spend too much money in the process without attaining the necessary objectives. Risk analysis helps companies prioritize their risks and shows management the amount of resources that should be applied to protecting against those risks in a sensible manner.

A risk analysis has four main goals:

- Identify assets and their value to the organization.
- Identify vulnerabilities and threats.
- Quantify the probability and business impact of these potential threats.
- Provide an economic balance between the impact of the threat and the cost of the countermeasure.

Treating Risk

Risk Mitigation

Risk mitigation is the practice of the elimination of, or the significant decrease in the level of risk presented. Examples of risk mitigation can be seen in everyday life and are readily apparent in the information technology world. Risk Mitigation involves applying appropriate control to reduce risk.

For example, to lessen the risk of exposing personal and financial information that is highly sensitive and confidential organizations put countermeasures in place, such as firewalls, intrusion detection/prevention systems, and other mechanisms, to deter malicious outsiders from accessing this highly sensitive information. In the underage driver example, risk mitigation could take the form of driver education for the youth or establishing a policy not allowing the young driver to use a cell phone while driving, or not letting youth of a certain age have more than one friend in the car as a passenger at any given time.

Risk Transfer

Risk transfer is the practice of passing on the risk in question to another entity, such as an insurance company. Let us look at one of the examples that were presented above in a different way. The family is evaluating whether to permit an underage driver to use the family car. The

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family decides that it is important for the youth to be mobile, so it transfers the financial risk of a youth being in an accident to the insurance company, which provides the family with auto insurance.

It is important to note that the transfer of risk may be accompanied by a cost. This is certainly true for the insurance example presented earlier, and can be seen in other insurance instances, such as liability insurance for a vendor or the insurance taken out by companies to protect against hardware and software theft or destruction. This may also be true if an organization must purchase and implement security controls in order to make their organization less desirable to attack. It is important to remember that not all risk can be transferred. While financial risk is simple to transfer through insurance, reputational risk may almost never be fully transferred.

#### Risk Avoidance

Risk avoidance is the practice of coming up with alternatives so that the risk in question is not realized. For example, have you ever heard a friend, or parents of a friend, complain about the costs of insuring an underage driver? How about the risks that many of these children face as they become mobile? Some of these families will decide that the child in question will not be allowed to drive the family car, but will rather wait until he or she is of legal age (i.e., 18 years of age) before committing to owning, insuring, and driving a motor vehicle.

In this case, the family has chosen to avoid the risks (and any associated benefits) associated with an underage driver, such as poor driving performance or the cost of insurance for the child.

Although this choice may be available for some situations, it is not available for all. Imagine a global retailer who, knowing the risks associated with doing business on the Internet, decides to avoid the practice. This decision will likely cost the company a significant amount of its revenue (if, indeed, the company has products or services that consumers wish to purchase). In addition, the decision may require the company to build or lease a site in each of the locations, globally, for which it wishes to continue business. This could have a catastrophic effect on the company's ability to continue business operations

#### Risk Acceptance

In some cases, it may be prudent for an organization to simply accept the risk that is presented in certain scenarios. Risk acceptance is the practice of accepting certain risk(s), typically based on a business decision that may also weigh the cost versus the benefit of dealing with the risk in another way.

For example, an executive may be confronted with risks identified during the course of a risk assessment for their organization. These risks have been prioritized by high, medium, and low impact to the organization. The executive notes that in order to mitigate or transfer the low-level risks, significant costs could be involved. Mitigation might involve the hiring of additional highly skilled personnel and the purchase of new hardware, software, and office equipment, while transference of the risk to an insurance company would require premium payments. The executive then further notes that minimal impact to the organization would occur if any of the reported low-level threats were realized. Therefore, he or she (rightly) concludes that it is wiser for the organization to forgo the costs and accept the risk. In the young driver example, risk acceptance could be based on the observation that the youngster has demonstrated the responsibility and maturity to warrant the parent's trust in his or her judgment.

The following answers are incorrect:

Risk Transfer - Risk transfer is the practice of passing on the risk in question to another entity, such as an insurance company. Let us look at one of the examples that were presented above in a different way.

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Risk Acceptance - Risk acceptance is the practice of accepting certain risk(s), typically based on a business decision that may also weigh the cost versus the benefit of dealing with the risk in another way.

Risk Mitigation - Risk mitigation is the practice of the elimination of, or the significant decrease in the level of risk presented

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 51

and

Official ISC2 guide to CISSP CBK 3rd edition page number 534-536

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### QUESTION 605

Which of the following risk handling technique involves the practice of passing on the risk to another entity, such as an insurance company?

- A. Risk Mitigation
- B. Risk Acceptance
- C. Risk Avoidance
- D. Risk transfer

Answer: D

Explanation: Risk transfer is the practice of passing on the risk in question to another entity, such as an insurance company. Let us look at one of the examples that were presented above in a different way.

For your exam you should know below information about risk assessment and treatment:

A risk assessment, which is a tool for risk management, is a method of identifying vulnerabilities and threats and assessing the possible impacts to determine where to implement security controls. A risk assessment is carried out, and the results are analyzed. Risk analysis is used to ensure that security is cost-effective, relevant, timely, and responsive to threats. Security can be quite complex, even for well-verses security professionals, and it is easy to apply too much security, not enough security, or the wrong security controls, and to spend too much money in the process without attaining the necessary objectives. Risk analysis helps companies prioritize their risks and shows management the amount of resources that should be applied to protecting against those risks in a sensible manner.

A risk analysis has four main goals:

- Identify assets and their value to the organization.
- Identify vulnerabilities and threats.
- Quantify the probability and business impact of these potential threats.
- Provide an economic balance between the impact of the threat and the cost of the countermeasure.

Treating Risk

#### Risk Mitigation

Risk mitigation is the practice of the elimination of, or the significant decrease in the level of risk presented. Examples of risk mitigation can be seen in everyday life and are readily apparent in the information technology world. Risk Mitigation involves applying appropriate control to reduce risk.

For example, to lessen the risk of exposing personal and financial information that is highly

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sensitive and confidential organizations put countermeasures in place, such as firewalls, intrusion detection/prevention systems, and other mechanisms, to deter malicious outsiders from accessing this highly sensitive information. In the underage driver example, risk mitigation could take the form of driver education for the youth or establishing a policy not allowing the young driver to use a cell phone while driving, or not letting youth of a certain age have more than one friend in the car as a passenger at any given time.

#### Risk Transfer

Risk transfer is the practice of passing on the risk in question to another entity, such as an insurance company. Let us look at one of the examples that were presented above in a different way. The family is evaluating whether to permit an underage driver to use the family car. The family decides that it is important for the youth to be mobile, so it transfers the financial risk of a youth being in an accident to the insurance company, which provides the family with auto insurance.

It is important to note that the transfer of risk may be accompanied by a cost. This is certainly true for the insurance example presented earlier, and can be seen in other insurance instances, such as liability insurance for a vendor or the insurance taken out by companies to protect against hardware and software theft or destruction. This may also be true if an organization must purchase and implement security controls in order to make their organization less desirable to attack. It is important to remember that not all risk can be transferred. While financial risk is simple to transfer through insurance, reputational risk may almost never be fully transferred.

#### Risk Avoidance

Risk avoidance is the practice of coming up with alternatives so that the risk in question is not realized. For example, have you ever heard a friend, or parents of a friend, complain about the costs of insuring an underage driver? How about the risks that many of these children face as they become mobile? Some of these families will decide that the child in question will not be allowed to drive the family car, but will rather wait until he or she is of legal age (i.e., 18 years of age) before committing to owning, insuring, and driving a motor vehicle.

In this case, the family has chosen to avoid the risks (and any associated benefits) associated with an underage driver, such as poor driving performance or the cost of insurance for the child. Although this choice may be available for some situations, it is not available for all. Imagine a global retailer who, knowing the risks associated with doing business on the Internet, decides to avoid the practice. This decision will likely cost the company a significant amount of its revenue (if, indeed, the company has products or services that consumers wish to purchase). In addition, the decision may require the company to build or lease a site in each of the locations, globally, for which it wishes to continue business. This could have a catastrophic effect on the company's ability to continue business operations.

#### Risk Acceptance

In some cases, it may be prudent for an organization to simply accept the risk that is presented in certain scenarios. Risk acceptance is the practice of accepting certain risk(s), typically based on a business decision that may also weigh the cost versus the benefit of dealing with the risk in another way.

For example, an executive may be confronted with risks identified during the course of a risk assessment for their organization. These risks have been prioritized by high, medium, and low impact to the organization. The executive notes that in order to mitigate or transfer the low-level risks, significant costs could be involved. Mitigation might involve the hiring of additional highly skilled personnel and the purchase of new hardware, software, and office equipment, while

transference of the risk to an insurance company would require premium payments.

The executive then further notes that minimal impact to the organization would occur if any of the reported low-level threats were realized. Therefore, he or she (rightly) concludes that it is wiser for the organization to forgo the costs and accept the risk. In the young driver example, risk acceptance could be based on the observation that the youngster has demonstrated the responsibility and maturity to warrant the parent's trust in his or her judgment.

The following answers are incorrect:

Risk Transfer - Risk transfer is the practice of passing on the risk in question to another entity, such as an insurance company. Let us look at one of the examples that were presented above in a different way.

Risk avoidance - Risk avoidance is the practice of coming up with alternatives so that the risk in question is not realized.

Risk Mitigation - Risk mitigation is the practice of the elimination of, or the significant decrease in the level of risk presented.

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 51

and

Official ISC2 guide to CISSP CBK 3rd edition page number 534-536

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### QUESTION 606

Which of the following security control is intended to bring environment back to regular operation?

- A. Deterrent
- B. Preventive
- C. Corrective
- D. Recovery

Answer: D

Explanation: Recovery controls are intended to bring the environment back to regular operations

For your exam you should know below information about different security controls

#### Deterrent Controls

Deterrent Controls are intended to discourage a potential attacker. Access controls act as a deterrent to threats and attacks by the simple fact that the existence of the control is enough to keep some potential attackers from attempting to circumvent the control. This is often because the effort required to circumvent the control is far greater than the potential reward if the attacker is successful, or, conversely, the negative implications of a failed attack (or getting caught) outweigh the benefits of success. For example, by forcing the identification and authentication of a user, service, or application, and all that it implies, the potential for incidents associated with the system is significantly reduced because an attacker will fear association with the incident. If there are no controls for a given access path, the number of incidents and the potential impact become infinite. Controls inherently reduce exposure to risk by applying oversight for a process. This oversight acts as a deterrent, curbing an attacker's appetite in the face of probable repercussions.

The best example of a deterrent control is demonstrated by employees and their propensity to intentionally perform unauthorized functions, leading to unwanted events.

When users begin to understand that by authenticating into a system to perform a function, their

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activities are logged and monitored, and it reduces the likelihood they will attempt such an action. Many threats are based on the anonymity of the threat agent, and any potential for identification and association with their actions is avoided at all costs.

It is this fundamental reason why access controls are the key target of circumvention by attackers. Deterrents also take the form of potential punishment if users do something unauthorized. For example, if the organization policy specifies that an employee installing an unauthorized wireless access point will be fired, that will determine most employees from installing wireless access points.

#### Preventative Controls

Preventive controls are intended to avoid an incident from occurring. Preventative access controls keep a user from performing some activity or function. Preventative controls differ from deterrent controls in that the control is not optional and cannot (easily) be bypassed. Deterrent controls work on the theory that it is easier to obey the control

rather than to risk the consequences of bypassing the control. In other words, the power for action resides with the user (or the attacker). Preventative controls place the power of action with the system, obeying the control is not optional. The only way to bypass the control is to find a flaw in the control's implementation.

#### Compensating Controls

Compensating controls are introduced when the existing capabilities of a system do not support the requirement of a policy. Compensating controls can be technical, procedural, or managerial. Although an existing system may not support the required controls, there may exist other technology or processes that can supplement the existing environment, closing the gap in controls, meeting policy requirements, and reducing overall risk.

For example, the access control policy may state that the authentication process must be encrypted when performed over the Internet. Adjusting an application to natively support encryption for authentication purposes may be too costly. Secure Socket Layer (SSL), an encryption protocol, can be employed and layered on top of the authentication process to support the policy statement.

Other examples include a separation of duties environment, which offers the capability to isolate certain tasks to compensate for technical limitations in the system and ensure the security of transactions. In addition, management processes, such as authorization, supervision, and administration, can be used to compensate for gaps in the access control environment.

#### Detective Controls

Detective controls warn when something has happened, and are the earliest point in the postincident timeline. Access controls are a deterrent to threats and can be aggressively utilized to prevent harmful incidents through the application of least privilege. However, the detective nature of access controls can provide significant visibility into the access environment and help organizations manage their access strategy and related security risk.

As mentioned previously, strongly managed access privileges provided to an authenticated user offer the ability to reduce the risk exposure of the enterprise's assets by limiting the capabilities that authenticated user has. However, there are few options to control what a user can perform once privileges are provided. For example, if a user is provided write access to a file and that file is damaged, altered, or otherwise negatively impacted (either deliberately or unintentionally), the use of applied access controls will offer visibility into the transaction. The control environment can be established to log activity regarding the identification, authentication, authorization, and use of privileges on a system.

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This can be used to detect the occurrence of errors, the attempts to perform an unauthorized action, or to validate when provided credentials were exercised. The logging system as a detective device provides evidence of actions (both successful and unsuccessful) and tasks that were executed by authorized users.

#### Corrective Controls

When a security incident occurs, elements within the security infrastructure may require corrective actions. Corrective controls are actions that seek to alter the security posture of an environment to correct any deficiencies and return the environment to a secure state. A security incident signals the failure of one or more directive, deterrent, preventative, or compensating controls. The detective controls may have triggered an alarm or notification, but now the corrective controls must work to stop the incident in its tracks. Corrective controls can take many forms, all depending on the particular situation at hand or the particular security failure that needs to be dealt with.

#### Recovery Controls

Any changes to the access control environment, whether in the face of a security incident or to offer temporary compensating controls, need to be accurately reinstated and returned to normal operations. There are several situations that may affect access controls, their applicability, status, or management.

Events can include system outages, attacks, project changes, technical demands, administrative gaps, and full-blown disaster situations. For example, if an application is not correctly installed or deployed, it may adversely affect controls placed on system files or even have default administrative accounts unknowingly implemented upon install.

Additionally, an employee may be transferred, quit, or be on temporary leave that may affect policy requirements regarding separation of duties. An attack on systems may have resulted in the implantation of a Trojan horse program, potentially exposing private user information, such as credit card information and financial data. In all of these cases, an undesirable situation must be rectified as quickly as possible and controls returned to normal operations.

The following answers are incorrect:

Deterrent - Deterrent controls are intended to discourage a potential attacker

Preventive - Preventive controls are intended to avoid an incident from occurring

Corrective - Corrective control fixes components or systems after an incident has occurred

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 44

and

Official ISC2 CISSP guide 3rd edition Page number 50 and 51

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#### QUESTION 607

Which of the following is NOT an example of a detective control?

- A. System Monitor
- B. IDS
- C. Monitor detector
- D. Backup data restore

Answer: D

Explanation: The word NOT is used as a keyword in the question. You need to find out a security

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control from an given options which in not detective control. Backup data restore is a corrective control and not a detective control.

For your exam you should know below information about different security controls

#### Deterrent Controls

Deterrent Controls are intended to discourage a potential attacker. Access controls act as a deterrent to threats and attacks by the simple fact that the existence of the control is enough to keep some potential attackers from attempting to circumvent the control. This is often because the effort required to circumvent the control is far greater than the potential reward if the attacker is successful, or, conversely, the negative implications of a failed attack (or getting caught) outweigh the benefits of success. For example, by forcing the identification and authentication of a user, service, or application, and all that it implies, the potential for incidents associated with the system is significantly reduced because an attacker will fear association with the incident. If there are no controls for a given access path, the number of incidents and the potential impact become infinite. Controls inherently reduce exposure to risk by applying oversight for a process. This oversight acts as a deterrent, curbing an attacker's appetite in the face of probable repercussions.

The best example of a deterrent control is demonstrated by employees and their propensity to intentionally perform unauthorized functions, leading to unwanted events. When users begin to understand that by authenticating into a system to perform a function, their activities are logged and monitored, and it reduces the likelihood they will attempt such an action. Many threats are based on the anonymity of the threat agent, and any potential for identification and association with their actions is avoided at all costs. It is this fundamental reason why access controls are the key target of circumvention by attackers. Deterrents also take the form of potential punishment if users do something unauthorized. For example, if the organization policy specifies that an employee installing an unauthorized wireless access point will be fired, that will determine most employees from installing wireless access points.

#### Preventative Controls

Preventive controls are intended to avoid an incident from occurring. Preventative access controls keep a user from performing some activity or function. Preventative controls differ from deterrent controls in that the control is not optional and cannot (easily) be bypassed. Deterrent controls work on the theory that it is easier to obey the control

rather than to risk the consequences of bypassing the control. In other words, the power for action resides with the user (or the attacker). Preventative controls place the power of action with the system, obeying the control is not optional. The only way to bypass the control is to find a flaw in the control's implementation.

#### Compensating Controls

Compensating controls are introduced when the existing capabilities of a system do not support the requirement of a policy. Compensating controls can be technical, procedural, or managerial. Although an existing system may not support the required controls, there may exist other technology or processes that can supplement the existing environment, closing the gap in controls, meeting policy requirements, and reducing overall risk. For example, the access control policy may state that the authentication process must be encrypted when performed over the Internet. Adjusting an application to natively support encryption for authentication purposes may be too costly. Secure Socket Layer (SSL), an encryption protocol, can be employed and layered on top of the authentication process to support the policy statement. Other examples include a separation of duties environment, which offers the capability to isolate certain tasks to compensate for technical limitations in the system and ensure the security of transactions. In addition,

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management processes, such as authorization, supervision, and administration, can be used to compensate for gaps in the access control environment.

#### Detective Controls

Detective controls warn when something has happened, and are the earliest point in the postincident timeline. Access controls are a deterrent to threats and can be aggressively utilized to prevent harmful incidents through the application of least privilege. However, the detective nature of access controls can provide significant visibility into the access environment and help organizations manage their access strategy and related security risk. As mentioned previously, strongly managed access privileges provided to an authenticated user offer the ability to reduce the risk exposure of the enterprise's assets by limiting the capabilities that authenticated user has. However, there are few options to control what a user can perform once privileges are provided. For example, if a user is provided write access to a file and that file is damaged, altered, or otherwise negatively impacted (either deliberately or unintentionally), the use of applied access controls will offer visibility into the transaction. The control environment can be established to log activity regarding the identification, authentication, authorization, and use of privileges on a system. This can be used to detect the occurrence of errors, the attempts to perform an unauthorized action, or to validate when provided credentials were exercised. The logging system as a detective device provides evidence of actions (both successful and unsuccessful) and tasks that were executed by authorized users.

#### Corrective Controls

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#### Recovery Controls

Any changes to the access control environment, whether in the face of a security incident or to offer temporary compensating controls, need to be accurately reinstated and returned to normal operations. There are several situations that may affect access controls, their applicability, status, or management. Events can include system outages, attacks, project changes, technical demands, administrative gaps, and full-blown disaster situations. For example, if an application is not correctly installed or deployed, it may adversely affect controls placed on system files or even have default administrative accounts unknowingly implemented upon install. Additionally, an employee may be transferred, quit, or be on temporary leave that may affect policy requirements regarding separation of duties. An attack on systems may have resulted in the implantation of a Trojan horse program, potentially exposing private user information, such as credit card information and financial data. In all of these cases, an undesirable situation must be rectified as quickly as possible and controls returned to normal operations.

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Additionally, an employee may be transferred, quit, or be on temporary leave that may affect policy requirements regarding separation of duties. An attack on systems may have resulted in the implantation of a Trojan horse program, potentially exposing private user information, such as credit card information and financial data. In all of these cases, an undesirable situation must be rectified as quickly as possible and controls returned to normal operations.

The following answers are incorrect:

The other examples are belongs to detective control.

The following reference(s) were/was used to create this question:

CISA Review Manual 2014 Page number 44

and

Official ISC2 CISSP guide 3rd edition Page number 50 and 51

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#### QUESTION 608

Which type of risk assessment is the formula  $ALE = ARO \times SLE$  used for?

- A. Quantitative Analysis
- B. Qualitative Analysis
- C. Objective Analysis
- D. Expected Loss Analysis

Answer: A

Explanation: The formula  $ALE = ARO \times SLE$  involves numerical values or quantities of a given resource or occurrence so it is thus a quantitative analysis.

ALE = Annual Lose expectancy or how much it might cost per year if you were to lose the asset

ARO = Annual Rate of Occurrence or how often the loss might occur.

SLE = Single Loss Expectancy or how much each incident of loss would cost the organization.

Using these values you can determine how much you should spend to secure the resources against loss.

It is useful to use these costs when we compare them to the value of the asset for which we are responsible.

It wouldn't be sensible to spend \$10,000 USD a year for an asset you could replace for \$2,000 USD.

The following answers are incorrect:

- Qualitative Analysis: This is part of the risk analysis process where interviews are conducted with employees to determine risk and where focus should be made for protecting assets. Many analysts combine Quantitative and Qualitative risk assessments to form an effective picture of where dollars should be spent to secure critical resources for the organization. It is not a correct answer because it does not use a mathematical formula to determine a hard value.

- Objective Analysis: This is not a commonly used term to describe an approach to risk analysis but an objective approach could be likened more to a quantitative analysis where specific values are determined in the risk analysis process.

- Expected Loss Analysis: This is also not a common term in risk analysis but it could describe the concept of analysis an expected loss due to a threat for which you must plan.

The following reference(s) was used to create this question:

Gregg, Michael; Haines, Billy (2012-02-16). CASP: CompTIA Advanced Security Practitioner Study Guide Authorized Courseware: Exam CAS-001 (p. 215). Wiley. Kindle Edition.

## QUESTION 609

Which of the following Confidentiality, Integrity, Availability (CIA) attribute supports the principle of least privilege by providing access to information only to authorized and intended users?

- A. Confidentiality
- B. Integrity
- C. Availability
- D. Accuracy

Answer: A

Explanation: Confidentiality supports the principle of “least privilege” by providing that only

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authorized individuals, processes, or systems should have access to information on a need-to-know basis.

The level of access that an authorized individual should have is at the level necessary for them to do their job. In recent years, much press has been dedicated to the privacy of information and the need to protect it from individuals, who may be able to commit crimes by viewing the information. Identity theft is the act of assuming one's identity through knowledge of confidential information obtained from various sources.

An important measure to ensure confidentiality of information is data classification. This helps to determine who should have access to the information (public, internal use only, or confidential). Identification, authentication, and authorization through access controls are practices that support maintaining the confidentiality of information.

A sample control for protecting confidentiality is to encrypt information. Encryption of information limits the usability of the information in the event it is accessible to an unauthorized person.

For your exam you should know the information below:

#### Integrity

Integrity is the principle that information should be protected from intentional, unauthorized, or accidental changes.

Information stored in files, databases, systems, and networks must be relied upon to accurately process transactions and provide accurate information for business decision making. Controls are put in place to ensure that information is modified through accepted practices.

Sample controls include management controls such as segregation of duties, approval checkpoints in the systems development life cycle, and implementation of testing practices that assist in providing information integrity. Well-formed transactions and security of the update programs provide consistent methods of applying changes to systems. Limiting update access to those individuals with a need to access limits the exposure to intentional and unintentional modification.

#### Availability

Availability is the principle that ensures that information is available and accessible to users when needed.

The two primary areas affecting the availability of systems are:

1. Denial-of-Service attacks and
2. Loss of service due to a disaster, which could be man-made (e.g., poor capacity planning resulting in system crash, outdated hardware, and poor testing resulting in system crash after upgrade) or natural (e.g., earthquake, tornado, blackout, hurricane, fire, and flood).

In either case, the end user does not have access to information needed to conduct business. The criticality of the system to the user and its importance to the survival of the organization will determine how significant the impact of the extended downtime becomes. The lack of appropriate security controls can increase the risk of viruses, destruction of data, external penetrations, or denial-of-service (DOS) attacks. Such events can prevent the system from being used by normal users.

#### CIA

The following answers are incorrect:

Integrity - Integrity is the principle that information should be protected from intentional, unauthorized, or accidental changes.

Availability - Availability is the principle that ensures that information is available and accessible to users when needed.

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Accuracy – Accuracy is not a valid CIA attribute.

Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 314

Official ISC2 guide to CISSP CBK 3rd Edition Page number 350

(Software Development Security)

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### QUESTION 610

What does "System Integrity" mean?

- A. The software of the system has been implemented as designed.
- B. Users can't tamper with processes they do not own.
- C. Hardware and firmware have undergone periodic testing to verify that they are functioning properly.
- D. Design specifications have been verified against the formal top-level specification.

Answer: C

Explanation: System Integrity means that all components of the system cannot be tampered with by unauthorized personnel and can be verified that they work properly.

The following answers are incorrect:

The software of the system has been implemented as designed. Is incorrect because this would fall under Trusted system distribution.

Users can't tamper with processes they do not own. Is incorrect because this would fall under Configuration Management.

Design specifications have been verified against the formal top-level specification. Is incorrect because this would fall under Specification and verification.

References:

AIOv3 Security Models and Architecture (pages 302 - 306)

DOD TCSEC - <http://www.cerberussystems.com/INFOSEC/stds/d520028.htm>

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### QUESTION 611

In computing what is the name of a non-self-replicating type of malware program containing malicious code that appears to have some useful purpose but also contains code that has a malicious or harmful purpose imbedded in it, when executed, carries out actions that are unknown to the person installing it, typically causing loss or theft of data, and possible system harm.

- A. virus.
- B. worm.
- C. Trojan horse.
- D. trapdoor.

Answer: C

Explanation: A trojan horse is any code that appears to have some useful purpose but also contains code that has a malicious or harmful purpose imbedded in it. A Trojan often also includes a trapdoor as a means to gain access to a computer system bypassing security controls.

Wikipedia defines it as:

A Trojan horse, or Trojan, in computing is a non-self-replicating type of malware program containing malicious code that, when executed, carries out actions determined by the nature of the Trojan, typically causing loss or theft of data, and possible system harm. The term is derived from the story of the wooden horse used to trick defenders of Troy into taking concealed warriors into their city in ancient Greece, because computer Trojans often employ a form of social engineering, presenting themselves as routine, useful, or interesting in order to persuade victims to install them on their computers.

The following answers are incorrect:

virus. Is incorrect because a Virus is a malicious program and is does not appear to be harmless, its sole purpose is malicious intent often doing damage to a system. A computer virus is a type of malware that, when executed, replicates by inserting copies of itself (possibly modified) into other computer programs, data files, or the boot sector of the hard drive; when this replication succeeds, the affected areas are then said to be "infected".

worm. Is incorrect because a Worm is similiar to a Virus but does not require user intervention to execute. Rather than doing damage to the system, worms tend to self-propagate and devour the resources of a system. A computer worm is a standalone malware computer program that replicates itself in order to spread to other computers. Often, it uses a computer network to spread itself, relying on security failures on the target computer to access it. Unlike a computer virus, it does not need to attach itself to an existing program. Worms almost always cause at least some harm to the network, even if only by consuming bandwidth, whereas viruses almost always corrupt or modify files on a targeted computer.

trapdoor. Is incorrect because a trapdoor is a means to bypass security by hiding an entry point into a system. Trojan Horses often have a trapdoor imbedded in them.

References:

[http://en.wikipedia.org/wiki/Trojan\\_horse\\_%28computing%29](http://en.wikipedia.org/wiki/Trojan_horse_%28computing%29)

and

[http://en.wikipedia.org/wiki/Computer\\_virus](http://en.wikipedia.org/wiki/Computer_virus)

and

[http://en.wikipedia.org/wiki/Computer\\_worm](http://en.wikipedia.org/wiki/Computer_worm)

and

[http://en.wikipedia.org/wiki/Backdoor\\_%28computing%29](http://en.wikipedia.org/wiki/Backdoor_%28computing%29)

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## QUESTION 612

The security of a computer application is most effective and economical in which of the following cases?

- A. The system is optimized prior to the addition of security.
- B. The system is procured off-the-shelf.
- C. The system is customized to meet the specific security threat.
- D. The system is originally designed to provide the necessary security.

Answer: D

Explanation: The earlier in the process that security is planned for and implement the cheaper it is. It is also much more efficient if security is addressed in each phase of the development cycle

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rather than an add-on because it gets more complicated to add at the end. If security plan is developed at the beginning it ensures that security won't be overlooked.

The following answers are incorrect:

The system is optimized prior to the addition of security. Is incorrect because if you wait to implement security after a system is completed the cost of adding security increases dramatically and can become much more complex.

The system is procured off-the-shelf. Is incorrect because it is often difficult to add security to off-the shelf systems.

The system is customized to meet the specific security threat. Is incorrect because this is a distractor. This implies only a single threat.

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### QUESTION 613

Which of the following virus types changes some of its characteristics as it spreads?

- A. Boot Sector
- B. Parasitic
- C. Stealth
- D. Polymorphic

Answer: D

Explanation: A Polymorphic virus produces varied but operational copies of itself in hopes of evading anti-virus software.

The following answers are incorrect:

boot sector. Is incorrect because it is not the best answer. A boot sector virus attacks the boot sector of a drive. It describes the type of attack of the virus and not the characteristics of its composition.

parasitic. Is incorrect because it is not the best answer. A parasitic virus attaches itself to other files but does not change its characteristics.

stealth. Is incorrect because it is not the best answer. A stealth virus attempts to hide changes of the affected files but not itself.

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### QUESTION 614

Which of the following is commonly used for retrofitting multilevel security to a database management system?

- A. trusted front-end.
- B. trusted back-end.
- C. controller.
- D. kernel.

Answer: A

Explanation: If you are "retrofitting" that means you are adding to an existing database management system (DBMS). You could go back and redesign the entire DBMS but the cost of that could be expensive and there is no telling what the effect will be on existing applications, but

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that is redesigning and the question states retrofitting. The most cost effective way with the least effect on existing applications while adding a layer of security on top is through a trusted front-end. Clark-Wilson is a synonym of that model as well. It was used to add more granular control or control to database that did not provide appropriate controls or no controls at all. It is one of the most popular model today. Any dynamic website with a back-end database is an example of this today.

Such a model would also introduce separation of duties by allowing the subject only specific rights on the objects they need to access.

The following answers are incorrect:

trusted back-end. Is incorrect because a trusted back-end would be the database management system (DBMS). Since the question stated "retrofitting" that eliminates this answer.

controller. Is incorrect because this is a distractor and has nothing to do with "retrofitting".

kernel. Is incorrect because this is a distractor and has nothing to do with "retrofitting". A security kernel would provide protection to devices and processes but would be inefficient in protecting rows or columns in a table.

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### QUESTION 615

Which of the following is an advantage of using a high-level programming language?

- A. It decreases execution times for programs
- B. It allows programmers to define syntax
- C. It requires programmer-controlled storage management
- D. It enforces coding standards

Answer: D

Explanation: Coding standards are enforced because a specific order to statements are required and there is required syntax that also must be used. High-Level languages are easier to read because of the english like statements.

See extract below from the Official ISC2 Guide (OIG) to the CISSP CBK :

In the development phase, programmers have the option of writing code in several different programming languages. A programming language is a set of rules telling the computer what operations to perform.

Programming languages have evolved in generations, and each language is characterized into one of the generations. Those in the lower level are closer in form to the binary language of the computer. Both machine and assembly languages are considered low-level languages.

As the languages become easier and more similar to the language people use to communicate, they become higher level. High-level languages are easier to use than low-level languages and can be used to produce programs more quickly.

In addition, high-level languages may be said to be beneficial because they enforce coding standards and can provide more security. On the other hand, higher level languages automate certain functions, and provide complicated operations for the program, implemented by the programming environment or tool, the internal details of which may be poorly understood by the programmer. Therefore, it is possible that high-level languages may introduce security vulnerabilities in ways that are not apparent to the developer.

Programming languages are frequently referred to by generations.

The first generation is generally held to be the machine language, opcodes (operating codes), and object code used by the computer itself. These are very simple instructions that can be executed directly by the CPU of a computer. Each type of computer has its own machine language. However, the blizzard of hexadecimal or binary code is difficult for people to understand. A second generation of assembly language was created, which uses symbols as abbreviations for major instructions.

The third generation, usually known as high-level language, uses meaningful words (generally English) as the commands. COBOL, FORTRAN, BASIC, and C are examples of this type.

Above this point there may be disagreement on definitions. Fourth-generation languages, sometimes known as very high-level languages, are represented by query languages, report generators, and application generators.

Fifth-generation languages, or natural language interfaces, require expert systems and artificial intelligence. The intent is to eliminate the need for programmers to learn a specific vocabulary, grammar, or syntax. The text of a natural language statement very closely resembles human speech.

#### NOTE FROM CLEMENT:

The use of the word Standard above is synonymous with Conventions

Code conventions are important to programmers for a number of reasons:

80% of the lifetime cost of a piece of software goes to maintenance.

Hardly any software is maintained for its whole life by the original author.

Code conventions improve the readability of the software, allowing engineers to understand new code more quickly and thoroughly.

If you ship your source code as a product, you need to make sure it is as well packaged and clean as any other product you create.

The following statements are incorrect:

It decreases execution times for programs. This is incorrect because high-level languages need to be converted into code that the computer understands. The programs are either compiled or run through an interpreter and converted into machine language.

It allows programmers to define syntax. Is incorrect because there is a required syntax for highlevel languages.

It requires programmer-controlled storage management. Is incorrect because whether it is a highlevel language or not this would not be an advantage.

Reference(s) used for this question:

OIG CBK Application Security (pages 545 - 547)

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 13030-13035). Auerbach Publications. Kindle Edition.

and

Example of Java Code Conventions

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#### QUESTION 616

In an online transaction processing system (OLTP), which of the following actions should be taken when erroneous or invalid transactions are detected?

- A. The transactions should be dropped from processing.
- B. The transactions should be processed after the program makes adjustments.

- C. The transactions should be written to a report and reviewed.
- D. The transactions should be corrected and reprocessed.

Answer: C

Explanation: In an online transaction processing system (OLTP) all transactions are recorded as they occur. When erroneous or invalid transactions are detected the transaction can be recovered by reviewing the logs.

As explained in the ISC2 OIG:

OLTP is designed to record all of the business transactions of an organization as they occur. It is a data processing system facilitating and managing transaction-oriented applications. These are characterized as a system used by many concurrent users who are actively adding and modifying data to effectively change real-time data.

OLTP environments are frequently found in the finance, telecommunications, insurance, retail, transportation, and travel industries. For example, airline ticket agents enter data in the database in real-time by creating and modifying travel reservations, and these are increasingly joined by users directly making their own reservations and purchasing tickets through airline company Web sites as well as discount travel Web site portals. Therefore, millions of people may be accessing the same flight database every day, and dozens of people may be looking at a specific flight at the same time.

The security concerns for OLTP systems are concurrency and atomicity.

Concurrency controls ensure that two users cannot simultaneously change the same data, or that one user cannot make changes before another user is finished with it. In an airline ticket system, it is critical for an agent processing a reservation to complete the transaction, especially if it is the last seat available on the plane.

Atomicity ensures that all of the steps involved in the transaction complete successfully. If one step should fail, then the other steps should not be able to complete. Again, in an airline ticketing system, if the agent does not enter a name into the name data field correctly, the transaction should not be able to complete.

OLTP systems should act as a monitoring system and detect when individual processes abort, automatically restart an aborted process, back out of a transaction if necessary, allow distribution of multiple copies of application servers across machines, and perform dynamic load balancing.

A security feature uses transaction logs to record information on a transaction before it is processed, and then mark it as processed after it is done. If the system fails during the transaction, the transaction can be recovered by reviewing the transaction logs.

Checkpoint restart is the process of using the transaction logs to restart the machine by running through the log to the last checkpoint or good transaction. All transactions following the last checkpoint are applied before allowing users to access the data again.

Wikipedia has nice coverage on what is OLTP:

Online transaction processing, or OLTP, refers to a class of systems that facilitate and manage transaction-oriented applications, typically for data entry and retrieval transaction processing. The term is somewhat ambiguous; some understand a "transaction" in the context of computer or database transactions, while others (such as the Transaction Processing Performance Council) define it in terms of business or commercial transactions.

OLTP has also been used to refer to processing in which the system responds immediately to user requests. An automatic teller machine (ATM) for a bank is an example of a commercial transaction

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processing application.

The technology is used in a number of industries, including banking, airlines, mailorder, supermarkets, and manufacturing. Applications include electronic banking, order processing, employee time clock systems, e-commerce, and eTrading.

There are two security concerns for OLTP system: Concurrency and Atomicity

#### ATOMICITY

In database systems, atomicity (or atomicness) is one of the ACID transaction properties. In an atomic transaction, a series of database operations either all occur, or nothing occurs. A guarantee of atomicity prevents updates to the database occurring only partially, which can cause greater problems than rejecting the whole series outright.

The etymology of the phrase originates in the Classical Greek concept of a fundamental and indivisible component; see atom.

An example of atomicity is ordering an airline ticket where two actions are required: payment, and a seat reservation. The potential passenger must either:

both pay for and reserve a seat; OR

neither pay for nor reserve a seat.

The booking system does not consider it acceptable for a customer to pay for a ticket without securing the seat, nor to reserve the seat without payment succeeding.

#### CONCURRENCY

Database concurrency controls ensure that transactions occur in an ordered fashion.

The main job of these controls is to protect transactions issued by different users/applications from the effects of each other. They must preserve the four characteristics of database transactions

ACID test: Atomicity, Consistency, Isolation, and Durability. Read <http://en.wikipedia.org/wiki/ACID> for more details on the ACID test.

Thus concurrency control is an essential element for correctness in any system where two database transactions or more, executed with time overlap, can access the same data, e.g., virtually in any general-purpose database system. A well established concurrency control theory exists for database systems: serializability theory, which allows to effectively design and analyze concurrency control methods and mechanisms.

Concurrency is not an issue in itself, it is the lack of proper concurrency controls that makes it a serious issue.

The following answers are incorrect:

The transactions should be dropped from processing. Is incorrect because the transactions are processed and when erroneous or invalid transactions are detected the transaction can be recovered by reviewing the logs.

The transactions should be processed after the program makes adjustments. Is incorrect because the transactions are processed and when erroneous or invalid transactions are detected the transaction can be recovered by reviewing the logs.

The transactions should be corrected and reprocessed. Is incorrect because the transactions are processed and when erroneous or invalid transactions are detected the transaction can be recovered by reviewing the logs.

References:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 12749-12768). Auerbach Publications. Kindle Edition.  
and

[http://en.wikipedia.org/wiki/Online\\_transaction\\_processing](http://en.wikipedia.org/wiki/Online_transaction_processing)

and

<http://databases.about.com/od/administration/g/concurrency.htm>

### QUESTION 617

Who can best decide what are the adequate technical security controls in a computer-based application system in regards to the protection of the data being used, the criticality of the data, and its sensitivity level?

- A. System Auditor
- B. Data or Information Owner
- C. System Manager
- D. Data or Information user

Answer: B

Explanation: The data or information owner also referred to as "Data Owner" would be the best person. That is the individual or officer who is ultimately responsible for the protection of the information and can therefore decide what are the adequate security controls according to the data sensitivity and data criticality. The auditor would be the best person to determine the adequacy of controls and whether or not they are working as expected by the owner.

The function of the auditor is to come around periodically and make sure you are doing what you are supposed to be doing. They ensure the correct controls are in place and are being maintained securely. The goal of the auditor is to make sure the organization complies with its own policies and the applicable laws and regulations.

Organizations can have internal auditors and/ or external auditors. The external auditors commonly work on behalf of a regulatory body to make sure compliance is being met. For example CobiT, which is a model that most information security auditors follow when evaluating a security program. While many security professionals fear and dread auditors, they can be valuable tools in ensuring the overall security of the organization. Their goal is to find the things you have missed and help you understand how to fix the problem.

The Official ISC2 Guide (OIG) says:

IT auditors determine whether users, owners, custodians, systems, and networks are in compliance with the security policies, procedures, standards, baselines, designs, architectures, management direction, and other requirements placed on systems. The auditors provide independent assurance to the management on the appropriateness of the security controls. The auditor examines the information systems and determines whether they are designed, configured, implemented, operated, and managed in a way ensuring that the organizational objectives are being achieved. The auditors provide top company management with an independent view of the controls and their effectiveness.

Example:

Bob is the head of payroll. He is therefore the individual with primary responsibility over the payroll database, and is therefore the information/data owner of the payroll database. In Bob's department, he has Sally and Richard working for him. Sally is responsible for making changes to the payroll database, for example if someone is hired or gets a raise. Richard is only responsible for printing paychecks. Given those roles, Sally requires both read and write access to the payroll database, but Richard requires only read access to it. Bob communicates these requirements to

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the system administrators (the "information/data custodians") and they set the file permissions for Sally's and Richard's user accounts so that Sally has read/write access, while Richard has only read access.

So in short Bob will determine what controls are required, what is the sensitivity and criticality of the Data. Bob will communicate this to the custodians who will implement the requirements on the systems/DB. The auditor would assess if the controls are in fact providing the level of security the Data Owner expects within the systems/DB. The auditor does not determine the sensitivity of the data or the criticality of the data.

The other answers are not correct because:

A "system auditor" is never responsible for anything but auditing... not actually making control decisions but the auditor would be the best person to determine the adequacy of controls and then make recommendations.

A "system manager" is really just another name for a system administrator, which is actually an information custodian as explained above.

A "Data or information user" is responsible for implementing security controls on a day-to-day basis as they utilize the information, but not for determining what the controls should be or if they are adequate.

References:

Official ISC2 Guide to the CISSP CBK, Third Edition , Page 477

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Information Security Governance and Risk Management ((ISC)2 Press) (Kindle Locations 294-298). Auerbach Publications. Kindle Edition.

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 3108-3114).

Information Security Glossary

Responsibility for use of information resources

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## QUESTION 618

A security evaluation report and an accreditation statement are produced in which of the following phases of the system development life cycle?

- A. project initiation and planning phase
- B. system design specification phase
- C. development & documentation phase
- D. acceptance phase

Answer: D

Explanation: The

Answer: "acceptance phase". Note the question asks about an "evaluation report" - which details how the system evaluated, and an "accreditation statement" which describes the level the system is allowed to operate at. Because those two activities are a part of testing and testing is a part of the acceptance phase, the only answer above that can be correct is "acceptance phase".

The other answers are not correct because:

The "project initiation and planning phase" is just the idea phase. Nothing has been developed yet

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to be evaluated, tested, accredited, etc.

The "system design specification phase" is essentially where the initiation and planning phase is fleshed out. For example, in the initiation and planning phase, we might decide we want the system to have authentication. In the design specification phase, we decide that that authentication will be accomplished via username/password. But there is still nothing actually developed at this point to evaluate or accredit.

The "development & documentation phase" is where the system is created and documented. Part of the documentation includes specific evaluation and accreditation criteria. That is the criteria that will be used to evaluate and accredit the system during the "acceptance phase".

In other words - you cannot evaluate or accredit a system that has not been created yet. Of the four answers listed, only the acceptance phase is dealing with an existing system. The others deal with planning and creating the system, but the actual system isn't there yet.

Reference:

Official ISC2 Guide Page: 558 - 559

All in One Third Edition page: 832 - 833 (recommended reading)

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### QUESTION 619

Which of the following is often the greatest challenge of distributed computing solutions?

- A. scalability
- B. security
- C. heterogeneity
- D. usability

Answer: B

Explanation: The correct answer to this "security". It is a major factor in deciding if a centralized or decentralized environment is more appropriate.

Example: In a centralized computing environment, you have a central server and workstations (often "dumb terminals") access applications, data, and everything else from that central servers.

Therefore, the vast majority of your security resides on a centrally managed server. In a decentralized (or distributed) environment, you have a collection of PC's each with their own operating systems to maintain, their own software to maintain, local data storage requiring protection and backup. You may also have PDA's and "smart phones", data watches, USB devices of all types able to store data... the list gets longer all the time.

It is entirely possible to reach a reasonable and acceptable level of security in a distributed environment. But doing so is significantly more difficult, requiring more effort, more money, and more time.

The other answers are not correct because:

scalability - A distributed computing environment is almost infinitely scalable. Much more so than a centralized environment. This is therefore a bad answer.

heterogeneity - Having products and systems from multiple vendors in a distributed environment is significantly easier than in a centralized environment. This would not be a "challenge of distributed computing solutions" and so is not a good answer.

usability - This is potentially a challenge in either environment, but whether or not this is a problem has very little to do with whether it is a centralized or distributed environment. Therefore, this

would not be a good answer.

Reference:

Official ISC2 Guide page: 313-314

All in One Third Edition page: (unavailable at this time)

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### QUESTION 620

What is the appropriate role of the security analyst in the application system development or acquisition project?

- A. policeman
- B. control evaluator & consultant
- C. data owner
- D. application user

Answer: B

Explanation:

The correct answer is "control evaluator & consultant". During any system development or acquisition, the security staff should evaluate security controls and advise (or consult) on the strengths and weaknesses with those responsible for making the final decisions on the project.

The other answers are not correct because:

policeman - It is never a good idea for the security staff to be placed into this type of role (though it is sometimes unavoidable). During system development or acquisition, there should be no need of anyone filling the role of policeman.

data owner - In this case, the data owner would be the person asking for the new system to manage, control, and secure information they are responsible for. While it is possible the security staff could also be the data owner for such a project if they happen to have responsibility for the information, it is also possible someone else would fill this role. Therefore, the best answer remains "control evaluator & consultant".

application user - Again, it is possible this could be the security staff, but it could also be many other people or groups. So this is not the best answer.

Reference:

Official ISC2 Guide page: 555 - 560

All in One Third Edition page: 832 - 846

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### QUESTION 621

The information security staff's participation in which of the following system development life cycle phases provides maximum benefit to the organization?

- A. project initiation and planning phase
- B. system design specifications phase
- C. development and documentation phase
- D. in parallel with every phase throughout the project

Answer: D

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Explanation: The other answers are not correct because:

You are always looking for the "best" answer. While each of the answers listed here could be considered correct in that each of them require input from the security staff, the best answer is for that input to happen at all phases of the project.

Reference:

Official ISC2 Guide page: 556

All in One Third Edition page: 832 – 833

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### QUESTION 622

Operations Security seeks to primarily protect against which of the following?

- A. object reuse
- B. facility disaster
- C. compromising emanations
- D. asset threats

Answer: D

Explanation: The most important reason for identifying threats is to know from what do the assets need protection and what is the likelihood that a threat will occur. Threats cannot be eliminated, but can be anticipated, and safeguards put in place to minimize their impact.

Operations Security provides audit and monitoring for mechanisms, tools and facilities which permit the identification of security events and documentation of subsequent corrective actions.

Source: State of Nebraska - Information Security Systems (ISS) Security Officer Instruction Guide.

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### QUESTION 623

A 'Pseudo flaw' is which of the following?

- A. An apparent loophole deliberately implanted in an operating system program as a trap for intruders.
- B. An omission when generating Psuedo-code.
- C. Used for testing for bounds violations in application programming.
- D. A normally generated page fault causing the system to halt.

Answer: A

Explanation: A Pseudo flaw is something that looks like it is vulnerable to attack, but really acts as an alarm or triggers automatic actions when an intruder attempts to exploit the flaw.

The following answers are incorrect:

An omission when generating Psuedo-code. Is incorrect because it is a distractor.

Used for testing for bounds violations in application programming. Is incorrect, this is a testing methodology.

A normally generated page fault causing the system to halt. This is incorrect because it is distractor.

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**QUESTION 624**

With SQL Relational databases where is the actual data stored?

- A. Views
- B. Tables
- C. Schemas and sub-schemas
- D. Index-sequential tables

Answer: B

Explanation: SQL is a relational database Query language. SQL stands for structured query language. Schemas describe how the tables and views are structured - careful design is required so that the SQL database runs in an efficient manner. Tables are made up of rows and columns and contain the actual data. Views represent how you want to look at the data. They are not concerned with where the data is, but rather what data you want to view and how you want to see it. You can even join more than one table together. However, the less efficient the views, the longer it takes to retrieve your report. Sub-schemas may be used to establish user privileges to see data.

**QUESTION 625**

Which of the following is based on the premise that the quality of a software product is a direct function of the quality of its associated software development and maintenance processes?

- A. The Software Capability Maturity Model (CMM)
- B. The Spiral Model
- C. The Waterfall Model
- D. Expert Systems Model

Answer: A

Explanation: The Capability Maturity Model (CMM) is a service mark owned by Carnegie Mellon University (CMU) and refers to a development model elicited from actual data. The data was collected from organizations that contracted with the U.S. Department of Defense, who funded the research, and became the foundation from which CMU created the Software Engineering Institute (SEI). Like any model, it is an abstraction of an existing system.

The Capability Maturity Model (CMM) is a methodology used to develop and refine an organization's software development process. The model describes a five-level evolutionary path of increasingly organized and systematically more mature processes. CMM was developed and is promoted by the Software Engineering Institute (SEI), a research and development center sponsored by the U.S. Department of Defense (DoD). SEI was founded in 1984 to address software engineering issues and, in a broad sense, to advance software engineering methodologies. More specifically, SEI was established to optimize the process of developing, acquiring, and maintaining heavily software-reliant systems for the DoD. Because the processes involved are equally applicable to the software industry as a whole, SEI advocates industry-wide adoption of the CMM.

The CMM is similar to ISO 9001, one of the ISO 9000 series of standards specified by the

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International Organization for Standardization (ISO). The ISO 9000 standards specify an effective quality system for manufacturing and service industries; ISO 9001 deals specifically with software development and maintenance. The main difference between the two systems lies in their respective purposes: ISO 9001 specifies a minimal acceptable quality level for software processes, while the CMM establishes a framework for continuous process improvement and is more explicit than the ISO standard in defining the means to be employed to that end.

#### CMM's Five Maturity Levels of Software Processes

At the initial level, processes are disorganized, even chaotic. Success is likely to depend on individual efforts, and is not considered to be repeatable, because processes would not be sufficiently defined and documented to allow them to be replicated.

At the repeatable level, basic project management techniques are established, and successes could be repeated, because the requisite processes would have been made established, defined, and documented.

At the defined level, an organization has developed its own standard software process through greater attention to documentation, standardization, and integration.

At the managed level, an organization monitors and controls its own processes through data collection and analysis.

At the optimizing level, processes are constantly being improved through monitoring feedback from current processes and introducing innovative processes to better serve the organization's particular needs.

When it is applied to an existing organization's software development processes, it allows an effective approach toward improving them. Eventually it became clear that the model could be applied to other processes. This gave rise to a more general concept that is applied to business processes and to developing people.

#### CMM is superseded by CMMI

The CMM model proved useful to many organizations, but its application in software development has sometimes been problematic. Applying multiple models that are not integrated within and across an organization could be costly in terms of training, appraisals, and improvement activities. The Capability Maturity Model Integration (CMMI) project was formed to sort out the problem of using multiple CMMs.

For software development processes, the CMM has been superseded by Capability Maturity Model Integration (CMMI), though the CMM continues to be a general theoretical process capability model used in the public domain.

#### CMM is adapted to processes other than software development

The CMM was originally intended as a tool to evaluate the ability of government contractors to perform a contracted software project. Though it comes from the area of software development, it can be, has been, and continues to be widely applied as a general model of the maturity of processes (e.g., IT Service Management processes) in IS/IT (and other) organizations.

#### Source:

[http://searchsoftwarequality.techtarget.com/sDefinition/0,,sid92\\_gci930057,00.html](http://searchsoftwarequality.techtarget.com/sDefinition/0,,sid92_gci930057,00.html)  
and

[http://en.wikipedia.org/wiki/Capability\\_Maturity\\_Model](http://en.wikipedia.org/wiki/Capability_Maturity_Model)

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#### QUESTION 626

Which of the following determines that the product developed meets the projects goals?

- A. verification
- B. validation
- C. concurrence
- D. accuracy

Answer: B

Explanation: Software Development Verification vs. Validation:

Verification determines if the product accurately represents and meets the design specifications given to the developers. A product can be developed that does not match the original specifications. This step ensures that the specifications are properly met and closely followed by the development team.

Validation determines if the product provides the necessary solution intended real-world problem. It validates whether or not the final product is what the user expected in the first place and whether or not it solve the problem it intended to solve. In large projects, it is easy to lose sight of overall goal. This exercise ensures that the main goal of the project is met.

From DITSCAP:

6.3.2. Phase 2, Verification. The Verification phase shall include activities to verify compliance of the system with previously agreed security requirements. For each life-cycle development activity, DoD Directive 5000.1 (reference (i)), there is a corresponding set of security activities, enclosure 3, that shall verify compliance with the security requirements and evaluate vulnerabilities.

6.3.3. Phase 3, Validation. The Validation phase shall include activities to evaluate the fully integrated system to validate system operation in a specified computing environment with an acceptable level of residual risk. Validation shall culminate in an approval to operate.

NOTE:

DIACAP has replace DITSCAP but the definition above are still valid and applicable for the purpose of the exam.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 1106). McGraw-Hill. Kindle Edition.

and

<http://iase.disa.mil/ditscap/DITSCAP.html>

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## QUESTION 627

Which of the following is the act of performing tests and evaluations to test a system's security level to see if it complies with the design specifications and security requirements?

- A. Validation
- B. Verification
- C. Assessment
- D. Accuracy

Answer: B

Explanation: Verification vs. Validation:

Verification determines if the product accurately represents and meets the specifications. A

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product can be developed that does not match the original specifications. This step ensures that the specifications are properly met.

Validation determines if the product provides the necessary solution intended real-world problem. In large projects, it is easy to lose sight of overall goal. This exercise ensures that the main goal of the project is met.

From DITSCAP:

6.3.2. Phase 2, Verification. The Verification phase shall include activities to verify compliance of the system with previously agreed security requirements. For each life-cycle development activity, DoD Directive 5000.1 (reference (i)), there is a corresponding set of security activities, enclosure 3, that shall verify compliance with the security requirements and evaluate vulnerabilities.

6.3.3. Phase 3, Validation. The Validation phase shall include activities to evaluate the fully integrated system to validate system operation in a specified computing environment with an acceptable level of residual risk. Validation shall culminate in an approval to operate.

You must also be familiar with Verification and Validation for the purpose of the exam. A simple definition for Verification would be whether or not the developers followed the design specifications along with the security requirements. A simple definition for Validation would be whether or not the final product meets the end user needs and can be used for a specific purpose.

Wikipedia has an informal description that is currently written as: Validation can be expressed by the query "Are you building the right thing?" and Verification by "Are you building it right?

NOTE:

DITSCAP was replaced by DIACAP some time ago (2007). While DITSCAP had defined both a verification and a validation phase, the DIACAP only has a validation phase. It may not make a difference in the answer for the exam; however, DIACAP is the cornerstone policy of DOD C&A and IA efforts today. Be familiar with both terms just in case all of a sudden the exam becomes updated with the new term.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 1106). McGraw-Hill. Kindle Edition.

<http://iase.disa.mil/ditscap/DITSCAP.html>

[https://en.wikipedia.org/wiki/Verification\\_and\\_validation](https://en.wikipedia.org/wiki/Verification_and_validation)

For the definition of "validation" in DIACAP, Click Here

Further sources for the phases in DIACAP, Click Here

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## QUESTION 628

Which of the following is one of the oldest and most common problem in software development that is still very prevalent today?

- A. Buffer Overflow
- B. Social Engineering
- C. Code injection for machine language
- D. Unassembled reversable DOS instructions.

Answer: A

Explanation: Buffer overflows occurs when a program fills up the buffer of memory allocated with more data than the buffer can hold. When the program begins to write beyond the end of the

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buffer, the program's execution path can be changed, or data can be written into areas used by the operating system itself. This can lead to the insertion of malicious code that can be used to gain administrative privileges to the program or system.

It is important to note you must always apply the principle of least privilege while running a process, program, or application. This way if a buffer overflow is attempted there will be a need to escalate privileges in order to take advantage of the system.

Reference:

TIPTON, Harold F., The Official (ISC)2 Guide to the CISSP CBK (2007), page 549 .

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### QUESTION 629

Which of the following is NOT true concerning Application Control?

- A. It limits end users use of applications in such a way that only particular screens are visible.
- B. Only specific records can be requested through the application controls
- C. Particular usage of the application can be recorded for audit purposes
- D. It is non-transparent to the endpoint applications so changes are needed to the applications and databases involved

Answer: D

Explanation: Source: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 2, Auerbach.

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### QUESTION 630

The object-relational and object-oriented models are better suited to managing complex data such as required for which of the following?

- A. computer-aided development and imaging.
- B. computer-aided duplexing and imaging.
- C. computer-aided processing and imaging.
- D. computer-aided design and imaging.

Answer: D

Explanation: The object-relational and object-oriented models are better suited to managing complex data such as required for computer-aided design and imaging.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 44.

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### QUESTION 631

Which of the following is not an element of a relational database model?

- A. Relations , tuples , attributes and domains
- B. Data Manipulation Language (DML) on how the data will be accessed and manipulated
- C. Constraints to determine valid ranges and values
- D. Security structures called referential validation within tables

Answer: D

Explanation: The Three Parts of the Relational Model

The relational model can be considered as having three parts and these are covered in sequence below:

1. Structural: defines the core of the data and the relationships involved. The model structure is described in terms of relations , tuples , attributes and domains .
2. Manipulative: defines how the data in the model will be accessed and manipulated. This concerns how relations in the model will be manipulated to produce other relations, which in turn provide the answer to some question posed by a user of the data. The manipulation is achieved through relational algebra or relational calculus .
3. Constraints: defines limits on the model. The constraints determine valid ranges and values of data to be included in the model.

Reference used for this question:

<http://www.diranieh.com/Database/RelationalDatabaseModel.htm#Relational%20Model:%20Data%20Manipulation>

and

[www.macs.hw.ac.uk/~trinder/DbInfSystems/l4RelModel2up.pdf](http://www.macs.hw.ac.uk/~trinder/DbInfSystems/l4RelModel2up.pdf)

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 44.

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### QUESTION 632

A persistent collection of interrelated data items can be defined as which of the following?

- A. database
- B. database management system
- C. database security
- D. database shadowing

Answer: A

Explanation: A database can be defined as a persistent collection of interrelated data items.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 44.

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### QUESTION 633

The description of the database is called a schema. The schema is defined by which of the following?

- A. Data Control Language (DCL).
- B. Data Manipulation Language (DML).
- C. Data Definition Language (DDL).
- D. Search Query Language (SQL).

Answer: C

Explanation: The description of the database is called a schema, and the schema is defined by a Data Definition Language (DDL).

A data definition language (DDL) or data description language (DDL) is a syntax similar to a computer programming language for defining data structures, especially database schemas. The data definition language concept and name was first introduced in relation to the Codasyl database model, where the schema of the database was written in a language syntax describing the records, fields, and sets of the user data model. Later it was used to refer to a subset of Structured Query Language (SQL) for creating tables and constraints. SQL-92 introduced a schema manipulation language and schema information tables to query schemas. These information tables were specified as SQL/Schemata in SQL:2003. The term DDL is also used in a generic sense to refer to any formal language for describing data or information structures.

Data Definition Language (DDL) statements are used to define the database structure or schema.

- CREATE - to create objects in the database
- ALTER - alters the structure of the database
- DROP - delete objects from the database
- TRUNCATE - remove all records from a table, including all spaces allocated for the records are removed
- COMMENT - add comments to the data dictionary
- RENAME - rename an object

The following answers were incorrect:

DCL Data Control Language. Also for Statement

The Data Control Language (DCL) is a subset of the Structured Query Language (SQL) that allows database administrators to configure security access to relational databases. It complements the Data Definition Language (DDL), which is used to add and delete database objects, and the Data Manipulation Language (DML), which is used to retrieve, insert and modify the contents of a database. DCL is the simplest of the SQL subsets, as it consists of only three commands: GRANT, REVOKE, and DENY. Combined, these three commands provide administrators with the flexibility to set and remove database permissions in an extremely granular fashion.

DML The Data Manipulation Language (DML) is used to retrieve, insert and modify database information. These commands will be used by all database users during the routine operation of the database. The Data Manipulation Language (DML) is used to retrieve, insert and modify database information. These commands will be used by all database users during the routine operation of the database. Some of the command are:

INSERT - Allow addition of data

SELECT - Used to query data from the DB, one of the most commonly used command.

UPDATE - Allow update to existing Data

SQL Structure Query Language

Abbreviation of structured query language, and pronounced either see-kwell or as separate letters. SQL is a standardized query language for requesting information from a database. The original version called SEQUEL (structured English query language) was designed by an IBM research center in 1974 and 1975. SQL was first introduced as a commercial database system in 1979 by Oracle Corporation.

Reference(s) used for this question:

[https://secure.wikimedia.org/wikipedia/en/wiki/Data\\_Definition\\_Language](https://secure.wikimedia.org/wikipedia/en/wiki/Data_Definition_Language)  
and

The CISSP All In One (AIO) guide, Shon Harris, Sixth Edition , chapter 10 Software Development Security, page 1177.

and

<http://databases.about.com/od/Advanced-SQL-Topics/a/Data-Control-Language-Dcl.htm>  
and

<http://www.webopedia.com/TERM/S/SQL.html>

<http://www.w3schools.in/mysql/ddl-dml-dcl/>

and

[http://www.orafaq.com/faq/what\\_are\\_the\\_difference\\_between\\_ddl\\_dml\\_and\\_dcl\\_commands](http://www.orafaq.com/faq/what_are_the_difference_between_ddl_dml_and_dcl_commands)

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### QUESTION 634

Which of the following defines the software that maintains and provides access to the database?

- A. database management system (DBMS)
- B. relational database management system (RDBMS)
- C. database identification system (DBIS)
- D. Interface Definition Language system (IDLS)

Answer: A

Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 44.

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### QUESTION 635

Which of the following represents a relation, which is the basis of a relational database?

- A. One-dimensional table
- B. Two-dimensional table
- C. Three-dimensional table
- D. Four-dimensional table

Answer: B

Explanation: The relational models is based on set theory and predicate logic and provide a high level of abstraction. The use of set theory allows data to be structured in a series of table that have columns representing the variables and rows that contain specific instances of data. Source: Page 605, OIG 2007

The representation in columns and rows represents the two dimensional table.

A relation is the basis of a relational database and is represented by a two dimensional table.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 45.

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### QUESTION 636

Which of the following represents the rows of the table in a relational database?

- A. attributes
- B. records or tuples
- C. record retention
- D. relation

Answer: B

Explanation: The rows of the table represent records or tuples and the columns of the table represent the attributes.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 45.

Also check out: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 11: Application and System Development (pages 795).

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### **QUESTION 637**

Which of the following can be defined as the set of allowable values that an attribute can take?

- A. domain of a relation
- B. domain name service of a relation
- C. domain analysis of a relation
- D. domains, in database of a relation

Answer: A

Explanation: The domain of a relation is the set of allowable values that an attribute can take.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 45.

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### **QUESTION 638**

Which of the following can be defined as a unique identifier in the table that unambiguously points to an individual tuple or record in the table?

- A. primary key
- B. candidate key
- C. secondary key
- D. foreign key

Answer: A

Explanation: A primary key is a unique identifier in the table that unambiguously points to an individual tuple or record in the table.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 45.

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**QUESTION 639**

Which of the following can be defined as THE unique attribute used as a unique identifier within a given table to identify a tuple?

- A. primary key
- B. candidate key
- C. foreign key
- D. secondary key

Answer: A

Explanation: The following answers were NOT correct:

**Candidate Key:** A candidate key is a combination of attributes that can be uniquely used to identify a database record without any extraneous data. Each table may have one or more candidate keys. One of these candidate keys is selected as the table primary key.

**Foreign Key:** A foreign key is a field in a relational table that matches the primary key column of another table. The foreign key can be used to cross-reference tables.

**Secondary key:** The term secondary key is a key that is used strictly for data-retrieval purposes. A secondary key is sometimes defined as a "data item value that identifies a set of records." It is important to note that a secondary key does not need to have unique values in a table; in this respect, secondary keys differ from primary keys (and candidate keys and superkeys).

References:

A candidate key is an attribute that is a unique identifier within a given table.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 45.

Candidate Key Ref: <http://databases.about.com/cs/specificproducts/g/candidate.htm>

Feedback from Jerry: A candidate key is one of several alternative columns in a table that may be chosen as a primary key. The PRIMARY KEY IS the unique identifier. The foundation of a relational database is the establishment and reliance on a unique primary key, not candidate keys. Primary key is a more correct answer to this question than candidate key.

Secondary key ref: <http://www.gslis.utexas.edu/~wyllys/DMPAMaterials/keys.html>

**QUESTION 640**

Which of the following can be defined as an attribute in one relation that has values matching the primary key in another relation?

- A. foreign key
- B. candidate key
- C. primary key
- D. secondary key

Answer: A

Explanation: If an attribute in one relation has values matching the primary key in another relation, this attribute is called a foreign key.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 45.

**QUESTION 641**

Referential Integrity requires that for any foreign key attribute, the referenced relation must have a tuple with the same value for which of the following?

- A. primary key
- B. secondary key
- C. foreign key
- D. candidate key

Answer: A

Explanation: Similarly, the Referential Integrity requires that for any foreign key attribute, the referenced relation must have a tuple with the same value for its primary key.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 46.

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**QUESTION 642**

Matches between which of the following are important because they represent references from one relation to another and establish the connections among these relations?

- A. foreign key to primary key
- B. foreign key to candidate key
- C. candidate key to primary key
- D. primary key to secondary key

Answer: A

Explanation: Foreign key to primary key matches are important because they represent references from one relation to another and establish the connections among these relations.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 46.

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**QUESTION 643**

A database view is the results of which of the following operations?

- A. Join and Select.
- B. Join, Insert, and Project.
- C. Join, Project, and Create.
- D. Join, Project, and Select.

Answer: D

Explanation: What is Relational Algebra:

- 
1. The formal description of how a relational database operates.
  2. The mathematics which underpin SQL operations.

A number of operations can be performed in relational algebra to build relations and operate on the data.

Five operations are primitives (Select, Project, Union, Difference and Product) and the other operations can be defined in terms of those five. A View is defined from the operations of Join, Project, and Select.

For the purpose of the exam you must remember the following terms from relational algebra and their SQL equivalent:

Tuple = Row, Entry

Attribute = Column

Relation or Based relation = Table

See the extract below from the ISC2 book:

Each table, or relation, in the relational model consists of a set of attributes and a set of tuples (rows) or entries in the table. Attributes correspond to a column in a table. Attributes are unordered left to right, and thus are referenced by name and not by position. All data values in the relational model are atomic. Atomic values mean that at every row/column position in every table there is always exactly one data value and never a set of values. There are no links or pointers connecting tables; thus, the representation of relationships is contained as data in another table.

A tuple of a table corresponds to a row in the table. Tuples are unordered top to bottom because a relation is a mathematical set and not a list. Also, because tuples are based on tables that are mathematical sets, there are no duplicate tuples in a table (sets in mathematics by definition do not include duplicate elements).

The primary key is an attribute or set of attributes that uniquely identifies a specific instance of an entity. Each table in a database must have a primary key that is unique to that table. It is a subset of the candidate key.

Reference used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 12262-12269). Auerbach Publications. Kindle Edition.  
and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 46.

and

<http://db.grussell.org/slides/rel%20algebra%201.ppt>

NOTE:

SQL offers three classes of operators: select, project, and join.

The select operator serves to shrink the table vertically by eliminating unwanted rows (tuples).

The project operator serves to shrink the table horizontally by removing unwanted columns (attributes).

And the join operator allows the dynamic linking of two tables that share a common column value.

The join operation is achieved by stating the selection criteria for two tables and equating them with their common columns.

Most commercial implementations of SQL do not support a project operation, instead projections are achieved by specifying the columns desired in the output. This is why the Project operator is not well known as it is fading away from most databases.

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**QUESTION 644**

In regards to the query function of relational database operations, which of the following represent implementation procedures that correspond to each of the low-level operations in the query?

- A. query plan
- B. relational plan
- C. database plan
- D. structuring plan

Answer: A

Explanation: A query plan is comprised of implementation procedures that correspond to each of the low-level operations in that query.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 47.

**QUESTION 645**

In regards to relational database operations using the Structure Query Language (SQL), which of the following is a value that can be bound to a placeholder declared within an SQL statement?

- A. A bind value
- B. An assimilation value
- C. A reduction value
- D. A resolution value

Answer: A

Explanation: A bind value is a value that can be bound to a placeholder declared within an SQL statement. Usage of Bind Values or Variable can improve the security within your database. Below you have an example using the Oracle database that shows usage without bind variables versus usage with bind variables. Many of the security benefits are listed.

#### Bind Variables/Values

Bind variables are placeholders for literal values in an SQL query being sent to the server. Take the example query above: in the old way, data was generally passed to Oracle directly, via Tcl string interpolation. So in the example above, the actual query we send would look like this:

```
select
foo,
bar,
baz
from some_table, some_other_table
where some_table.id=some_other_table.id
and some_table.condition_p = 'foo'
```

There are a few problems with this: first, if the literal value is a huge string, then we waste a lot of time in the database server doing useless parsing. Second, if the literal value contains characters like single quotes, we have to be careful to double-quote them, because not quoting them will lead to surprising errors. Third, no type checking occurs on the literal value. Finally, if the Tcl variable is

passed in or between web forms or otherwise subject to external modification, there is nothing keeping malicious users from setting the Tcl variable to some string that changes the query textually. This type of attack, called SQL smuggling, can be very damaging - entire tables can be exposed or have their contents deleted, for example. Another very important reason for using bind variables is performance. Oracle caches all previously parsed queries. If there are values in the where clause, that is how the query is cached. It also performs bind variable substitution after parsing the SQL statement. This means that SQL statements that use bind variables will always match (assuming all else is the same) while SQL statements that do not use bind variables will not match unless the values in the statement are exactly the same. This will improve performance considerably.

To fix all these problems, we replace literal values in the query with a placeholder character, and then send the data along after. So the query looks like this:

```
select
foo,
bar,
baz
from some_table, some_other_table
where some_table.id = some_other_table.id
and some_table.condition_p =?
```

The '?' character means "This will be filled in later with literal data". In use, you might write code that looks like this:

```
set statement [prepare_query "
select
foo,
bar,
baz
from some_table, some_other_table
where some_table.id = some_other_table.id
and some_table.condition_p =?
"]
```

```
[bind_param $statement 1 $tcl_var]
```

References:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 47

see also an example for Oracle at:

[http://docstore.mik.ua/orelly/linux/dbi/ch05\\_03.htm](http://docstore.mik.ua/orelly/linux/dbi/ch05_03.htm)

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### QUESTION 646

Which of the following are placeholders for literal values in a Structured Query Language (SQL) query being sent to the database on a server?

- A. Bind variables
- B. Assimilation variables
- C. Reduction variables
- D. Resolution variables

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Answer: A

Explanation: Bind variables are placeholders for literal values in a Structured Query Language (SQL) query being sent to the database on a server.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 47.

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### QUESTION 647

Which of the following is an important part of database design that ensures that attributes in a table depend only on the primary key?

- A. Normalization
- B. Assimilation
- C. Reduction
- D. Compaction

Answer: A

Explanation: Normalization is an important part of database design that ensures that attributes in a table depend only on the primary key.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 47.

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### QUESTION 648

Normalizing data within a database could includes all or some of the following except which one?

- A. Eliminate duplicative columns from the same table.
- B. Eliminates functional dependencies on a partial key by putting the fields in a separate table from those that are dependent on the whole key
- C. Eliminated Functional dependencies on non-key fields by putting them in a separate table. At this level, all non-key fields are dependent on the primary key.
- D. Eliminating duplicate key fields by putting them into separate tables.

Answer: D

Explanation: 1. Eliminate duplicative columns from the same table.

2. Eliminates functional dependencies on a partial key by putting the fields in a separate table from those that are dependent on the whole key.

3. Eliminated Functional dependencies on non-key fields by putting them in a separate table. At this level, all non-key fields are dependent on the primary key.

In creating a database, normalization is the process of organizing it into tables in such a way that the results of using the database are always unambiguous and as intended. Normalization may have the effect of duplicating data within the database and often results in the creation of additional tables. (While normalization tends to increase the duplication of data, it does not introduce redundancy, which is unnecessary duplication.) Normalization is typically a refinement process after the initial exercise of identifying the data objects that should be in the database,

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identifying their relationships, and defining the tables required and the columns within each table. A simple example of normalizing data might consist of a table showing:

Customer Item purchased Purchase price

Thomas Shirt \$40

Maria Tennis shoes \$35

Evelyn Shirt \$40

Pajaro Trousers \$25

If this table is used for the purpose of keeping track of the price of items and you want to delete one of the customers, you will also delete a price. Normalizing the data would mean understanding this and solving the problem by dividing this table into two tables, one with information about each customer and a product they bought and the second about each product and its price. Making additions or deletions to either table would not affect the other.

Normalization degrees of relational database tables have been defined and include:

First normal form (1NF). This is the "basic" level of normalization and generally corresponds to the definition of any database, namely:

It contains two-dimensional tables with rows and columns.

Each column corresponds to a sub-object or an attribute of the object represented by the entire table.

Each row represents a unique instance of that sub-object or attribute and must be different in some way from any other row (that is, no duplicate rows are possible).

All entries in any column must be of the same kind. For example, in the column labeled "Customer," only customer names or numbers are permitted.

An entity is in First Normal Form (1NF) when all tables are two-dimensional with no repeating groups.

A row is in first normal form (1NF) if all underlying domains contain atomic values only. 1NF eliminates repeating groups by putting each into a separate table and connecting them with a one-to-many relationship. Make a separate table for each set of related attributes and uniquely identify each record with a primary key.

Eliminate duplicative columns from the same table.

Create separate tables for each group of related data and identify each row with a unique column or set of columns (the primary key).

Second normal form (2NF). At this level of normalization, each column in a table that is not a determiner of the contents of another column must itself be a function of the other columns in the table. For example, in a table with three columns containing customer ID, product sold, and price of the product when sold, the price would be a function of the customer ID (entitled to a discount) and the specific product.

An entity is in Second Normal Form (2NF) when it meets the requirement of being in First Normal Form (1NF) and additionally:

Does not have a composite primary key. Meaning that the primary key can not be subdivided into separate logical entities.

All the non-key columns are functionally dependent on the entire primary key.

A row is in second normal form if, and only if, it is in first normal form and every non-key attribute is fully dependent on the key.

2NF eliminates functional dependencies on a partial key by putting the fields in a separate table from those that are dependent on the whole key. An example is resolving many:many relationships using an intersecting entity

Third normal form (3NF). At the second normal form, modifications are still possible because a change to one row in a table may affect data that refers to this information from another table. For example, using the customer table just cited, removing a row describing a customer purchase (because of a return perhaps) will also remove the fact that the product has a certain price. In the third normal form, these tables would be divided into two tables so that product pricing would be tracked separately.

An entity is in Third Normal Form (3NF) when it meets the requirement of being in Second Normal Form (2NF) and additionally:

Functional dependencies on non-key fields are eliminated by putting them in a separate table. At this level, all non-key fields are dependent on the primary key.

A row is in third normal form if and only if it is in second normal form and if attributes that do not contribute to a description of the primary key are moved into a separate table. An example is creating look-up tables.

Domain/key normal form (DKNF). A key uniquely identifies each row in a table. A domain is the set of permissible values for an attribute. By enforcing key and domain restrictions, the database is assured of being freed from modification anomalies. DKNF is the normalization level that most designers aim to achieve.

References:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 47.

and

<http://psoug.org/reference/normalization.html>

and

Tech Target SearchSQLServer at:

<http://searchsqlserver.techtarget.com/definition/normalization?vgnextfmt=print>

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## QUESTION 649

Which of the following is used to create and modify the structure of your tables and other objects in the database?

- A. SQL Data Definition Language (DDL)
- B. SQL Data Manipulation Language (DML)
- C. SQL Data Relational Language (DRL)
- D. SQL Data Identification Language (DIL)

Answer: A

Explanation: The SQL Data Definition Language (DDL) is used to create, modify, and delete views and relations (tables).

Data Definition Language

The Data Definition Language (DDL) is used to create and destroy databases and database objects. These commands will primarily be used by database administrators during the setup and removal phases of a database project. Let's take a look at the structure and usage of four basic DDL commands:

CREATE

Installing a database management system (DBMS) on a computer allows you to create and

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manage many independent databases. For example, you may want to maintain a database of customer contacts for your sales department and a personnel database for your HR department. The CREATE command can be used to establish each of these databases on your platform. For example, the command:

**CREATE DATABASE employees**

creates an empty database named "employees" on your DBMS. After creating the database, your next step is to create tables that will contain data. (If this doesn't make sense, you might want to read the article Microsoft Access Fundamentals for an overview of tables and databases.) Another variant of the CREATE command can be used for this purpose. The command:

**CREATE TABLE personal\_info (first\_name char(20) not null, last\_name char(20) not null, employee\_id int not null)**

establishes a table titled "personal\_info" in the current database. In our example, the table contains three attributes: first\_name, last\_name and employee\_id. Don't worry about the other information included in the command -- we'll cover that in a future article.

**USE**

The USE command allows you to specify the database you wish to work with within your DBMS. For example, if we're currently working in the sales database and want to issue some commands that will affect the employees database, we would preface them with the following SQL command:

**USE employees**

It's important to always be conscious of the database you are working in before issuing SQL commands that manipulate data.

**ALTER**

Once you've created a table within a database, you may wish to modify the definition of it. The ALTER command allows you to make changes to the structure of a table without deleting and recreating it. Take a look at the following command:

**ALTER TABLE personal\_info**

**ADD salary money null**

This example adds a new attribute to the personal\_info table -- an employee's salary. The "money" argument specifies that an employee's salary will be stored using a dollars and cents format. Finally, the "null" keyword tells the database that it's OK for this field to contain no value for any given employee.

**DROP**

The final command of the Data Definition Language, DROP, allows us to remove entire database objects from our DBMS. For example, if we want to permanently remove the personal\_info table that we created, we'd use the following command:

**DROP TABLE personal\_info**

Similarly, the command below would be used to remove the entire employees database:

**DROP DATABASE employees**

Use this command with care! Remember that the DROP command removes entire data structures from your database. If you want to remove individual records, use the DELETE command of the Data Manipulation Language.

That's the Data Definition Language in a nutshell.

**Data Manipulation Language**

The Data Manipulation Language (DML) is used to retrieve, insert and modify database information. These commands will be used by all database users during the routine operation of the database. Let's take a brief look at the basic DML commands:

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The Data Manipulation Language (DML) is used to retrieve, insert and modify database information. These commands will be used by all database users during the routine operation of the database. Let's take a brief look at the basic DML commands:

#### INSERT

The INSERT command in SQL is used to add records to an existing table. Returning to the personal\_info example from the previous section, let's imagine that our HR department needs to add a new employee to their database. They could use a command similar to the one shown below:

```
INSERT INTO personal_info  
values('bart','simpson',12345,$45000)
```

Note that there are four values specified for the record. These correspond to the table attributes in the order they were defined: first\_name, last\_name, employee\_id, and salary.

#### SELECT

The SELECT command is the most commonly used command in SQL. It allows database users to retrieve the specific information they desire from an operational database. Let's take a look at a few examples, again using the personal\_info table from our employees database.

The command shown below retrieves all of the information contained within the personal\_info table. Note that the asterisk is used as a wildcard in SQL. This literally means "Select everything from the personal\_info table."

```
SELECT *
```

```
FROM personal_info
```

Alternatively, users may want to limit the attributes that are retrieved from the database. For example, the Human Resources department may require a list of the last names of all employees in the company. The following SQL command would retrieve only that information:

```
SELECT last_name  
FROM personal_info
```

Finally, the WHERE clause can be used to limit the records that are retrieved to those that meet specified criteria. The CEO might be interested in reviewing the personnel records of all highly paid employees. The following command retrieves all of the data contained within personal\_info for records that have a salary value greater than \$50,000:

```
SELECT *  
FROM personal_info  
WHERE salary > $50000
```

#### UPDATE

The UPDATE command can be used to modify information contained within a table, either in bulk or individually. Each year, our company gives all employees a 3% cost-of-living increase in their salary. The following SQL command could be used to quickly apply this to all of the employees stored in the database:

```
UPDATE personal_info  
SET salary = salary * 1.03
```

On the other hand, our new employee Bart Simpson has demonstrated performance above and beyond the call of duty. Management wishes to recognize his stellar accomplishments with a \$5,000 raise. The WHERE clause could be used to single out Bart for this raise:

```
UPDATE personal_info  
SET salary = salary + $5000  
WHERE employee_id = 12345
```

## DELETE

Finally, let's take a look at the DELETE command. You'll find that the syntax of this command is similar to that of the other DML commands. Unfortunately, our latest corporate earnings report didn't quite meet expectations and poor Bart has been laid off. The DELETE command with a WHERE clause can be used to remove his record from the personal\_info table:

```
DELETE FROM personal_info  
WHERE employee_id = 12345
```

## JOIN Statements

Now that you've learned the basics of SQL, it's time to move on to one of the most powerful concepts the language has to offer – the JOIN statement. Quite simply, these statements allow you to combine data in multiple tables to quickly and efficiently process large quantities of data. These statements are where the true power of a database resides.

We'll first explore the use of a basic JOIN operation to combine data from two tables. In future installments, we'll explore the use of outer and inner joins to achieve added power.

We'll continue with our example using the PERSONAL\_INFO table, but first we'll need to add an additional table to the mix. Let's assume we have a table called DISCIPLINARY\_ACTION that was created with the following statement:

```
CREATE TABLE disciplinary_action (action_id int not null, employee_id int not null, comments char(500))
```

This table contains the results of disciplinary actions on company employees. You'll notice that it doesn't contain any information about the employee other than the employee number. It's then easy to imagine many scenarios where we might want to combine information from the DISCIPLINARY\_ACTION and PERSONAL\_INFO tables.

Assume we've been tasked with creating a report that lists the disciplinary actions taken against all employees with a salary greater than \$40,000. The use of a JOIN operation in this case is quite straightforward. We can retrieve this information using the following command:

```
SELECT personal_info.first_name, personal_info.last_name, disciplinary_action.comments  
FROM personal_info, disciplinary_action  
WHERE personal_info.employee_id = disciplinary_action.employee_id  
AND personal_info.salary > 40000
```

As you can see, we simply specified the two tables that we wished to join in the FROM clause and then included a statement in the WHERE clause to limit the results to records that had matching employee IDs and met our criteria of a salary greater than \$40,000.

Another term you must be familiar with as a security mechanism in Databases is: VIEW

What is a view?

In database theory, a view is a virtual or logical table composed of the result set of a query. Unlike ordinary tables (base tables) in a relational database, a view is not part of the physical schema: it is a dynamic, virtual table computed or collated from data in the database. Changing the data in a table alters the data shown in the view.

The result of a view is stored in a permanent table whereas the result of a query is displayed in a temporary table.

Views can provide advantages over tables;

They can subset the data contained in a table

They can join and simplify multiple tables into a single virtual table

Views can act as aggregated tables, where aggregated data (sum, average etc.) are calculated and presented as part of the data

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Views can hide the complexity of data, for example a view could appear as Sales2000 or Sales2001, transparently partitioning the actual underlying table

Views take very little space to store; only the definition is stored, not a copy of all the data they present

Depending on the SQL engine used, views can provide extra security.

Limit the exposure to which a table or tables are exposed to outer world

Just like functions (in programming) provide abstraction, views can be used to create abstraction.

Also, just like functions, views can be nested, thus one view can aggregate data from other views.

Without the use of views it would be much harder to normalise databases above second normal form. Views can make it easier to create lossless join decomposition.

Rows available through a view are not sorted. A view is a relational table, and the relational model states that a table is a set of rows. Since sets are not sorted - per definition - the rows in a view are not ordered either. Therefore, an ORDER BY clause in the view definition is meaningless and the SQL standard (SQL:2003) does not allow this for the subselect in a CREATE VIEW statement.

The following reference(s) were used for this question:

The text above is from About.Com at: <http://databases.about.com/>

The definition of views above is from: [http://en.wikipedia.org/wiki/View\\_%28database%29](http://en.wikipedia.org/wiki/View_%28database%29)

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 47.

<http://www.tomjewett.com/dbdesign/dbdesign.php?page=ddldml.php>

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## QUESTION 650

SQL commands do not include which of the following?

- A. Select, Update
- B. Grant, Revoke
- C. Delete, Insert
- D. Add, Relist

Answer: D

Explanation: There are no such commands within the Structure Query Language (SQL).

SQL commands include Select, Update, Delete, Insert, Grant, Replace, Restore, and Revoke to name only a few of the common ones.

Reference(s) used for this question:

<http://technet.microsoft.com/en-us/library/ms186862.aspx>

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 47.

and

<http://www.sqlcommands.net/>

and

<http://www.cs.utexas.edu/~mitra/csFall2012/cs329/lectures/sql.html>

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## QUESTION 651

Complex applications involving multimedia, computer aided design, video, graphics, and expert

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systems are more suited to which of the following database type?

- A. Object-Oriented Data Bases (OODB)
- B. Object-Relational Data Bases
- C. Relational Data Bases
- D. Data base management systems (DBMS)

Answer: A

Explanation: Complex applications involving multimedia, computer aided design, video, graphics, and expert systems are more suited to OODB.

The Object-Oriented Data Bases (OODB) database model stores data as objects.

The OODB objects are a collection of public and private data items and the set of operations that can be executed on the data. Because the data objects contain their own operations, any call to data potentially has the full range of database functions available.

The object-oriented model does not necessarily require a high-level language like SQL, because the functions (or methods) are contained within the objects. An advantage of not having a query language allows the object-oriented DBMS to interact with applications without the language overhead.

Relational models are starting to add object-oriented functions and interfaces, to create an objectrelational model.

An object-relational database system is a hybrid system: a relational DBMS that has an objectoriented interface built on top of the original software. This can be accomplished either by a separate interface or by adding additional commands to the current system. The hybrid model allows organizations to maintain their current relational database software and, at the same time, provide an upgrade path for future technologies.

#### Relational Database Management Model (RDBMS)

The majority of organizations use software based on the relational database management model. The relational database has become so dominant in database management systems that many people consider it to be the only form of database. (This may create problems when dealing with other table-oriented database systems that do not provide the integrity functions required in a true relational database.) The relational model is based on set theory 8 and predicate logic 9 and provides a high level of abstraction. The use of set theory allows data to be structured in a series of tables that have columns representing the variables and rows that contain specific instances of data. These tables are organized using normal forms. The relational model outlines how programmers should design the DBMS so that different database systems used by the organization can communicate with each other.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 12356-12365). Auerbach Publications. Kindle Edition. and

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 1175). McGraw-Hill. Kindle Edition.

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## QUESTION 652

With regard to databases, which of the following has characteristics of ease of reusing code and

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analysis and reduced maintenance?

- A. Object-Oriented Data Bases (OODB)
- B. Object-Relational Data Bases (ORDB)
- C. Relational Data Bases
- D. Data base management systems (DBMS)

Answer: A

Explanation: OODB has the characteristics of ease of reusing code and analysis, reduced maintenance, and an easier transition from analysis of the problem to design and implementation.  
Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 47.

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### QUESTION 653

Which of the following is the marriage of object-oriented and relational technologies combining the attributes of both?

- A. object-relational database
- B. object-oriented database
- C. object-linking database
- D. object-management database

Answer: A

Explanation: The object-relational database is the marriage of object-oriented and relational technologies and combines the attributes of both.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 48.

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### QUESTION 654

What is used to hide data from unauthorized users by allowing a relation in a database to contain multiple tuples with the same primary keys with each instance distinguished by a security level?

- A. Data mining
- B. Polyinstantiation
- C. Cell suppression
- D. Noise and perturbation

Answer: B

Explanation: Polyinstantiation enables a relation to contain multiple tuples with the same primary keys with each instance distinguished by a security level. Instead of just restricting access, another set of data is created to fool the lower-level subjects into thinking that the information actually means something else. Data mining is the process of extracting and processing the information held in a data warehouse into something useful. Cell suppression is a technique used

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to hide specific cells that contain information that could be used in inference attacks. Noise and perturbation is a technique of inserting bogus data to misdirect an attacker.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 11: Application and System Development (page 727).

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### QUESTION 655

Which of the following translates source code one command at a time for execution on a computer?

- A. A translator
- B. An interpreter
- C. A compiler
- D. An assembler

Answer: B

Explanation: Interpreters translate one command at a time during execution, as opposed to compilers and assemblers where source code for the whole application is transformed to executable code before being executed. A translator is a generic term for the others.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 11: Application and System Development (page 751).

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### QUESTION 656

Which of the following is a Microsoft technology for communication among software components distributed across networked computers?

- A. DDE
- B. OLE
- C. ODBC
- D. DCOM

Answer: D

Explanation: DCOM (Distributed Component Object Model) defines how distributed components interact and provides an architecture for interprocess communication (IPC).

Distributed Component Object Model (DCOM) is a proprietary Microsoft technology for communication among software components distributed across networked computers. DCOM, which originally was called "Network OLE", extends Microsoft's COM, and provides the communication substrate under Microsoft's COM+ application server infrastructure. It has been deprecated in favor of the Microsoft .NET Remoting, a part of their .NET Framework.

The addition of the "D" to COM was due to extensive use of DCE/RPC (Distributed Computing Environment/Remote Procedure Calls) – more specifically Microsoft's enhanced version, known as MSRPC.

Shon Harris describes it as:

Component Object Model (COM) is a model that allows for interprocess communication within one application or between applications on the same computer system. The model was created by

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Microsoft outlines standardized APIs, component naming schemes, and communication standards. So if I am a developer and I want my application to be able to interact with the Windows operating system and the different applications developed for this platform, I will follow the COM outlined standards.

Distributed Component Object Model (DCOM) supports the same model for component interaction, and also supports distributed interprocess communication (IPC). COM enables applications to use components on the same systems, while DCOM enables applications to access objects that reside in different parts of a network. So this is how the client/server-based activities are carried out by COM-based operating systems and/or applications.

The following are incorrect answers:

DDE (Dynamic Data Exchange) enables different applications to share data and send commands to each other directly.

The primary function of DDE is to allow Windows applications to share data. For example, a cell in Microsoft Excel could be linked to a value in another application and when the value changed, it would be automatically updated in the Excel spreadsheet. The data communication was established by a simple, three-segment model. Each program was known to DDE by its "application" name. Each application could further organize information by groups known as "topic" and each topic could serve up individual pieces of data as an "item". For example, if a user wanted to pull a value from Microsoft Excel which was contained in a spreadsheet called "Book1.xls" in the cell in the first row and first column, the application would be "Excel", the topic "Book1.xls" and the item "r1c1".

A common use of DDE is for custom-developed applications to control off-the-shelf software. For example, a custom in-house application might use DDE to open a Microsoft Excel spreadsheet and fill it with data, by opening a DDE conversation with Excel and sending it DDE commands. Today, however, one could also use the Excel object model with OLE Automation (part of COM). The technique is, however, still in use, particularly for distribution of financial data.

OLE (Object Linking and Embedding) provides a way for objects to be shared on a local personal computer. OLE allows an editing application to export part of a document to another editing application and then import it with additional content. For example, a desktop publishing system might send some text to a word processor or a picture to a bitmap editor using OLE. The main benefit of OLE is to add different kinds of data to a document from different applications, like a text editor and an image editor. This creates a compound document and a master file to which the document references. Changes to data in the master file immediately affects the document that references it. This is called "linking" (instead of "embedding").

ODBC (Open Database Connectivity) is a de facto standard that provides a standard SQL dialect that can be used to access many types of relational databases. ODBC accomplishes DBMS independence by using an ODBC driver as a translation layer between the application and the DBMS. The application uses ODBC functions through an ODBC driver manager with which it is linked, and the driver passes the query to the DBMS. An ODBC driver can be thought of as analogous to a printer or other driver, providing a standard set of functions for the application to use, and implementing DBMS-specific functionality. An application that can use ODBC is referred to as "ODBC-compliant". Any ODBC-compliant application can access any DBMS for which a driver is installed.

Reference(s) used for this question:

Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 1146). McGraw-Hill. Kindle Edition. Development (page 772).

and

<https://en.wikipedia.org/wiki/DCOM>

and

[https://en.wikipedia.org/wiki/Dynamic\\_Data\\_Exchange](https://en.wikipedia.org/wiki/Dynamic_Data_Exchange)

and

[https://en.wikipedia.org/wiki/Object\\_linking\\_and\\_embedding](https://en.wikipedia.org/wiki/Object_linking_and_embedding)

and

<https://en.wikipedia.org/wiki/ODBC>

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### QUESTION 657

Which of the following statements relating to Distributed Computing Environment (DCE) is FALSE?

- A. It is a layer of software that sits on the top of the network layer and provides services to the applications above it.
- B. It uses a Universal Unique Identifier (UUID) to uniquely identify users, resources and components.
- C. It provides the same functionality as DCOM, but it is more proprietary than DCOM.
- D. It is a set of management services with a communication layer based on RPC.

Answer: C

Explanation: DCE does provide the same functionality as DCOM, but DCE is an open standard developed by the Open Software Foundation (OSF) and DCOM was developed by Microsoft, DCOM is more proprietary in nature.

DCE is the Distributed Computing Environment, from the Open Software Foundation. (It is called "the DCE" by sticklers for grammatical consistency.) (The Open Software Foundation is now called the Open Group.

Here are some of the advantages of DCE:

First, DCE provides services that can be found in other computer networking environments, but packages them so as to make them much easier to use. For example, the DCE Remote Procedure Call (RPC) facility provides a way of communicating between software modules running on different systems that is much simpler to code than older methods, such as using socket calls. Second, DCE provides new capabilities that go beyond what was available previously. The DCE Security Service provides a reliable way of determining if a user of a distributed system should be allowed to perform a certain action, for example. This is very useful for most distributed applications, yet the design and implementation effort entailed in providing such a capability would be prohibitive for an individual developer.

Third, DCE integrates components in a manner that makes them more valuable together than separately. For example, the DCE RPC uses threads in such a way that a developer can implement a multi-threaded server without ever explicitly creating or destroying a thread.

Finally, DCE supports both portability and interoperability by providing the developer with capabilities that hide differences among the various hardware, software and networking elements an application will deal with in a large network. For example, the RPC automatically converts data from the format used by one computer to that used by another.

Portability is a measure of the ease with which a piece of software that executes on one type of

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computer can be made to execute on a different type of computer. Interoperability is a measure of the ability of computers of different types to participate in the same distributed system.

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 11: Application and System Development (page 773).

and

The DCE Frequently Asked questions

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### QUESTION 658

Which virus category has the capability of changing its own code, making it harder to detect by anti-virus software?

- A. Stealth viruses
- B. Polymorphic viruses
- C. Trojan horses
- D. Logic bombs

Answer: B

Explanation: A polymorphic virus has the capability of changing its own code, enabling it to have many different variants, making it harder to detect by anti-virus software. The particularity of a stealth virus is that it tries to hide its presence after infecting a system. A Trojan horse is a set of unauthorized instructions that are added to or replacing a legitimate program. A logic bomb is a set of instructions that is initiated when a specific event occurs.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 11: Application and System Development (page 786).

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### QUESTION 659

Why would a database be denormalized?

- A. To ensure data integrity
- B. To increase processing efficiency
- C. To prevent duplication of data
- D. To save storage space

Answer: B

Explanation: A database is denormalized when there is a need to improve processing efficiency. There is, however, a risk to data integrity when this occurs. Since it implies the introduction of duplication, it will not likely allow saving of storage space.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, Chapter 3: Technical Infrastructure and Operational Practices (page 109).

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### QUESTION 660

Risk analysis is MOST useful when applied during which phase of the system development process?

- 
- A. Project initiation and Planning
  - B. Functional Requirements definition
  - C. System Design Specification
  - D. Development and Implementation

Answer: A

Explanation: In most projects the conditions for failure are established at the beginning of the project. Thus risk management should be established at the commencement of the project with a risk assessment during project initiation.

As it is clearly stated in the ISC2 book: Security should be included at the first phase of development and throughout all of the phases of the system development life cycle. This is a key concept to understand for the purpose for the exam.

The most useful time is to undertake it at project initiation, although it is often valuable to update the current risk analysis at later stages.

Attempting to retrofit security after the SDLC is completed would cost a lot more money and might be impossible in some cases. Look at the family of browsers we use today, for the past 8 years they always claim that it is the most secure version that has been released and within days vulnerabilities will be found.

Risks should be monitored throughout the SDLC of the project and reassessed when appropriate. The phases of the SDLC can vary from one source to another one. It could be as simple as Concept, Design, and Implementation. It could also be expanded to include more phases such as this list proposed within the ISC2 Official Study book:

Project Initiation and Planning

Functional Requirements Definition

System Design Specification

Development and Implementation

Documentations and Common Program Controls

Testing and Evaluation Control, certification and accreditation (C&A)

Transition to production (Implementation)

And there are two phases that will extend beyond the SDLC, they are:

Operation and Maintenance Support (O&M)

Revisions and System Replacement (Disposal)

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 291).

and

The Official ISC2 Guide to the CISSP CBK , Second Edition, Page 182-185

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### QUESTION 661

Which of the following would MOST likely ensure that a system development project meets business objectives?

- A. Development and tests are run by different individuals
- B. User involvement in system specification and acceptance

- 
- C. Development of a project plan identifying all development activities
  - D. Strict deadlines and budgets

Answer: B

Explanation: Effective user involvement is the most critical factor in ensuring that the application meets business objectives.

A great way of getting early input from the user community is by using Prototyping. The prototyping method was formally introduced in the early 1980s to combat the perceived weaknesses of the waterfall model with regard to the speed of development. The objective is to build a simplified version (prototype) of the application, release it for review, and use the feedback from the users' review to build a second, better version.

This is repeated until the users are satisfied with the product. It is a four-step process:  
initial concept,  
design and implement initial prototype,  
refine prototype until acceptable, and  
complete and release final version.

There is also the Modified Prototype Model (MPM). This is a form of prototyping that is ideal for Web application development. It allows for the basic functionality of a desired system or component to be formally deployed in a quick time frame. The maintenance phase is set to begin after the deployment. The goal is to have the process be flexible enough so the application is not based on the state of the organization at any given time. As the organization grows and the environment changes, the application evolves with it, rather than being frozen in time.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 12101-12108 and 12099-12101). Auerbach Publications. Kindle Edition.

and

Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 296).

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## QUESTION 662

What is RAD?

- A. A development methodology
- B. A project management technique
- C. A measure of system complexity
- D. Risk-assessment diagramming

Answer: A

Explanation: RAD stands for Rapid Application Development.

RAD is a methodology that enables organizations to develop strategically important systems faster while reducing development costs and maintaining quality.

RAD is a programming system that enables programmers to quickly build working programs.

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In general, RAD systems provide a number of tools to help build graphical user interfaces that would normally take a large development effort.

Two of the most popular RAD systems for Windows are Visual Basic and Delphi. Historically, RAD systems have tended to emphasize reducing development time, sometimes at the expense of generating in-efficient executable code. Nowadays, though, many RAD systems produce extremely faster code that is optimized.

Conversely, many traditional programming environments now come with a number of visual tools to aid development. Therefore, the line between RAD systems and other development environments has become blurred.

Reference:

Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 307)

<http://www.webopedia.com>

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### QUESTION 663

Which of the following best describes the purpose of debugging programs?

- A. To generate random data that can be used to test programs before implementing them.
- B. To ensure that program coding flaws are detected and corrected.
- C. To protect, during the programming phase, valid changes from being overwritten by other changes.
- D. To compare source code versions before transferring to the test environment

Answer: B

Explanation: Debugging provides the basis for the programmer to correct the logic errors in a program under development before it goes into production.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 298).

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### QUESTION 664

Which of the following would best describe the difference between white-box testing and black-box testing?

- A. White-box testing is performed by an independent programmer team.
- B. Black-box testing uses the bottom-up approach.
- C. White-box testing examines the program internal logical structure.
- D. Black-box testing involves the business units

Answer: C

Explanation: Black-box testing observes the system external behavior, while white-box testing is a detailed exam of a logical path, checking the possible conditions.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor

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2002 review manual, chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 299).

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**QUESTION 665**

Which of the following is not a preventative control?

- A. Deny programmer access to production data.
- B. Require change requests to include information about dates, descriptions, cost analysis and anticipated effects.
- C. Run a source comparison program between control and current source periodically.
- D. Establish procedures for emergency changes.

Answer: C

Explanation: Running the source comparison program between control and current source periodically allows detection, not prevention, of unauthorized changes in the production environment. Other options are preventive controls.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 309).

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**QUESTION 666**

Which of the following would provide the BEST stress testing environment taking under consideration and avoiding possible data exposure and leaks of sensitive data?

- A. Test environment using test data.
- B. Test environment using sanitized live workloads data.
- C. Production environment using test data.
- D. Production environment using sanitized live workloads data.

Answer: B

Explanation: The best way to properly verify an application or system during a stress test would be to expose it to "live" data that has been sanitized to avoid exposing any sensitive information or Personally Identifiable Data (PII) while in a testing environment. Fabricated test data may not be as varied, complex or computationally demanding as "live" data. A production environment should never be used to test a product, as a production environment is one where the application or system is being put to commercial or operational use. It is a best practice to perform testing in a non-production environment.

Stress testing is carried out to ensure a system can cope with production workloads, but as it may be tested to destruction, a test environment should always be used to avoid damaging the production environment. Hence, testing should never take place in a production environment. If only test data is used, there is no certainty that the system was adequately stress tested.

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**QUESTION 667**

Which of the following BEST explains why computerized information systems frequently fail to

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meet the needs of users?

- A. Inadequate quality assurance (QA) tools.
- B. Constantly changing user needs.
- C. Inadequate user participation in defining the system's requirements.
- D. Inadequate project management.

Answer: C

Explanation: Inadequate user participation in defining the system's requirements. Most projects fail to meet the needs of the users because there was inadequate input in the initial steps of the project from the user community and what their needs really are.

The other answers, while potentially valid, are incorrect because they do not represent the most common problem associated with information systems failing to meet the needs of users.

References: All in One pg 834

Only users can define what their needs are and, therefore, what the system should accomplish. Lack of adequate user involvement, especially in the systems requirements phase, will usually result in a system that doesn't fully or adequately address the needs of the user.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 296).

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### QUESTION 668

Which of the following would be the MOST serious risk where a systems development life cycle methodology is inadequate?

- A. The project will be completed late.
- B. The project will exceed the cost estimates.
- C. The project will be incompatible with existing systems.
- D. The project will fail to meet business and user needs.

Answer: D

Explanation: This is the most serious risk of inadequate systems development life cycle methodology.

The following answers are incorrect because :

The project will be completed late is incorrect as it is not most devastating as the above answer.

The project will exceed the cost estimates is also incorrect when compared to the above correct answer.

The project will be incompatible with existing systems is also incorrect when compared to the above correct answer.

Reference: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 290).

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**QUESTION 669**

Which of the following is an advantage of prototyping?

- A. Prototype systems can provide significant time and cost savings.
- B. Change control is often less complicated with prototype systems.
- C. It ensures that functions or extras are not added to the intended system.
- D. Strong internal controls are easier to implement.

Answer: A

Explanation: Prototype systems can provide significant time and cost savings, however they also have several disadvantages. They often have poor internal controls, change control becomes much more complicated and it often leads to functions or extras being added to the system that were not originally intended.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 306).

**QUESTION 670**

Which of the following is a CHARACTERISTIC of a decision support system (DSS) in regards to Threats and Risks Analysis?

- A. DSS is aimed at solving highly structured problems.
- B. DSS emphasizes flexibility in the decision making approach of users.
- C. DSS supports only structured decision-making tasks.
- D. DSS combines the use of models with non-traditional data access and retrieval functions.

Answer: B

Explanation: DSS emphasizes flexibility in the decision-making approach of users. It is aimed at solving less structured problems, combines the use of models and analytic techniques with traditional data access and retrieval functions and supports semi-structured decision-making tasks.

DSS is sometimes referred to as the Delphi Method or Delphi Technique:

The Delphi technique is a group decision method used to ensure that each member gives an honest opinion of what he or she thinks the result of a particular threat will be. This avoids a group of individuals feeling pressured to go along with others' thought processes and enables them to participate in an independent and anonymous way. Each member of the group provides his or her opinion of a certain threat and turns it in to the team that is performing the analysis. The results are compiled and distributed to the group members, who then write down their comments anonymously and return them to the analysis group. The comments are compiled and redistributed for more comments until a consensus is formed. This method is used to obtain an agreement on cost, loss values, and probabilities of occurrence without individuals having to agree verbally.

Here is the ISC2 book coverage of the subject:

One of the methods that uses consensus relative to valuation of information is the

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consensus/modified Delphi method. Participants in the valuation exercise are asked to comment anonymously on the task being discussed. This information is collected and disseminated to a participant other than the original author. This participant comments upon the observations of the original author. The information gathered is discussed in a public forum and the best course is agreed upon by the group (consensus).

**EXAM TIP:**

The DSS is what some of the books are referring to as the Delphi Method or Delphi Technique. Be familiar with both terms for the purpose of the exam.

The other answers are incorrect:

'DSS is aimed at solving highly structured problems' is incorrect because it is aimed at solving less structured problems.

'DSS supports only structured decision-making tasks' is also incorrect as it supports semistructured decision-making tasks.

'DSS combines the use of models with non-traditional data access and retrieval functions' is also incorrect as it combines the use of models and analytic techniques with traditional data access and retrieval functions.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 91). McGraw-Hill. Kindle Edition.

and

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Information Security Governance and Risk Management ((ISC)2 Press) (Kindle Locations 1424-1426). Auerbach Publications. Kindle Edition.

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**QUESTION 671**

Which of the following is an advantage in using a bottom-up versus a top-down approach to software testing?

- A. Interface errors are detected earlier.
- B. Errors in critical modules are detected earlier.
- C. Confidence in the system is achieved earlier.
- D. Major functions and processing are tested earlier.

Answer: B

Explanation: The bottom-up approach to software testing begins with the testing of atomic units, such as programs and modules, and work upwards until a complete system testing has taken place. The advantages of using a bottom-up approach to software testing are the fact that there is no need for stubs or drivers and errors in critical modules are found earlier. The other choices refer to advantages of a top down approach which follows the opposite path.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 299).

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**QUESTION 672**

Which of the following would be the best reason for separating the test and development

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environments?

- A. To restrict access to systems under test.
- B. To control the stability of the test environment.
- C. To segregate user and development staff.
- D. To secure access to systems under development.

Answer: B

Explanation: The test environment must be controlled and stable in order to ensure that development projects are tested in a realistic environment which, as far as possible, mirrors the live environment.

Reference(s) used for this question:

Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 309).

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### QUESTION 673

Why do buffer overflows happen? What is the main cause?

- A. Because buffers can only hold so much data
- B. Because of improper parameter checking within the application
- C. Because they are an easy weakness to exploit
- D. Because of insufficient system memory

Answer: B

Explanation: Buffer Overflow attack takes advantage of improper parameter checking within the application. This is the classic form of buffer overflow and occurs because the programmer accepts whatever input the user supplies without checking to make sure that the length of the input is less than the size of the buffer in the program.

The buffer overflow problem is one of the oldest and most common problems in software development and programming, dating back to the introduction of interactive computing. It can result when a program fills up the assigned buffer of memory with more data than its buffer can hold. When the program begins to write beyond the end of the buffer, the program's execution path can be changed, or data can be written into areas used by the operating system itself. This can lead to the insertion of malicious code that can be used to gain administrative privileges on the program or system.

As explained by Gaurab, it can become very complex. At the time of input even if you are checking the length of the input, it has to be checked against the buffer size. Consider a case where entry point of data is stored in Buffer1 of Application1 and then you copy it to Buffer2 within Application2 later on, if you are just checking the length of data against Buffer1, it will not ensure that it will not cause a buffer overflow in Buffer2 of Application2.

A bit of reassurance from the ISC2 book about level of Coding Knowledge needed for the exam: It should be noted that the CISSP is not required to be an expert programmer or know the inner workings of developing application software code, like the FORTRAN programming language, or

how to develop Web applet code using Java. It is not even necessary that the CISSP know detailed security-specific coding practices such as the major divisions of buffer overflow exploits or the reason for preferring `str(n)cpy` to `strcpy` in the C language (although all such knowledge is, of course, helpful). Because the CISSP may be the person responsible for ensuring that security is included in such developments, the CISSP should know the basic procedures and concepts involved during the design and development of software programming. That is, in order for the CISSP to monitor the software development process and verify that security is included, the CISSP must understand the fundamental concepts of programming developments and the security strengths and weaknesses of various application development processes.

The following are incorrect answers:

"Because buffers can only hold so much data" is incorrect. This is certainly true but is not the best answer because the finite size of the buffer is not the problem -- the problem is that the programmer did not check the size of the input before moving it into the buffer.

"Because they are an easy weakness to exploit" is incorrect. This answer is sometimes true but is not the best answer because the root cause of the buffer overflow is that the programmer did not check the size of the user input.

"Because of insufficient system memory" is incorrect. This is irrelevant to the occurrence of a buffer overflow.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 13319-13323). Auerbach Publications. Kindle Edition.

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### QUESTION 674

What is called the number of columns in a table?

- A. Schema
- B. Relation
- C. Degree
- D. Cardinality

Answer: C

Explanation: The number of columns in a relation (a table) is the degree whereas the cardinality is the number of rows. The schema is the description of the database.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 45).

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### QUESTION 675

Which of the following would not correspond to the number of primary keys values found in a table in a relational database?

- A. Degree
- B. Number of tuples
- C. Cardinality
- D. Number of rows

Answer: A

Explanation: The degree of a table represents the number of columns in a table. All other elements represent the number of rows, or records, thus the number of unique primary keys values within the table.

NOTE FROM DAN:

You can have multiple columns that in aggregate make up the Primary Key, but you only have one PK.

#### Primary Keys

The first type of key we'll discuss is the primary key. Every database table should have one or more columns designated as the primary key. The value this key holds should be unique for each record in the database. For example, assume we have a table called Employees that contains personnel information for every employee in our firm. We'd need to select an appropriate primary key that would uniquely identify each employee. Your first thought might be to use the employee's name.

This wouldn't work out very well because it's conceivable that you'd hire two employees with the same name. A better choice might be to use a unique employee ID number that you assign to each employee when they're hired. Some organizations choose to use Social Security Numbers (or similar government identifiers) for this task because each employee already has one and they're guaranteed to be unique. However, the use of Social Security Numbers for this purpose is highly controversial due to privacy concerns. (If you work for a government organization, the use of a Social Security Number may even be illegal under the Privacy Act of 1974.) For this reason, most organizations have shifted to the use of unique identifiers (employee ID, student ID, etc.) that don't share these privacy concerns.

Once you decide upon a primary key and set it up in the database, the database management system will enforce the uniqueness of the key. If you try to insert a record into a table with a primary key that duplicates an existing record, the insert will fail.

Most databases are also capable of generating their own primary keys. Microsoft Access, for example, may be configured to use the AutoNumber data type to assign a unique ID to each record in the table. While effective, this is a bad design practice because it leaves you with a meaningless value in each record in the table. Why not use that space to store something useful?

#### Foreign Keys

The other type of key that we'll discuss in this course is the foreign key. These keys are used to create relationships between tables. Natural relationships exist between tables in most database structures. Returning to our employees database, let's imagine that we wanted to add a table containing departmental information to the database. This new table might be called Departments and would contain a large amount of information about the department as a whole. We'd also want to include information about the employees in the department, but it would be redundant to have the same information in two tables (Employees and Departments). Instead, we can create a relationship between the two tables.

Let's assume that the Departments table uses the Department Name column as the primary key. To create a relationship between the two tables, we add a new column to the Employees table called Department. We then fill in the name of the department to which each employee belongs. We also inform the database management system that the Department column in the Employees table is a foreign key that references the Departments table. The database will then enforce

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referential integrity by ensuring that all of the values in the Departments column of the Employees table have corresponding entries in the Departments table.

Note that there is no uniqueness constraint for a foreign key. We may (and most likely do!) have more than one employee belonging to a single department. Similarly, there's no requirement that an entry in the Departments table have any corresponding entry in the Employees table. It is possible that we'd have a department with no employees.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access Control Systems (page 45).

also see:

<http://databases.about.com/od/specificproducts/a/keys.htm>

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### QUESTION 676

Which of the following represents the best programming?

- A. Low cohesion, low coupling
- B. Low cohesion, high coupling
- C. High cohesion, low coupling
- D. High cohesion, high coupling

Answer: C

Explanation: The best programming uses the most cohesive modules possible, but because different modules need to pass data and communicate, they usually cannot be totally cohesive. Also, the lower the coupling, the better the software design, because it promotes module independence. The more independent a component is, the less complex the application is and the easier it is to modify and troubleshoot.

Source: WALLHOFF, John, CBK#4 Applications & Systems Development Security (CISSP Study Guide), April 2002 (page 7).

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### QUESTION 677

Java is not:

- A. Object-oriented.
- B. Distributed.
- C. Architecture Specific.
- D. Multithreaded.

Answer: C

Explanation: JAVA was developed so that the same program could be executed on multiple hardware and operating system platforms, it is not Architecture Specific.

The following answers are incorrect:

Object-oriented. Is not correct because JAVA is object-oriented. It should use the object-oriented programming methodology.

Distributed. Is incorrect because JAVA was developed to be able to be distributed, run on multiple

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computer systems over a network.

Multithreaded. Is incorrect because JAVA is multi-threaded that is calls to subroutines as is the case with object-oriented programming.

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**QUESTION 678**

In which of the following phases of system development life cycle (SDLC) is contingency planning most important?

- A. Initiation
- B. Development/acquisition
- C. Implementation
- D. Operation/maintenance

Answer: A

Explanation: Contingency planning requirements should be considered at every phase of SDLC, but most importantly when a new IT system is being conceived. In the initiation phase, system requirements are identified and matched to their related operational processes, allowing determination of the system's appropriate recovery priority.

Source: SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST), NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems, December 2001 (page 12).

and

The Official ISC2 Guide to the CBK, Second Edition, Application Security, page 180-185

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**QUESTION 679**

Buffer overflow and boundary condition errors are subsets of which of the following?

- A. Race condition errors.
- B. Access validation errors.
- C. Exceptional condition handling errors.
- D. Input validation errors.

Answer: D

Explanation: In an input validation error, the input received by a system is not properly checked, resulting in a vulnerability that can be exploited by sending a certain input sequence. There are two important types of input validation errors: buffer overflows (input received is longer than expected input length) and boundary condition error (where an input received causes the system to exceed an assumed boundary). A race condition occurs when there is a delay between the time when a system checks to see if an operation is allowed by the security model and the time when the system actually performs the operation. In an access validation error, the system is vulnerable because the access control mechanism is faulty. In an exceptional condition handling error, the system somehow becomes vulnerable due to an exceptional condition that has arisen.

Source: DUPUIS, Clement, Access Control Systems and Methodology CISSP Open Study Guide, version 1.0, march 2002 (page 105).

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**QUESTION 680**

Which of the following does not address Database Management Systems (DBMS) Security?

- A. Perturbation
- B. Cell suppression
- C. Padded cells
- D. Partitioning

Answer: C

Explanation: Padded cells complement Intrusion Detection Systems (IDSs) and are not related to DBMS security. Padded cells are simulated environments to which IDSs seamlessly transfer detected attackers and are designed to convince an attacker that the attack is going according to the plan. Cell suppression is a technique used against inference attacks by not revealing information in the case where a statistical query produces a very small result set. Perturbation also addresses inference attacks but involves making minor modifications to the results to a query. Partitioning involves splitting a database into two or more physical or logical parts; especially relevant for multilevel secure databases.

Source: LaROSA, Jeanette (domain leader), Application and System Development Security CISSP Open Study Guide, version 3.0, January 2002.

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**QUESTION 681**

During which phase of an IT system life cycle are security requirements developed?

- A. Operation
- B. Initiation
- C. Functional design analysis and Planning
- D. Implementation

Answer: C

Explanation: The software development life cycle (SDLC) (sometimes referred to as the System Development Life Cycle) is the process of creating or altering software systems, and the models and methodologies that people use to develop these systems.

The NIST SP 800-64 revision 2 has within the description section of para 3.2.1:

This section addresses security considerations unique to the second SDLC phase. Key security activities for this phase include:

- Conduct the risk assessment and use the results to supplement the baseline security controls;
- Analyze security requirements;
- Perform functional and security testing;
- Prepare initial documents for system certification and accreditation; and
- Design security architecture.

Reviewing this publication you may want to pick development/acquisition. Although initiation would be a decent choice, it is correct to say during this phase you would only brainstorm the idea of security requirements. Once you start to develop and acquire hardware/software components then

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you would also develop the security controls for these. The Shon Harris reference below is correct as well.

Shon Harris' Book (All-in-One CISSP Certification Exam Guide) divides the SDLC differently:

- Project initiation
- Functional design analysis and planning
- System design specifications
- Software development
- Installation
- Maintenance support
- Revision and replacement

According to the author (Shon Harris), security requirements should be developed during the functional design analysis and planning phase.

#### SDLC POSITIONING FROM NIST 800-64

##### SDLC Positioning in the enterprise

Information system security processes and activities provide valuable input into managing IT systems and their development, enabling risk identification, planning and mitigation. A risk management approach involves continually balancing the protection of agency information and assets with the cost of security controls and mitigation strategies throughout the complete information system development life cycle (see Figure 2-1 above). The most effective way to implement risk management is to identify critical assets and operations, as well as systemic vulnerabilities across the agency. Risks are shared and not bound by organization, revenue source, or topologies. Identification and verification of critical assets and operations and their interconnections can be achieved through the system security planning process, as well as through the compilation of information from the Capital Planning and Investment Control (CPIC) and Enterprise Architecture (EA) processes to establish insight into the agency's vital business operations, their supporting assets, and existing interdependencies and relationships.

With critical assets and operations identified, the organization can and should perform a business impact analysis (BIA). The purpose of the BIA is to relate systems and assets with the critical services they provide and assess the consequences of their disruption. By identifying these systems, an agency can manage security effectively by establishing priorities. This positions the security office to facilitate the IT program's cost-effective performance as well as articulate its business impact and value to the agency.

#### SDLC OVERVIEW FROM NIST 800-64

##### SDLC Overview from NIST 800-64 Revision 2

NIST 800-64 Revision 2 is one publication within the NIST standards that I would recommend you look at for more details about the SDLC. It describes in great detail what activities would take place and they have a nice diagram for each of the phases of the SDLC. You will find a copy at: <http://csrc.nist.gov/publications/nistpubs/800-64-Rev2/SP800-64-Revision2.pdf>

##### DISCUSSION:

Different sources present slightly different info as far as the phases names are concerned.

People sometimes get confused with some of the NIST standards. For example NIST 800-64 Security Considerations in the Information System Development Life Cycle has slightly different names, the activities mostly remain the same.

NIST clearly specifies that Security requirements would be considered throughout ALL of the phases. The keyword here is considered, if a question is about which phase they would be developed than Functional Design Analysis would be the correct choice.

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Within the NIST standard they use different phase, however under the second phase you will see that they talk specifically about Security Functional requirements analysis which confirms it is not at the initiation stage so it become easier to come out with the answer to this question. Here is what is stated:

The security functional requirements analysis considers the system security environment, including the enterprise information security policy and the enterprise security architecture. The analysis should address all requirements for confidentiality, integrity, and availability of information, and should include a review of all legal, functional, and other security requirements contained in applicable laws, regulations, and guidance.

At the initiation step you would NOT have enough detailed yet to produce the Security Requirements. You are mostly brainstorming on all of the issues listed but you do not develop them all at that stage.

By considering security early in the information system development life cycle (SDLC), you may be able to avoid higher costs later on and develop a more secure system from the start.

NIST says:

NIST's Information Technology Laboratory recently issued Special Publication (SP) 800-64, Security Considerations in the Information System Development Life Cycle, by Tim Grance, Joan Hash, and Marc Stevens, to help organizations include security requirements in their planning for every phase of the system life cycle, and to select, acquire, and use appropriate and cost-effective security controls.

I must admit this is all very tricky but reading skills and paying attention to KEY WORDS is a must for this exam.

References:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, Fifth Edition, Page 956

and

NIST S-64 Revision 2 at <http://csrc.nist.gov/publications/nistpubs/800-64-Rev2/SP800-64-Revision2.pdf>

and

<http://www.mks.com/resources/resource-pages/software-development-life-cycle-sdlc-systemdevelopment>

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## QUESTION 682

Which of the following phases of a system development life-cycle is most concerned with establishing a good security policy as the foundation for design?

- A. Development/acquisition
- B. Implementation
- C. Initiation
- D. Maintenance

Answer: C

Explanation: A security policy is an important document to develop while designing an information system. The security policy begins with the organization's basic commitment to information security formulated as a general policy statement.

The policy is then applied to all aspects of the system design or security solution. The policy

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identifies security goals (e.g., confidentiality, integrity, availability, accountability, and assurance) the system should support, and these goals guide the procedures, standards and controls used in the IT security architecture design.

The policy also should require definition of critical assets, the perceived threat, and security-related roles and responsibilities.

Source: STONEBURNER, Gary & al, National Institute of Standards and Technology (NIST), NIST Special Publication 800-27, Engineering Principles for Information Technology Security (A Baseline for Achieving Security), June 2001 (page 6).

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### QUESTION 683

When considering an IT System Development Life-cycle, security should be:

- A. Mostly considered during the initiation phase.
- B. Mostly considered during the development phase.
- C. Treated as an integral part of the overall system design.
- D. Added once the design is completed.

Answer: C

Explanation: Security must be considered in information system design. Experience has shown it is very difficult to implement security measures properly and successfully after a system has been developed, so it should be integrated fully into the system life-cycle process. This includes establishing security policies, understanding the resulting security requirements, participating in the evaluation of security products, and finally in the engineering, design, implementation, and disposal of the system.

Source: STONEBURNER, Gary & al, National Institute of Standards and Technology (NIST), NIST Special Publication 800-27, Engineering Principles for Information Technology Security (A Baseline for Achieving Security), June 2001 (page 7).

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### QUESTION 684

Risk reduction in a system development life-cycle should be applied:

- A. Mostly to the initiation phase.
- B. Mostly to the development phase.
- C. Mostly to the disposal phase.
- D. Equally to all phases.

Answer: D

Explanation: Risk is defined as the combination of the probability that a particular threat source will exploit, or trigger, a particular information system vulnerability and the resulting mission impact should this occur. Previously, risk avoidance was a common IT security goal. That changed as the nature of the risk became better understood. Today, it is recognized that elimination of all risk is not cost-effective. A cost-benefit analysis should be conducted for each proposed control. In some cases, the benefits of a more secure system may not justify the direct and indirect costs. Benefits include more than just prevention of monetary loss; for example, controls may be essential for

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maintaining public trust and confidence. Direct costs include the cost of purchasing and installing a given technology; indirect costs include decreased system performance and additional training. The goal is to enhance mission/business capabilities by managing mission/business risk to an acceptable level.

Source: STONEBURNER, Gary & al, National Institute of Standards and Technology (NIST), NIST Special Publication 800-27, Engineering Principles for Information Technology Security (A Baseline for Achieving Security), June 2001 (page 8).

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### QUESTION 685

Which of the following phases of a system development life-cycle is most concerned with maintaining proper authentication of users and processes to ensure appropriate access control decisions?

- A. Development/acquisition
- B. Implementation
- C. Operation/Maintenance
- D. Initiation

Answer: C

Explanation: The operation phase of an IT system is concerned with user authentication.

Authentication is the process where a system establishes the validity of a transmission, message, or a means of verifying the eligibility of an individual, process, or machine to carry out a desired action, thereby ensuring that security is not compromised by an untrusted source.

It is essential that adequate authentication be achieved in order to implement security policies and achieve security goals. Additionally, level of trust is always an issue when dealing with crossdomain interactions. The solution is to establish an authentication policy and apply it to crossdomain interactions as required.

Source: STONEBURNER, Gary & al, National Institute of Standards and Technology (NIST), NIST Special Publication 800-27, Engineering Principles for Information Technology Security (A Baseline for Achieving Security), June 2001 (page 15).

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### QUESTION 686

What can be defined as: It confirms that users' needs have been met by the supplied solution?

- A. Accreditation
- B. Certification
- C. Assurance
- D. Acceptance

Answer: D

Explanation: Acceptance confirms that users' needs have been met by the supplied solution.

Verification and Validation informs Acceptance by establishing the evidence – set against acceptance criteria - to determine if the solution meets the users' needs. Acceptance should also explicitly address any integration or interoperability requirements involving other equipment or

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systems. To enable acceptance every user and system requirement must have a 'testable' characteristic.

Accreditation is the formal acceptance of security, adequacy, authorization for operation and acceptance of existing risk. Accreditation is the formal declaration by a Designated Approving Authority (DAA) that an IS is approved to operate in a particular security mode using a prescribed set of safeguards to an acceptable level of risk.

Certification is the formal testing of security safeguards and assurance is the degree of confidence that the implemented security measures work as intended. The certification is a Comprehensive evaluation of the technical and nontechnical security features of an IS and other safeguards, made in support of the accreditation process, to establish the extent to which a particular design and implementation meets a set of specified security requirements.

Assurance is the descriptions of the measures taken during development and evaluation of the product to assure compliance with the claimed security functionality. For example, an evaluation may require that all source code is kept in a change management system, or that full functional testing is performed. The Common Criteria provides a catalogue of these, and the requirements may vary from one evaluation to the next. The requirements for particular targets or types of products are documented in the Security Targets (ST) and Protection Profiles (PP), respectively.

Source: ROTHKE, Ben, CISSP CBK Review presentation on domain 4, August 1999.

and

Official ISC2 Guide to the CISSP CBK, Second Edition, on page 211.

and

<http://www.aof.mod.uk/aofcontent/tactical/randa/content/randaintroduction.htm>

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### QUESTION 687

Which of the following statements pertaining to software testing is incorrect?

- A. Unit testing should be addressed and considered when the modules are being designed.
- B. Test data should be part of the specifications.
- C. Testing should be performed with live data to cover all possible situations.
- D. Test data generators can be used to systematically generate random test data that can be used to test programs.

Answer: C

Explanation: Live or actual field data is not recommended for use in the testing procedures because both data types may not cover out of range situations and the correct outputs of the test are unknown. Live data would not be the best data to use because of the lack of anomalies and also because of the risk of exposure to your live data.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 7: Applications and Systems Development (page 251).

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### QUESTION 688

Which of the following can be defined as the process of rerunning a portion of the test scenario or test plan to ensure that changes or corrections have not introduced new errors?

- A. Unit testing
- B. Pilot testing
- C. Regression testing
- D. Parallel testing

Answer: C

Explanation: Regression testing is the process of rerunning a portion of the test scenario or test plan to ensure that changes or corrections have not introduced new errors. The data used in regression testing should be the same as the data used in the original test. Unit testing refers to the testing of an individual program or module. Pilot testing is a preliminary test that focuses only on specific and predetermined aspects of a system. Parallel testing is the process of feeding test data into two systems and comparing the results.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, Chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 300).

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### QUESTION 689

Which of the following statements pertaining to software testing approaches is correct?

- A. A bottom-up approach allows interface errors to be detected earlier.
- B. A top-down approach allows errors in critical modules to be detected earlier.
- C. The test plan and results should be retained as part of the system's permanent documentation.
- D. Black box testing is predicated on a close examination of procedural detail.

Answer: C

Explanation: The test plan and results should always be retained as part of the system's permanent documentation.

A bottom-up approach to testing begins testing of atomic units, such as programs or modules, and works upwards until a complete system testing has taken place. It allows errors in critical modules to be found early. A top-down approach allows for early detection of interface errors and raises confidence in the system, as programmers and users actually see a working system. White box testing is predicated on a close examination of procedural detail. Black box testing examines some aspect of the system with little regard for the internal logical structure of the software.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, Chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 300).

**Top Down Testing:** An approach to integration testing where the component at the top of the component hierarchy is tested first, with lower level components being simulated by stubs. Tested components are then used to test lower level components. The process is repeated until the lowest level components have been tested.

**Bottom Up Testing:** An approach to integration testing where the lowest level components are tested first, then used to facilitate the testing of higher level components. The process is repeated until the component at the top of the hierarchy is tested.

**Black Box Testing:** Testing based on an analysis of the specification of a piece of software without

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reference to its internal workings. The goal is to test how well the component conforms to the published requirements for the component.

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**QUESTION 690**

Which of the following test makes sure the modified or new system includes appropriate access controls and does not introduce any security holes that might compromise other systems?

- A. Recovery testing
- B. Security testing
- C. Stress/volume testing
- D. Interface testing

Answer: B

Explanation: Security testing makes sure the modified or new system includes appropriate access controls and does not introduce any security holes that might compromise other systems. Recovery testing checks the system's ability to recover after a software or hardware failure. Stress/volume testing involves testing an application with large quantities of data in order to evaluate performance during peak hours.

Interface testing evaluates the connection of two or more components that pass information from one area to another.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, Chapter 6: Business Application System Development, Acquisition, Implementation and Maintenance (page 300).

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**QUESTION 691**

Which of the following phases of a software development life cycle normally addresses Due Care and Due Diligence?

- A. Implementation
- B. System feasibility
- C. Product design
- D. Software plans and requirements

Answer: D

Explanation: The software plans and requirements phase addresses threats, vulnerabilities, security requirements, reasonable care, due diligence, legal liabilities, cost/benefit analysis, level of protection desired, test plans.

Implementation is incorrect because it deals with installing security software, running the system, acceptance testing, security software testing, and complete documentation certification and accreditation (where necessary).

System Feasibility is incorrect because it deals with information security policy, standards, legal issues, and the early validation of concepts.

Product design is incorrect because it deals with incorporating security specifications, adjusting test plans and data,

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determining access controls, design documentation, evaluating encryption options, and verification.

Sources:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 7: Applications and Systems Development (page 252).

KRUTZ, Ronald & VINES, Russel, The CISSP Prep Guide: Gold Edition, Wiley Publishing Inc., 2003, Chapter 7: Security Life Cycle Components, Figure 7.5 (page 346).

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### QUESTION 692

Which of the following phases of a software development life cycle normally incorporates the security specifications, determines access controls, and evaluates encryption options?

- A. Detailed design
- B. Implementation
- C. Product design
- D. Software plans and requirements

Answer: C

Explanation: The Product design phase deals with incorporating security specifications, adjusting test plans and data, determining access controls, design documentation, evaluating encryption options, and verification.

Implementation is incorrect because it deals with Installing security software, running the system, acceptance testing, security software testing, and complete documentation certification and accreditation (where necessary).

Detailed design is incorrect because it deals with information security policy, standards, legal issues, and the early validation of concepts.

Software plans and requirements is incorrect because it deals with addressing threats, vulnerabilities, security requirements, reasonable care, due diligence, legal liabilities, cost/benefit analysis, level of protection desired, test plans.

Sources:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 7: Applications and Systems Development (page 252).

KRUTZ, Ronald & VINES, Russel, The CISSP Prep Guide: Gold Edition, Wiley Publishing Inc., 2003, Chapter 7: Security Life Cycle Components, Figure 7.5 (page 346).

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### QUESTION 693

In a database management system (DBMS), what is the "cardinality?"

- A. The number of rows in a relation.
- B. The number of columns in a relation.
- C. The set of allowable values that an attribute can take.
- D. The number of relations in a database.

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Answer: A

Explanation: Cardinality is the "number" of rows in a relation. The rows of the table represent records or tuples.

Degree is the "number" of columns in a relation. The individual columns of the table represent the attributes.

A relation is the basis of a relational database and is represented by a two-dimensional table.

The domain of a relation is the set of allowable values that an attribute can take.

Sources:

WALLHOFF, John, CISSP Summary 2002, April 2002, CBK#4 Applications & Systems Development Security (page 1), [/Documents/CISSP\\_Summary\\_2002/index.html](#).

KRUTZ, Ronald & VINES, Russel, The CISSP Prep Guide: Gold Edition, Wiley Publishing Inc., 2003, Chapter 2: Relational Database Security (page 59).

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### QUESTION 694

At which of the basic phases of the System Development Life Cycle are security requirements formalized?

- A. Disposal
- B. System Design Specifications
- C. Development and Implementation
- D. Functional Requirements Definition

Answer: D

Explanation: During the Functional Requirements Definition the project management and systems development teams will conduct a comprehensive analysis of current and possible future functional requirements to ensure that the new system will meet end-user needs. The teams also review the documents from the project initiation phase and make any revisions or updates as needed. For smaller projects, this phase is often subsumed in the project initiation phase. At this point security requirements should be formalized.

The Development Life Cycle is a project management tool that can be used to plan, execute, and control a software development project usually called the Systems Development Life Cycle (SDLC).

The SDLC is a process that includes systems analysts, software engineers, programmers, and end users in the project design and development. Because there is no industry-wide SDLC, an organization can use any one, or a combination of SDLC methods.

The SDLC simply provides a framework for the phases of a software development project from defining the functional requirements to implementation. Regardless of the method used, the SDLC outlines the essential phases, which can be shown together or as separate elements. The model chosen should be based on the project.

For example, some models work better with long-term, complex projects, while others are more suited for short-term projects. The key element is that a formalized SDLC is utilized.

The number of phases can range from three basic phases (concept, design, and implement) on up.

The basic phases of SDLC are:

Project initiation and planning

Functional requirements definition

System design specifications

Development and implementation

Documentation and common program controls

Testing and evaluation control, (certification and accreditation)

Transition to production (implementation)

The system life cycle (SLC) extends beyond the SDLC to include two additional phases:

Operations and maintenance support (post-installation)

Revisions and system replacement

### System Design Specifications

This phase includes all activities related to designing the system and software. In this phase, the system architecture, system outputs, and system interfaces are designed. Data input, data flow, and output requirements are established and security features are designed, generally based on the overall security architecture for the company.

### Development and Implementation

During this phase, the source code is generated, test scenarios and test cases are developed, unit and integration testing is conducted, and the program and system are documented for maintenance and for turnover to acceptance testing and production. As well as general care for software quality, reliability, and consistency of operation, particular care should be taken to ensure that the code is analyzed to eliminate common vulnerabilities that might lead to security exploits and other risks.

### Documentation and Common Program Controls

These are controls used when editing the data within the program, the types of logging the program should be doing, and how the program versions should be stored. A large number of such controls may be needed, see the reference below for a full list of controls.

### Acceptance

In the acceptance phase, preferably an independent group develops test data and tests the code to ensure that it will function within the organization's environment and that it meets all the functional and security requirements. It is essential that an independent group test the code during all applicable stages of development to prevent a separation of duties issue. The goal of security testing is to ensure that the application meets its security requirements and specifications. The security testing should uncover all design and implementation flaws that would allow a user to violate the software security policy and requirements. To ensure test validity, the application should be tested in an environment that simulates the production environment. This should include a security certification package and any user documentation.

### Certification and Accreditation (Security Authorization)

Certification is the process of evaluating the security stance of the software or system against a predetermined set of security standards or policies. Certification also examines how well the system performs its intended functional requirements. The certification or evaluation document should contain an analysis of the technical and nontechnical security features and countermeasures and the extent to which the software or system meets the security requirements for its mission and operational environment.

### Transition to Production (Implementation)

During this phase, the new system is transitioned from the acceptance phase into the live production environment. Activities during this phase include obtaining security accreditation;

training the new users according to the implementation and training schedules; implementing the system, including installation and data conversions; and, if necessary, conducting any parallel operations.

#### Revisions and System Replacement

As systems are in production mode, the hardware and software baselines should be subject to periodic evaluations and audits. In some instances, problems with the application may not be defects or flaws, but rather additional functions not currently developed in the application. Any changes to the application must follow the same SDLC and be recorded in a change management system. Revision reviews should include security planning and procedures to avoid future problems. Periodic application audits should be conducted and include documenting security incidents when problems occur. Documenting system failures is a valuable resource for justifying future system enhancements.

Below you have the phases used by NIST in its 800-63 Revision 2 document

As noted above, the phases will vary from one document to another one. For the purpose of the exam use the list provided in the official ISC2 Study book which is presented in short form above. Refer to the book for a more detailed description of activities at each of the phases of the SDLC. However, all references have very similar steps being used. As mentioned in the official book, it could be as simple as three phases in its most basic version (concept, design, and implement) or a lot more in more detailed versions of the SDLC.

The key thing is to make use of an SDLC.



#### SDLC phases

Reference(s) used for this question:

NIST SP 800-64 Revision 2 at <http://csrc.nist.gov/publications/nistpubs/800-64-Rev2/SP800-64-Revision2.pdf>

and

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition: Software Development Security ((ISC)2 Press) (Kindle Locations 134-157). Auerbach Publications. Kindle Edition.

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**QUESTION 695**

Which of the following is less likely to be included in the change control sub-phase of the maintenance phase of a software product?

- A. Estimating the cost of the changes requested
- B. Recreating and analyzing the problem
- C. Determining the interface that is presented to the user
- D. Establishing the priorities of requests

Answer: A

Explanation: Change control sub-phase includes Recreating and analyzing the problem, Determining the interface that is presented to the user, and Establishing the priorities of requests.  
Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 7: Applications and Systems Development (page 252).

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**QUESTION 696**

Sensitivity labels are an example of what application control type?

- A. Preventive security controls
- B. Detective security controls
- C. Compensating administrative controls
- D. Preventive accuracy controls

Answer: A

Explanation: Sensitivity labels are a preventive security application controls, such as are firewalls, reference monitors, traffic padding, encryption, data classification, one-time passwords, contingency planning, separation of development, application and test environments.

The incorrect answers are:

Detective security controls - Intrusion detection systems (IDS), monitoring activities, and audit trails.

Compensating administrative controls - There no such application control.

Preventive accuracy controls - data checks, forms, custom screens, validity checks, contingency planning, and backups.

Sources:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 7: Applications and Systems Development (page 264).

KRUTZ, Ronald & VINES, Russel, The CISSP Prep Guide: Gold Edition, Wiley Publishing Inc., 2003, Chapter 7: Application Controls, Figure 7.1 (page 360).

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**QUESTION 697**

What is the act of obtaining information of a higher sensitivity by combining information from lower

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levels of sensitivity?

- A. Polyinstantiation
- B. Inference
- C. Aggregation
- D. Data mining

Answer: C

Explanation: Aggregation is the act of obtaining information of a higher sensitivity by combining information from lower levels of sensitivity.

The incorrect answers are:

Polyinstantiation is the development of a detailed version of an object from another object using different values in the new object.

Inference is the ability of users to infer or deduce information about data at sensitivity levels for which they do not have access privilege.

Data mining refers to searching through a data warehouse for data correlations.

Sources:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 7: Applications and Systems Development (page 261).

KRUTZ, Ronald & VINES, Russel, The CISSP Prep Guide: Gold Edition, Wiley Publishing Inc., 2003, Chapter 7: Database Security Issues (page 358).

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### QUESTION 698

Which expert system operating mode allows determining if a given hypothesis is valid?

- A. Blackboard
- B. Lateral chaining
- C. Forward chaining
- D. Backward chaining

Answer: D

Explanation: Backward-chaining mode - the expert system backtracks to determine if a given hypothesis is valid. Backward-chaining is generally used when there are a large number of possible solutions relative to the number of inputs.

Incorrect answers are:

In a forward-chaining mode, the expert system acquires information and comes to a conclusion based on that information. Forward-chaining is the reasoning approach that can be used when there is a small number of solutions relative to the number of inputs.

Blackboard is an expert system-reasoning methodology in which a solution is generated by the use of a virtual blackboard, wherein information or potential solutions are placed on the blackboard by a plurality of individuals or expert knowledge sources. As more information is placed on the blackboard in an iterative process, a solution is generated.

Lateral-chaining mode - No such expert system mode.

**Sources:**

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 7: Applications and Systems Development (page 259).

KRUTZ, Ronald & VINES, Russel, The CISSP Prep Guide: Gold Edition, Wiley Publishing Inc., 2003, Chapter 7: Expert Systems (page 354).

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**QUESTION 699**

Why does compiled code pose more of a security risk than interpreted code?

- A. Because malicious code can be embedded in compiled code and be difficult to detect.
- B. If the executed compiled code fails, there is a chance it will fail insecurely.
- C. Because compilers are not reliable.
- D. There is no risk difference between interpreted code and compiled code.

Answer: A

Explanation: From a security standpoint, a compiled program is less desirable than an interpreted one because malicious code can be resident somewhere in the compiled code, and it is difficult to detect in a very large program.

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**QUESTION 700**

Which of the following is not a defined maturity level within the Software Capability Maturity Model?

- A. Repeatable
- B. Defined
- C. Managed
- D. Oriented

Answer: D

Explanation: The five defined maturity levels of the CMM are:

Initial, repeatable, defined, managed and optimizing.

Reference used for this question:

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 7: Applications and Systems Development (page 254).

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**QUESTION 701**

Which software development model is actually a meta-model that incorporates a number of the software development models?

- A. The Waterfall model
- B. The modified Waterfall model
- C. The Spiral model

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#### D. The Critical Path Model (CPM)

Answer: C

Explanation: The spiral model is actually a meta-model that incorporates a number of the software development models. This model depicts a spiral that incorporates the various phases of software development. The model states that each cycle of the spiral involves the same series of steps for each part of the project. CPM refers to the Critical Path Methodology.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 7: Applications and Systems Development (page 246).

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#### QUESTION 702

Which of the following is used in database information security to hide information?

- A. Inheritance
- B. Polyinstantiation
- C. Polymorphism
- D. Delegation

Answer: B

Explanation: Polyinstantiation enables a relation to contain multiple tuples with the same primary keys with each instance distinguished by a security level. When this information is inserted into a database, lower-level subjects need to be restricted from this information. Instead of just restricting access, another set of data is created to fool the lower-level subjects into thinking that the information actually means something else.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 11: Application and System Development (page 727).

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#### QUESTION 703

Which model, based on the premise that the quality of a software product is a direct function of the quality of its associated software development and maintenance processes, introduced five levels with which the maturity of an organization involved in the software process is evaluated?

- A. The Total Quality Model (TQM)
- B. The IDEAL Model
- C. The Software Capability Maturity Model
- D. The Spiral Model

Answer: C

Explanation: The Software Capability Maturity Model (CMM) is based on the premise that the quality of a software product is a direct function of the quality of its associated software development and maintenance processes. It introduces five maturity levels that serve as a foundation for conducting continuous process improvement and as an ordinal scale for measuring

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the maturity of the organization involved in the software processes.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 7: Applications and Systems Development (page 254).

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#### QUESTION 704

Which of the following characteristics pertaining to databases is not true?

- A. A data model should exist and all entities should have a significant name.
- B. Justifications must exist for normalized data.
- C. No NULLs should be allowed for primary keys.
- D. All relations must have a specific cardinality.

Answer: B

Explanation: Justifications should be provided when data is denormalized, not when it is normalized, because it introduces risk of data inconsistency. Denormalization is usually introduced for performance purposes.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, Chapter 3: Technical Infrastructure and Operational Practices (page 108).

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#### QUESTION 705

Which of the following is best defined as a circumstance in which a collection of information items is required to be classified at a higher security level than any of the individual items that comprise it?

- A. Aggregation
- B. Inference
- C. Clustering
- D. Collision

Answer: A

Explanation: The Internet Security Glossary (RFC2828) defines aggregation as a circumstance in which a collection of information items is required to be classified at a higher security level than any of the individual items that comprise it.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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#### QUESTION 706

At what stage of the applications development process should the security department become involved?

- A. Prior to the implementation
- B. Prior to systems testing
- C. During unit testing
- D. During requirements development

Answer: D

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 707

What is one disadvantage of content-dependent protection of information?

- A. It increases processing overhead.
- B. It requires additional password entry.
- C. It exposes the system to data locking.
- D. It limits the user's individual address space.

Answer: A

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 708

In what way could Java applets pose a security threat?

- A. Their transport can interrupt the secure distribution of World Wide Web pages over the Internet by removing SSL and S-HTTP
- B. Java interpreters do not provide the ability to limit system access that an applet could have on a client system.
- C. Executables from the Internet may attempt an intentional attack when they are downloaded on a client system.
- D. Java does not check the bytecode at runtime or provide other safety mechanisms for program isolation from the client system.

Answer: C

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 709

A system file that has been patched numerous times becomes infected with a virus. The anti-virus software warns that disinfecting the file may damage it. What course of action should be taken?

- A. Replace the file with the original version from master media
- B. Proceed with automated disinfection
- C. Research the virus to see if it is benign
- D. Restore an uninfected version of the patched file from backup media

Answer: D

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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**QUESTION 710**

For competitive reasons, the customers of a large shipping company called the "Integrated International Secure Shipping Containers Corporation" (IISSCC) like to keep private the various cargos that they ship. IISSCC uses a secure database system based on the Bell-LaPadula access control model to keep this information private. Different information in this database is classified at different levels. For example, the time and date a ship departs is labeled Unclassified, so customers can estimate when their cargos will arrive, but the contents of all shipping containers on the ship are labeled Top Secret to keep different shippers from viewing each other's cargos.

An unscrupulous fruit shipper, the "Association of Private Fuit Exporters, Limited" (APFEL) wants to learn whether or not a competitor, the "Fruit Is Good Corporation" (FIGCO), is shipping pineapples on the ship "S.S. Cruise Pacific" (S.S. CP). APFEL can't simply read the top secret contents in the IISSCC database because of the access model. A smart APFEL worker, however, attempts to insert a false, unclassified record in the database that says that FIGCO is shipping pineapples on the S.S. CP, reasoning that if there is already a FIGCO-pineapple-SSCP record then the insertion attempt will fail. But the attempt does not fail, so APFEL can't be sure whether or not FIGCO is shipping pineapples on the S.S. CP.

What is the name of the access control model property that prevented APFEL from reading FIGCO's cargo information? What is a secure database technique that could explain why, when the insertion attempt succeeded, APFEL was still unsure whether or not FIGCO was shipping pineapples?

- A. \*-Property and Polymorphism
- B. Strong \*-Property and Polyinstantiation
- C. Simple Security Property and Polymorphism
- D. Simple Security Property and Polyinstantiation

Answer: D

Explanation: The Simple Security Property states that a subject at a given clearance may not read an object at a higher classification, so unclassified APFEL could not read FIGCO's top secret cargo information.

Polyinstantiation permits a database to have two records that are identical except for their classifications (i.e., the primary key includes the classification). Thus, APFEL's new unclassified record did not collide with the real, top secret record, so APFEL was not able to learn about FIGs pineapples.

The following answers are incorrect:

\*-Property and Polymorphism

The \*-property states that a subject at a given clearance must not write to any object at a lower classification, which is irrelevant here because APFEL was trying to read data with a higher classification.

Polymorphism is a term that can refer to, among other things, viruses that can change their code to better hide from anti-virus programs or to objects of different types in an object-oriented program that are related by a common superclass and can, therefore, respond to a common set of methods in different ways. That's also irrelevant to this question.

Strong \*-Property and Polyinstantiation

Half-right. The strong \*-property limits a subject of a given clearance to writing only to objects with

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a matching classification. APFEL's attempt to insert an unclassified record was consistent with this property, but that has nothing to do with preventing APFEL from reading top secret information.

#### Simple Security Property and Polymorphism

Also half-right. See above for why Polymorphism is wrong.

The following reference(s) were/was used to create this question:

HARRIS, Shon, CISSP All-in-one Exam Guide, Third Edition, McGraw-Hill/Osborne, 2005

Chapter 5: Security Models and Architecture (page 280)

Chapter 11: Application and System Development (page 828)

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### QUESTION 711

A shared resource matrix is a technique commonly used to locate:

- A. Malicious code
- B. Security flaws
- C. Trap doors
- D. Covert channels

Answer: D

Explanation: Analyzing resources of a system is one standard for locating covert channels because the basis of a covert channel is a shared resource.

The following properties must hold for a storage channel to exist:

1. Both sending and receiving process must have access to the same attribute of a shared object.
2. The sending process must be able to modify the attribute of the shared object.
3. The receiving process must be able to reference that attribute of the shared object.
4. A mechanism for initiating both processes and properly sequencing their respective accesses to the shared resource must exist.

Note: Similar properties for timing channel can be listed

The following answers are incorrect:

All other answers were not directly related to discovery of Covert Channels.

The following reference(s) were/was used to create this question:

Auerbach Publications, Auerbach Publications (Test Series) - CRC Press LLC, Page No. 225

and

<http://www.cs.ucsb.edu/~sherwood/cs290/papers/covert-kemmerer.pdf>

and

<http://www.cs.utexas.edu/~byoung/cs361/lecture16.pdf>

and

<http://www.cs.utexas.edu/~byoung/cs361/lecture16.pdf>

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### QUESTION 712

What is NOT included in a data dictionary?

- A. Data Element Definitions
- B. Schema Objects
- C. Reference Keys
- D. Structured Query Language

Answer: D

Explanation: Structured Query Language (SQL) is a standard programming language used to allow clients to interact with a database. Although SQL can be used to access the data dictionary, it is NOT a part of the data dictionary.

A data dictionary, or metadata repository, as defined in the IBM Dictionary of Computing, is a "centralized repository of information about data such as meaning, relationships to other data, origin, usage, and format." The term may have one of several closely related meanings pertaining to databases and database management systems (DBMS):

a document describing a database or collection of databases

an integral component of a DBMS that is required to determine its structure

a piece of middleware that extends or supplants the native data dictionary of a DBMS

#### METADATA & DATA DICTIONARY

In addition to facilitating the effective retrieving of information, metadata can also manage restricted access to information. Metadata can serve as a gatekeeper function to filter access and thus provide security controls. One specialized form of metadata is the data dictionary, a central repository of information regarding the various databases that may be used within an enterprise. The data dictionary does not provide direct control of the databases, or access control functions, but does give the administrator a full picture of the various bodies of information around the company, potentially including the sensitivity and classification of material held in different objects. Therefore, the data dictionary can be used in risk management and direction of protective resources.

A data dictionary is a central collection of data element definitions, schema objects, and reference keys. The schema objects can contain tables, views, indexes, procedures, functions, and triggers. A data dictionary can contain the default values for columns, integrity information, the names of users, the privileges and roles for users, and auditing information. It is a tool used to centrally manage parts of a database by controlling data about the data (referred to as metadata) within the database. It provides a cross-reference between groups of data elements and the databases. The database management software creates and reads the data dictionary to ascertain what schema objects exist and checks to see if specific users have the proper access rights to view them

The following answers were incorrect:

All of the other options were included within the data dictionary, only SQL is NOT part of the Data Dictionary.

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition , Software Development, Page 1178. For Kindle users see Kindle Locations 23951-23957.

Corporate; (Isc)<sup>2</sup> (2010-04-20). Official (ISC)<sup>2</sup> Guide to the CISSP CBK, Third Edition ((ISC)<sup>2</sup> Press), Software Development Security, Page 667. For Kindle users see Kindle Locations 5950-5954.

[http://en.wikipedia.org/wiki/Data\\_dictionary](http://en.wikipedia.org/wiki/Data_dictionary)

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#### QUESTION 713

In which phase of the System Development Lifecycle (SDLC) is Security Accreditation Obtained?

A. Functional Requirements Phase

- B. Testing and evaluation control
- C. Acceptance Phase
- D. Postinstallation Phase

Answer: B

Explanation: A project management tool that can be used to plan, execute, and control a software development project is the systems development life cycle (SDLC). The SDLC is a process that includes systems analysts, software engineers, programmers, and end users in the project design and development.

Because there is no industry-wide SDLC, an organization can use any one, or a combination of SDLC methods.

The SDLC simply provides a framework for the phases of a software development project from defining the functional requirements to implementation. Regardless of the method used, the SDLC outlines the essential phases, which can be shown together or as separate elements.

The model chosen should be based on the project. For example, some models work better with long-term, complex projects, while others are more suited for short-term projects. The key element is that a formalized SDLC is utilized.

The number of phases can range from three basic phases (concept, design, and implement) on up.

The basic phases of SDLC are:

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Functional requirements definition

System design specifications

Development and implementation

Documentation and common program controls

Testing and evaluation control, (certification and accreditation)

Transition to production (implementation)

The system life cycle (SLC) extends beyond the SDLC to include two additional phases:

Operations and maintenance support (post-installation)

Revisions and system replacement

The following answers are incorrect:

Functional Requirements Phase

Acceptance Phase

Postinstallation Phase

The following reference(s) were/was used to create this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 11790-11809). Auerbach Publications. Kindle Edition.

## QUESTION 714

Java follows which security model:

- A. least privilege
- B. Sand box
- C. CIA
- D. OSI

Answer: B

Explanation: Java follows a sand box security model. If a java program operates with the sand box it is considered safe.

However, hackers have found ways to make Java run outside of the sand box and thus is unsafe.

The following answers are incorrect:

- A. least privilege - minimum rights required to perform an authorized task are given. This is to limit damage or access to sensitive or confidential data.
- B. CIA - stands for Confidentiality, Integrity and Availability. These are the fundamental principles of security.
- D. OSI - this is a model is guideline on how devices/applications on a network are to communicate with each other.

This is defined in a seven layer approach.

The following reference(s) were/was used to create this question:

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### QUESTION 715

What is surreptitious transfer of information from a higher classification compartment to a lower classification compartment without going through the formal communication channels?

- A. Object Reuse
- B. Covert Channel
- C. Security domain
- D. Data Transfer

Answer: B

Explanation: In computer security, a covert channel is a type of computer security attack that creates a capability to transfer information objects between processes that are not supposed to be allowed to communicate by the computer security policy. The term, originated in 1973 by Lampson is defined as (channels) not intended for information transfer at all, such as the service program's effect on system load, to distinguish it from Legitimate channels that are subjected to access controls by COMPUSEC.

For more details see: [http://en.wikipedia.org/wiki/Covert\\_channel](http://en.wikipedia.org/wiki/Covert_channel)

The following answers are incorrect:

- Object Reuse
- Security Domain
- Data Transfer

The following reference(s) were/was used to create this question:

ISC2 Review V 8.00 page 440

[http://en.wikipedia.org/wiki/Covert\\_channel](http://en.wikipedia.org/wiki/Covert_channel)

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### QUESTION 716

Many approaches to Knowledge Discovery in Databases (KDD) are used to identify valid and useful patterns in data. This is an evolving field of study that includes a variety of automated

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analysis solutions such as Data Mining. Which of the following is not an approach used by KDD?

- A. Probabilistic
- B. Oriented
- C. Deviation
- D. Classification

Answer: B

Explanation: The Oriented approach does not correctly describe a KDD approach.

The main approaches of KDD according to CBK are:

- Probabilistic approach: uses graphical representation models to compare different knowledge representations. The models are based on probabilities and data independencies. The probabilistic models are useful for applications involving uncertainty, such as those used in planning and control systems.
- Statistical approach: uses rule discovery and is based on data relationships. Learning algorithm can automatically select useful data relationship paths and attributes. These paths and attributes are then used to construct rules for discovering meaningful information. This approach is used to generalize patterns in the data and to construct rules from the noted patterns. An example of the statistical approach is OLAP.
- Classification approach: groups data according to similarities. One example is a pattern discovery and data-cleaning model that reduces a large database to only a few specific records. By eliminating redundant and non-important data, the discovery of patterns in the data is simplified.
- Deviation and trend analysis: uses filtering techniques to detect patterns. An example is an intrusion detection system that filters a large volume of data so that only the pertinent data is analyzed.
- Neural networks: methods used to develop classification, regression, association, and segmentation models. A neural net method organizes data into nodes that are arranged in layers, and links between the nodes have specific weighting classifications. The neural net is helpful in detecting the associations among the input patterns or relationships. It is also considered a learning system because new information is automatically incorporated into the system. However, the value and relevance of the decisions made by the neural network are only as good as the experience it is given. The greater the experience, the better the decision. Note that neural nets have a specific problem in terms of an individual's ability to substantiate processing in that they are subject to superstitious knowledge, which is a tendency to identify relations when no relations actually exist. More sophisticated neural nets are less subject to this problem.
- Expert system approach: uses a knowledge base (a collection of all the data, or knowledge, on a particular matter) and a set of algorithms and/or rules that infer new facts from knowledge and incoming data. The knowledge base could be the human experience that is available in an organization. Because the system reacts to a set of rules, if the rules are faulty, the response will also be faulty. Also, because human decision is removed from the point of action, if an error were to occur, the reaction time from a human would be longer.
- Hybrid approach: a combination of more than one approach that provides a more powerful and useful system.

The following answers are incorrect:

The other options describes some of the KDD possible approaches but were not the right choice.

The following reference(s) were/was used to create this question:

OFFICIAL (ISC)2® GUIDE TO THE CISSP® EXAM - First Edition, page 309.

and

[https://en.wikipedia.org/wiki/Data\\_mining](https://en.wikipedia.org/wiki/Data_mining)

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## QUESTION 717

Business rules can be enforced within a database through the use of

- A. Proxy
- B. Redundancy
- C. Views
- D. Authentication

Answer: C

Explanation: In database theory, a view consists of a stored query accessible as a virtual table in a relational database or a set of documents in a document-oriented database composed of the result set of a query or map and reduce functions. Unlike ordinary tables (base tables) in a relational database, a view does not form part of the physical schema: it is a dynamic, virtual table computed or collated from data in the database. Changing the data in a table alters the data shown in subsequent invocations of the view. In some NoSQL databases views are the only way to query data.

Views can provide advantages over tables:

Views can represent a subset of the data contained in a table

Views can join and simplify multiple tables into a single virtual table

Views can act as aggregated tables, where the database engine aggregates data (sum, average etc.) and presents the calculated results as part of the data

Views can hide the complexity of data; for example a view could appear as Sales2000 or Sales2001, transparently partitioning the actual underlying table

Views take very little space to store; the database contains only the definition of a view, not a copy of all the data it presents

Depending on the SQL engine used, views can provide extra security

Views can limit the degree of exposure of a table or tables to the outer world

Just as functions (in programming) can provide abstraction, so database users can create abstraction by using views. In another parallel with functions, database users can manipulate nested views, thus one view can aggregate data from other views. Without the use of views the normalization of databases above second normal form would become much more difficult. Views can make it easier to create lossless join decomposition.

The following answers are incorrect:

Proxy

In computer networks, a proxy server is a server (a computer system or an application) that acts as an intermediary for requests from clients seeking resources from other servers. A client connects to the proxy server, requesting some service, such as a file, connection, web page, or other resource available from a different server. The proxy server evaluates the request according to its filtering rules. For example, it may filter traffic by IP address or protocol. If the request is

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validated by the filter, the proxy provides the resource by connecting to the relevant server and requesting the service on behalf of the client. A proxy server may optionally alter the client's request or the server's response, and sometimes it may serve the request without contacting the specified server. In this case, it 'caches' responses from the remote server, and returns subsequent requests for the same content directly.

#### Redundancy

Redundancy is the duplication of critical components or functions of a system with the intention of increasing reliability of the system, usually in the case of a backup or fail-safe.

There are four major forms of redundancy, these are:

Hardware redundancy, such as Fail-Over, Load Balancer, Stanby mechanisms, DMR, and TMR

Information redundancy, such as Error detection and correction methods

Time redundancy, including transient fault detection methods such as Alternate Logic

Software redundancy

Redundancy allow you to avoid any single point of failure.

#### Authentication

The ways in which someone may be authenticated fall into three categories, based on what are known as the factors of authentication: something you know, something you have, or something you are. Each authentication factor covers a range of elements used to authenticate or verify a person's identity prior to being granted access, approving a transaction request, signing a document or other work product, granting authority to others, and establishing a chain of authority. Security research has determined that for a positive identification, elements from at least two, and preferably all three, factors be verified. The three factors (classes) and some of elements of each factor are:

the knowledge factors: Something the user knows

(e.g., a password, pass phrase, or personal identification number (PIN))

the ownership factors: Something the user has

(e.g., wrist band, ID card, security token, software token)

the inherence factors: Something the user is or does

(e.g., fingerprint, retinal pattern, DNA sequence, signature, face, voice, or other biometric identifier).

#### TWO FACTORS AUTHENTICATION

When elements representing two factors are required for identification, the term two-factor authentication is applied. . e.g. a bankcard (something the user has) and a PIN (something the user knows). Business networks may require users to provide a password (knowledge factor) and a pseudorandom number from a security token (ownership factor).

The following reference(s) were/was used to create this question:

Official (ISC)2 Guide to the CISSP CBK, Second Edition (2010)

[https://en.wikipedia.org/wiki/View\\_%28database%29](https://en.wikipedia.org/wiki/View_%28database%29)

[https://en.wikipedia.org/wiki/Redundancy\\_%28computer\\_science%29](https://en.wikipedia.org/wiki/Redundancy_%28computer_science%29)

<https://en.wikipedia.org/wiki/Authentication>

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#### QUESTION 718

What is the BEST definition of SQL injection.

- A. SQL injection is a database problem.
- B. SQL injection is a web Server problem.

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- C. SQL injection is a windows and Linux website problem that could be corrected by applying a website vendors patch.
  - D. SQL injection is an input validation problem.

Answer: D

Explanation: SQL injection is execution of unexpected SQL in the database as a result of unsanitized user input being accepted and used in the application code to form the SQL statement. It is a coding problem which affects inhouse, open source and commercial software.

The following answers are incorrect:

SQL injection is a database problem.

SQL injection is a web Server problem.

SQL injection is a windows and Linux website problem that could be corrected by applying a website vendors patch.

The following reference(s) were/was used to create this question:

[https://security.berkeley.edu/sites/default/files/uploads/SQLi\\_Prevention.pdf](https://security.berkeley.edu/sites/default/files/uploads/SQLi_Prevention.pdf) (page 9 and 10)

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### QUESTION 719

What allows a relation to contain multiple rows with a same primary key?

- A. RDBMS
- B. Polymorphism
- C. Polyinstantiation
- D. It is not possible

Answer: C

Explanation: In databases, polyinstantiation is database-related SQL (structured query language) terminology. It allows a relation to contain multiple rows with the same primary key; the multiple instances are distinguished by their security levels. It occurs because of mandatory policy.

Depending on the security level established, one record contains sensitive information, and the other one does not, that is, a user will see the record's information depending on his/her level of confidentiality previously dictated by the company's policy.

The following answers are incorrect:

An RDBMS is a DBMS in which data is stored in tables and the relationships among the data are also stored in tables. The data can be accessed or reassembled in many different ways without having to change the table forms.

Polymorphism based on the Greek roots “poly” and “morph,” meaning many and forms, respectively): allows the ability to overload operators, performing different methods depending on the context of the input message.

It is not possible

The following reference(s) were/was used to create this question:

<http://en.wikipedia.org/wiki/Polyinstantiation>

[https://en.wikipedia.org/wiki/Relational\\_database\\_management\\_system](https://en.wikipedia.org/wiki/Relational_database_management_system)

[https://en.wikipedia.org/wiki/Polymorphism\\_%28computer\\_science%29](https://en.wikipedia.org/wiki/Polymorphism_%28computer_science%29)

<http://my.safaribooksonline.com/book/certification/cissp/9781597495639>

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**QUESTION 720**

The Open Web Application Security Project (OWASP) Top Ten list of risks during the past several years. The following items have been on the list for many year. What of the choices below represent threats that have been at the top of the list for many years?

- A. Cross Site Scripting and Dynamic Unicode injection attacks
- B. SQL injection and Cross Site Scripting attacks
- C. SQL Injection and Weak Authentication and Session Management attacks
- D. Cross Site Scripting and Security Misconfigurations attacks

Answer: B

Explanation: SQL injection and other database related raw content injections with LDAP, XML through dynamic SQL queries indicate the highest risks to information systems with web and database tiered systems.

Injection flaws, such as SQL, OS, and LDAP injection occur when untrusted data is sent to an interpreter as part of a command or query. The attacker's hostile data can trick the interpreter into executing unintended commands or accessing data without proper authorization.

XSS flaws occur whenever an application takes untrusted data and sends it to a web browser without proper validation or escaping. XSS allows attackers to execute scripts in the victim's browser which can hijack user sessions, deface web sites, or redirect the user to malicious sites. Several organizations have developed frameworks for secure web development. One of the most common is the Open Web Application Security Project (OWASP). OWASP has several guides available for web application development including:

Development Guide

Code Review Guide

Testing Guide

Top Ten web application security vulnerabilities

OWASP Mobile

Given the prevalence of web-based and cloud-based solutions, OWASP provides an accessible and thorough framework with processes for web application security. The information security professional should be familiar with the "top ten" web application vulnerabilities and also how to mitigate them.

The following answers are incorrect:

Cross Site Scripting and Dynamic Unicode injection attacks

SQL Injection and Weak Authentication and Session Management attacks

Cross Site Scripting and Security Misconfigurations attacks

The following reference(s) were/was used to create this question:

Open Web Application Security Project (OWASP) Top Ten List.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 12878-12891). Auerbach Publications. Kindle Edition.

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**QUESTION 721**

Which one of the following is NOT a check for Input or Information Accuracy in Software

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Development security?

- A. Review check
- B. Range Check
- C. Relationship Check
- D. Reasonableness check

Answer: A

Explanation: There is no method called Review Check. To check input accuracy, data validation and verification checks should be incorporated into appropriate applications.

Character checks compare input characters against the expected type of characters, such as numbers or letters. This is sometimes also known as sanity checking.

Range checks verify input data against predetermined upper and lower limits.

Relationship checks compare input data to data on a master record file.

Reasonableness checks compare input data to an expected standard—another form of sanity checking.

Transaction limits check input data against administratively set ceilings on specified transactions.

The following answers are incorrect:

The are incorrect because THEY ARE all methods of Input checks

Range check - Verify input against predetermined upper and lower limits

Relationship check - compare input data to data on a master record file

Reasonableness check - compare input data to an expected standard

The following reference(s) were/was used to create this question:

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Software Development Security ((ISC)2 Press) (Kindle Locations 2554-2558). Auerbach Publications. Kindle Edition.

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## QUESTION 722

What would you call an attack where an attacker can influence the state of the resource between check and use?

This attack can happen with shared resources such as files, memory, or even variables in multithreaded programs. This can cause the software to perform invalid actions when the resource is in an unexpected state. The steps followed by this attack are usually the following: the software checks the state of a resource before using that resource, but the resource's state can change between the check and the use in a way that invalidates the results of the check.

- A. TOCTOU attack
- B. Input checking attack
- C. Time of Check attack
- D. Time of Use attack

Answer: A

Explanation: The TOCTTOU acronym expands to "Time Of Check To Time Of Use". It is a type of File Access Race Condition.

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The software checks the state of a resource before using that resource, but the resource's state can change between the check and the use in a way that invalidates the results of the check. This can cause the software to perform invalid actions when the resource is in an unexpected state. This weakness can be security-relevant when an attacker can influence the state of the resource between check and use. This can happen with shared resources such as files, memory, or even variables in multithreaded programs.

See the reference below for more details and examples of how this attack could be carried out.

#### WHAT ARE RACE CONDITIONS:

A race condition or race hazard is the behavior of an electronic or software system where the output is dependent on the sequence or timing of other uncontrollable events. It becomes a bug when events do not happen in the order the programmer intended. The term originates with the idea of two signals racing each other to influence the output first.

Race conditions can occur in electronics systems, especially logic circuits, and in computer software, especially multithreaded or distributed programs.

Race conditions arise in software when an application depends on the sequence or timing of processes or threads for it to operate properly. As with electronics, there are critical race conditions that result in invalid execution and bugs as well as non-critical race-conditions that result in unanticipated behavior. Critical race conditions often happen when the processes or threads depend on some shared state. Operations upon shared states are critical sections that must be mutually exclusive. Failure to obey this rule opens up the possibility of corrupting the shared state.

Race conditions have a reputation of being difficult to reproduce and debug, since the end result is nondeterministic and depends on the relative timing between interfering threads. Problems occurring in production systems can therefore disappear when running in debug mode, when additional logging is added, or when attaching a debugger, often referred to as a "Heisenbug". It is therefore better to avoid race conditions by careful software design rather than attempting to fix them afterwards.

The following answers are incorrect:

All of the other choices are incorrect and only bogus detractors

The following reference(s) were/was used to create this question:

<http://cwe.mitre.org/data/definitions/367.html>

and

[https://www.owasp.org/index.php/File\\_Access\\_Race\\_Condition:\\_TOCTOU](https://www.owasp.org/index.php/File_Access_Race_Condition:_TOCTOU)

and

[http://en.wikipedia.org/wiki/Race\\_condition](http://en.wikipedia.org/wiki/Race_condition)

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#### QUESTION 723

A virus is a program that can replicate itself on a system but not necessarily spread itself by network connections.

What is malware that can spread itself over open network connections?

- A. Worm
- B. Rootkit
- C. Adware
- D. Logic Bomb

Answer: A

Explanation: Computer worms are also known as Network Mobile Code, or a virus-like bit of code that can replicate itself over a network, infecting adjacent computers.

A computer worm is a standalone malware computer program that replicates itself in order to spread to other computers. Often, it uses a computer network to spread itself, relying on security failures on the target computer to access it. Unlike a computer virus, it does not need to attach itself to an existing program. Worms almost always cause at least some harm to the network, even if only by consuming bandwidth, whereas viruses almost always corrupt or modify files on a targeted computer.

A notable example is the SQL Slammer computer worm that spread globally in ten minutes on January 25, 2003. I myself came to work that day as a software tester and found all my SQL servers infected and actively trying to infect other computers on the test network.

A patch had been released a year prior by Microsoft and if systems were not patched and exposed to a 376 byte UDP packet from an infected host then system would become compromised.

Ordinarily, infected computers are not to be trusted and must be rebuilt from scratch but the vulnerability could be mitigated by replacing a single vulnerable dll called sqsort.dll.

Replacing that with the patched version completely disabled the worm which really illustrates to us the importance of actively patching our systems against such network mobile code.

The following answers are incorrect:

- Rootkit: Sorry, this isn't correct because a rootkit isn't ordinarily classified as network mobile code like a worm is. This isn't to say that a rootkit couldn't be included in a worm, just that a rootkit isn't usually classified like a worm. A rootkit is a stealthy type of software, typically malicious, designed to hide the existence of certain processes or programs from normal methods of detection and enable continued privileged access to a computer. The term rootkit is a concatenation of "root" (the traditional name of the privileged account on Unix operating systems) and the word "kit" (which refers to the software components that implement the tool). The term "rootkit" has negative connotations through its association with malware.

- Adware: Incorrect answer. Sorry but adware isn't usually classified as a worm. Adware, or advertising-supported software, is any software package which automatically renders advertisements in order to generate revenue for its author. The advertisements may be in the user interface of the software or on a screen presented to the user during the installation process. The functions may be designed to analyze which Internet sites the user visits and to present advertising pertinent to the types of goods or services featured there. The term is sometimes used to refer to software that displays unwanted advertisements.

- Logic Bomb: Logic bombs like adware or rootkits could be spread by worms if they exploit the right service and gain root or admin access on a computer.

The following reference(s) was used to create this question:

<http://en.wikipedia.org/wiki/Rootkit>

and

[http://en.wikipedia.org/wiki/Computer\\_worm](http://en.wikipedia.org/wiki/Computer_worm)

and

<http://en.wikipedia.org/wiki/Adware>

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## QUESTION 724

Debbie from finance called to tell you that she downloaded and installed a free wallpaper program

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that sets the wallpaper on her computer to match the current weather outside but now her computer runs slowly and the disk drive activity light is always on. You take a closer look and when you do a simple port scan to see which ports are open on her computer, you notice that TCP/80 is open. You point a web browser at her computer's IP Address and port and see a site selling prescription drugs.

Apart from the wallpaper changing software, what did Debbie ... from finance install without her knowledge?

- A. Trojan horse
- B. Network mobile code
- C. Virus
- D. Logic Bomb

Answer: A

Explanation: Debbie installed an application that has installed a web server and is acting as website server for a possibly criminal organization.

A Trojan horse, or Trojan, in computing is a non-self-replicating type of malware program containing malicious code that, when executed, carries out actions determined by the nature of the Trojan, typically causing loss or theft of data, and possible system harm. The term is derived from the story of the wooden horse used to trick defenders of Troy into taking concealed warriors into their city in ancient Greece, because computer Trojans often employ a form of social engineering, presenting themselves as routine, useful, or interesting in order to persuade victims to install them on their computers without the user knowledge.

A Trojans often acts as a backdoor, contacting a controller which can then have unauthorized access to the affected computer. The Trojan and backdoors are not themselves easily detectable, but if they carry out significant computing or communications activity may cause the computer to run noticeably slowly. Malicious programs are classified as Trojans if they do not attempt to inject themselves into other files (computer virus) or otherwise propagate themselves (worm). A computer may host a Trojan via a malicious program a user is duped into executing (often an email attachment disguised to be unsuspicious, e.g., a routine form to be filled in) or by drive-by download.

The following answers are incorrect:

- Network mobile code: This is incorrect because network mobile code is usually called a worm and that is malicious software that infects adjacent hosts which are unpatched against the vulnerability the worm exploits.
- Virus: A "Virus" is a generic term these days used to describe malware but isn't a specific enough term to describe what happened here?
- Logic Bomb: These are malware which, when a certain event occurs can be triggered to action. It could be a date, the creation or deletion of a file, visiting a website; basically anything a user can do can be something that triggers a logic bomb. However, this term isn't specific enough to describe what happened to Debbie's computer.

The following reference(s) was used to create this question:

and

[http://en.wikipedia.org/wiki/Trojan\\_horse\\_%28computing%29](http://en.wikipedia.org/wiki/Trojan_horse_%28computing%29)

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**QUESTION 725**

Which of the following technologies is a target of XSS or CSS (Cross-Site Scripting) attacks?

- A. Web Applications
- B. Intrusion Detection Systems
- C. Firewalls
- D. DNS Servers

Answer: A

Explanation: XSS or Cross-Site Scripting is a threat to web applications where malicious code is placed on a website that attacks the user using their existing authenticated session status.

Cross-Site Scripting attacks are a type of injection problem, in which malicious scripts are injected into the otherwise benign and trusted web sites. Cross-site scripting (XSS) attacks occur when an attacker uses a web application to send malicious code, generally in the form of a browser side script, to a different end user. Flaws that allow these attacks to succeed are quite widespread and occur anywhere a web application uses input from a user in the output it generates without validating or encoding it.

An attacker can use XSS to send a malicious script to an unsuspecting user. The end user's browser has no way to know that the script should not be trusted, and will execute the script. Because it thinks the script came from a trusted source, the malicious script can access any cookies, session tokens, or other sensitive information retained by your browser and used with that site. These scripts can even rewrite the content of the HTML page.

Mitigation:

- Configure your IPS - Intrusion Prevention System to detect and suppress this traffic.
- Input Validation on the web application to normalize input data.
- Set web apps to bind session cookies to the IP Address of the legitimate user and only permit that IP Address to use that cookie.

See the XSS (Cross Site Scripting) Prevention Cheat Sheet

See the Abridged XSS Prevention Cheat Sheet

See the DOM based XSS Prevention Cheat Sheet

See the OWASP Development Guide article on Phishing.

See the OWASP Development Guide article on Data Validation.

The following answers are incorrect:

- Intrusion Detection Systems: Sorry. IDS Systems aren't usually the target of XSS attacks but a properly-configured IDS/IPS can "detect and report on malicious string and suppress the TCP connection in an attempt to mitigate the threat."
- Firewalls: Sorry. Firewalls aren't usually the target of XSS attacks.
- DNS Servers: Same as above, DNS Servers aren't usually targeted in XSS attacks but they play a key role in the domain name resolution in the XSS attack process.

The following reference(s) was used to create this question:

[https://www.owasp.org/index.php/Cross-site\\_Scripting\\_%28XSS%29](https://www.owasp.org/index.php/Cross-site_Scripting_%28XSS%29)

**QUESTION 726**

Examine the following characteristics and identify which answer best indicates the likely cause of this behavior:

- Core operating system files are hidden
- Backdoor access for attackers to return
- Permissions changing on key files
- A suspicious device driver
- Encryption applied to certain files without explanation
- Logfiles being wiped

- A. Kernel-mode Rootkit
- B. User-mode Rootkit
- C. Malware
- D. Kernel-mode Badware

Answer: A

Explanation: Rootkits are software that is designed to get, keep and provide access to attackers by hooking into key components of the operating system like the kernel or system drivers. Rootkits commonly try to hide their presence by affecting operating system functionality and can subvert detection software like Antivirus Scanners.

Removing a rootkit may be impossible because the software can irrevocably change components of the operating system. The OS may need to be completely reinstalled to remove the infestation. At any rate, a computer infected with ANY malware should never be trusted again and infestation should be mitigated by a completely new install of the OS from trusted media.

The following answers are incorrect:

- User-Mode Rootkit: This isn't correct because User-mode rootkits don't include device drivers.
- Malware: This isn't a bad answer but it isn't as specific as the correct answer. Malware is a very broad term that describes any software that is written to do something nefarious.
- Kernel-mode Badware: This isn't really a computer term. But it should be.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

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### QUESTION 727

Which of the following attack includes social engineering, link manipulation or web site forgery techniques?

- A. smurf attack
- B. Traffic analysis
- C. Phishing
- D. Interrupt attack

Answer: C

Explanation: Phishing technique include social engineering, link manipulation or web site forgery techniques.

For your exam you should know the information below:

Phishing is the attempt to acquire sensitive information such as usernames, passwords, and credit card details (and sometimes, indirectly, money) by masquerading as a trustworthy entity in an

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electronic communication. Communications purporting to be from popular social web sites, auction sites, banks, online payment processors or IT administrators are commonly used to lure unsuspecting public. Phishing emails may contain links to websites that are infected with malware. Phishing is typically carried out by email spoofing or instant messaging, and it often directs users to enter details at a fake website whose look and feel are almost identical to the legitimate one. Phishing is an example of social engineering techniques used to deceive users, and exploits the poor usability of current web security technologies. Attempts to deal with the growing number of reported phishing incidents include legislation, user training, public awareness, and technical security measures.

**Spear phishing** - Phishing attempts directed at specific individuals or companies have been termed spearphishing. Attackers may gather personal information about their target to increase their probability of success.

#### Link manipulation

Most methods of phishing use some form of technical deception designed to make a link in an email (and the spoofed website it leads to) appear to belong to the spoofed organization. Misspelled URLs or the use of subdomains are common tricks used by phishers. In the following example URL, <http://www.yourbank.example.com/>, it appears as though the URL will take you to the example section of the yourbank website; actually this URL points to the "yourbank" (i.e. phishing) section of the example website. Another common trick is to make the displayed text for a link (the text between the tags) suggest a reliable destination, when the link actually goes to the phishers' site. The following example link, [//en.wikipedia.org/wiki/Genuine](http://en.wikipedia.org/wiki/Genuine), appears to direct the user to an article entitled "Genuine"; clicking on it will in fact take the user to the article entitled "Deception". In the lower left hand corner of most browsers users can preview and verify where the link is going to take them. Hovering your cursor over the link for a couple of seconds may do a similar thing, but this can still be set by the phisher through the HTML tooltip tag.

#### Website forgery

Once a victim visits the phishing website, the deception is not over. Some phishing scams use JavaScript commands in order to alter the address bar. This is done either by placing a picture of a legitimate URL over the address bar, or by closing the original bar and opening up a new one with the legitimate URL.

An attacker can even use flaws in a trusted website's own scripts against the victim. These types of attacks (known as cross-site scripting) are particularly problematic, because they direct the user to sign in at their bank or service's own web page, where everything from the web address to the security certificates appears correct. In reality, the link to the website is crafted to carry out the attack, making it very difficult to spot without specialist knowledge.

The following answers are incorrect:

**Smurf Attack** – Occurs when mis-configured network device allow packet to be sent to all hosts on a particular network via the broadcast address of the network

**Traffic analysis** - is the process of intercepting and examining messages in order to deduce information from patterns in communication. It can be performed even when the messages are encrypted and cannot be decrypted. In general, the greater the number of messages observed, or even intercepted and stored, the more can be inferred from the traffic. Traffic analysis can be performed in the context of military intelligence, counter-intelligence, or pattern-of-life analysis, and is a concern in computer security.

**Interrupt attack** - Interrupt attack occurs when a malicious action is performed by invoking the operating system to execute a particular system call.

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Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 323

Official ISC2 guide to CISSP CBK 3rd Edition Page number 493

<http://en.wikipedia.org/wiki/Phishing>

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### QUESTION 728

Which of the following attack could be avoided by creating more security awareness in the organization and provide adequate security knowledge to all employees?

- A. smurf attack
- B. Traffic analysis
- C. Phishing
- D. Interrupt attack

Answer: C

Explanation: Phishing techniques include social engineering, link manipulation, spear phishing, whaling, vishing, or web site forgery techniques.

For your exam you should know the information below:

Phishing is the attempt to acquire sensitive information such as usernames, passwords, and credit card details (and sometimes, indirectly, money) by masquerading as a trustworthy entity in an electronic communication. Communications purporting to be from popular social web sites, auction sites, banks, online payment processors or IT administrators are commonly used to lure unsuspecting public. Phishing emails may contain links to websites that are infected with malware. Phishing is typically carried out by email spoofing or instant messaging, and it often directs users to enter details at a fake website whose look and feel are almost identical to the legitimate one. Phishing is an example of social engineering techniques used to deceive users, and exploits the poor usability of current web security technologies. Attempts to deal with the growing number of reported phishing incidents include legislation, user training, public awareness, and technical security measures.

#### Spear phishing

Phishing attempts directed at specific individuals or companies have been termed spearphishing. Attackers may gather personal information about their target to increase their probability of success.

#### Link manipulation

Most methods of phishing use some form of technical deception designed to make a link in an email (and the spoofed website it leads to) appear to belong to the spoofed organization. Misspelled URLs or the use of subdomains are common tricks used by phishers. In the following example URL, <http://www.yourbank.example.com/>, it appears as though the URL will take you to the example section of the yourbank website; actually this URL points to the "yourbank" (i.e. phishing) section of the example website. Another common trick is to make the displayed text for a link (the text between the tags) suggest a reliable destination, when the link actually goes to the phishers' site. The following example link, [//en.wikipedia.org/wiki/Genuine](http://en.wikipedia.org/wiki/Genuine), appears to direct the user to an article entitled "Genuine"; clicking on it will in fact take the user to the article entitled "Deception". In the lower left hand corner of most browsers users can preview and verify where the link is going to take them. Hovering your cursor over the link for a couple of seconds may do a

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similar thing, but this can still be set by the phisher through the HTML tooltip tag.

#### Website forgery

Once a victim visits the phishing website, the deception is not over. Some phishing scams use JavaScript commands in order to alter the address bar. This is done either by placing a picture of a legitimate URL over the address bar, or by closing the original bar and opening up a new one with the legitimate URL.

An attacker can even use flaws in a trusted website's own scripts against the victim. These types of attacks (known as cross-site scripting) are particularly problematic, because they direct the user to sign in at their bank or service's own web page, where everything from the web address to the security certificates appears correct. In reality, the link to the website is crafted to carry out the attack, making it very difficult to spot without specialist knowledge.

The following answers are incorrect:

Smurf Attack – Occurs when mis-configured network device allow packet to be sent to all hosts on a particular network via the broadcast address of the network

Traffic analysis - is the process of intercepting and examining messages in order to deduce information from patterns in communication. It can be performed even when the messages are encrypted and cannot be decrypted. In general, the greater the number of messages observed, or even intercepted and stored, the more can be inferred from the traffic. Traffic analysis can be performed in the context of military intelligence, counter-intelligence, or pattern-of-life analysis, and is a concern in computer security.

Interrupt attack - Interrupt attack occurs when a malicious action is performed by invoking the operating system to execute a particular system call.

Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 323

Official ISC2 guide to CISSP CBK 3rd Edition Page number 493

<http://en.wikipedia.org/wiki/Phishing>

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### QUESTION 729

Which of the following answer specifies the correct sequence of levels within the Capability Maturity Model (CMM)?

- A. Initial, Managed, Defined, Quantitatively managed, optimized
- B. Initial, Managed, Defined, optimized, Quantitatively managed
- C. Initial, Defined, Managed, Quantitatively managed, optimized
- D. Initial, Managed, Quantitatively managed, Defined, optimized

Answer: A

#### Explanation: Maturity model

A maturity model can be viewed as a set of structured levels that describe how well the behaviors, practices and processes of an organization can reliably and sustainably produce required outcomes.

## CMMI Staged Maturity Levels

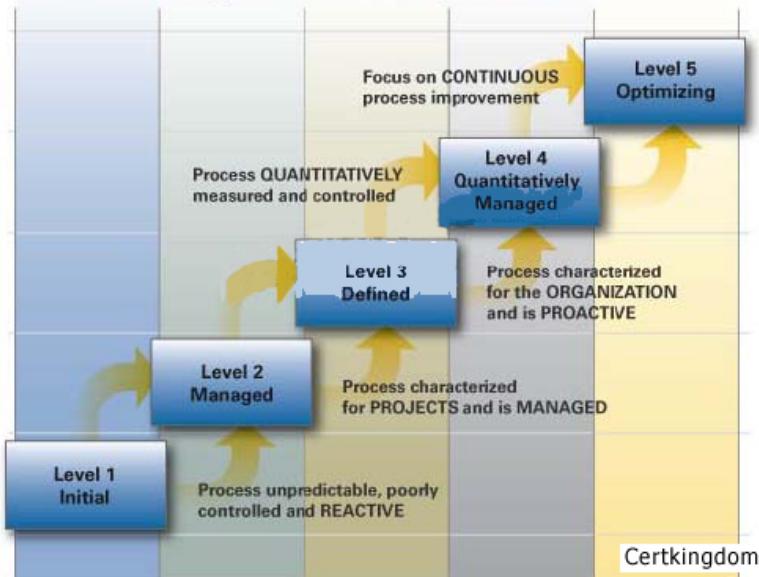


Image Source - <http://www.cmmilevels.com/cmmi-levels.jpg>

A maturity model can be used as a benchmark for comparison and as an aid to understanding - for example, for comparative assessment of different organizations where there is something in common that can be used as a basis for comparison. In the case of the CMM, for example, the basis for comparison would be the organizations' software development processes.

### Structure

The model involves five aspects:

**Maturity Levels:** a 5-level process maturity continuum - where the uppermost (5th) level is a notional ideal state where processes would be systematically managed by a combination of process optimization and continuous process improvement.

**Key Process Areas:** a Key Process Area identifies a cluster of related activities that, when performed together, achieve a set of goals considered important.

**Goals:** the goals of a key process area summarize the states that must exist for that key process area to have been implemented in an effective and lasting way. The extent to which the goals have been accomplished is an indicator of how much capability the organization has established at that maturity level. The goals signify the scope, boundaries, and intent of each key process area.

**Common Features:** common features include practices that implement and institutionalize a key process area. There are five types of common features: commitment to perform, ability to perform, activities performed, measurement and analysis, and verifying implementation.

**Key Practices:** The key practices describe the elements of infrastructure and practice that contribute most effectively to the implementation and institutionalization of the area.

### Levels

There are five levels defined along the continuum of the model and, according to the SEI: "Predictability, effectiveness, and control of an organization's software processes are believed to improve as the organization moves up these five levels. While not rigorous, the empirical evidence to date supports this belief".

**Initial** (chaotic, ad hoc, individual heroics) - the starting point for use of a new or undocumented repeat process.

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Repeatable - the process is at least documented sufficiently such that repeating the same steps may be attempted.

Defined - the process is defined/confirmed as a standard business process, and decomposed to levels 0, 1 and 2 (the last being Work Instructions).

Managed - the process is quantitatively managed in accordance with agreed-upon metrics.

Optimizing - process management includes deliberate process optimization/improvement.

Within each of these maturity levels are Key Process Areas which characteristic that level, and for each such area there are five factors: goals, commitment, ability, measurement, and verification.

These are not necessarily unique to CMM, representing — as they do — the stages that organizations must go through on the way to becoming mature.

The model provides a theoretical continuum along which process maturity can be developed incrementally from one level to the next. Skipping levels is not allowed/feasible.

#### Level 1 - Initial (Chaotic)

It is characteristic of processes at this level that they are (typically) undocumented and in a state of dynamic change, tending to be driven in an ad hoc, uncontrolled and reactive manner by users or events. This provides a chaotic or unstable environment for the processes.

#### Level 2 - Repeatable

It is characteristic of processes at this level that some processes are repeatable, possibly with consistent results. Process discipline is unlikely to be rigorous, but where it exists it may help to ensure that existing processes are maintained during times of stress.

#### Level 3 - Defined

It is characteristic of processes at this level that there are sets of defined and documented standard processes established and subject to some degree of improvement over time. These standard processes are in place (i.e., they are the AS-IS processes) and used to establish consistency of process performance across the organization.

#### Level 4 - Managed

It is characteristic of processes at this level that, using process metrics, management can effectively control the AS-IS process (e.g., for software development). In particular, management can identify ways to adjust and adapt the process to particular projects without measurable losses of quality or deviations from specifications. Process Capability is established from this level.

#### Level 5 - Optimizing

It is a characteristic of processes at this level that the focus is on continually improving process performance through both incremental and innovative technological changes/improvements.

At maturity level 5, processes are concerned with addressing statistical common causes of process variation and changing the process (for example, to shift the mean of the process performance) to improve process performance. This would be done at the same time as maintaining the likelihood of achieving the established quantitative process-improvement objectives.

The following answers are incorrect:

The other option specified in the option does not provide correct sequence.

The following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 188

CISSP Official study guide page number 693

(Cryptography)

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**QUESTION 730**

Which of the following is true about Kerberos?

- A. It utilizes public key cryptography.
- B. It encrypts data after a ticket is granted, but passwords are exchanged in plain text.
- C. It depends upon symmetric ciphers.
- D. It is a second party authentication system.

Answer: C

Explanation: Kerberos depends on secret keys (symmetric ciphers). Kerberos is a third party authentication protocol. It was designed and developed in the mid 1980's by MIT. It is considered open source but is copyrighted and owned by MIT. It relies on the user's secret keys. The password is used to encrypt and decrypt the keys.

The following answers are incorrect:

It utilizes public key cryptography. Is incorrect because Kerberos depends on secret keys (symmetric ciphers).

It encrypts data after a ticket is granted, but passwords are exchanged in plain text. Is incorrect because the passwords are not exchanged but used for encryption and decryption of the keys.

It is a second party authentication system. Is incorrect because Kerberos is a third party authentication system, you authenticate to the third party (Kerberos) and not the system you are accessing.

References:

MIT <http://web.mit.edu/kerberos/>

Wikipedia [http://en.wikipedia.org/wiki/Kerberos\\_%28protocol%29](http://en.wikipedia.org/wiki/Kerberos_%28protocol%29)

OIG CBK Access Control (pages 181 - 184)

AIOv3 Access Control (pages 151 - 155)

**QUESTION 731**

The RSA algorithm is an example of what type of cryptography?

- A. Asymmetric Key.
- B. Symmetric Key.
- C. Secret Key.
- D. Private Key.

Answer: A

Explanation: An Asymmetric Key is another name for Public Key, RSA is a Public Key cryptographic system.

The following answers are incorrect:

Symmetric Key. Is incorrect because RSA is a Public Key or a Asymmetric Key cryptographic system and not a Symmetric Key or a Secret Key cryptographic system.

Secret Key. Is incorrect because RSA is a Public Key or a Asymmetric Key cryptographic system and not a Secret Key or a Symmetric Key cryptographic system.

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Private Key. Is incorrect because Private Key is just one part if an Asymmetric Key cryptographic system, a Private Key used alone is also called a Symmetric Key cryptographic system.

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**QUESTION 732**

Kerberos depends upon what encryption method?

- A. Public Key cryptography.
- B. Secret Key cryptography.
- C. El Gamal cryptography.
- D. Blowfish cryptography.

Answer: B

Explanation: Kerberos depends on Secret Keys or Symmetric Key cryptography.

Kerberos a third party authentication protocol. It was designed and developed in the mid 1980's by MIT. It is considered open source but is copyrighted and owned by MIT. It relies on the user's secret keys. The password is used to encrypt and decrypt the keys.

This question asked specifically about encryption methods. Encryption methods can be SYMMETRIC (or secret key) in which encryption and decryption keys are the same, or ASYMMETRIC (aka 'Public Key') in which encryption and decryption keys differ.

'Public Key' methods must be asymmetric, to the extent that the decryption key CANNOT be easily derived from the encryption key. Symmetric keys, however, usually encrypt more efficiently, so they lend themselves to encrypting large amounts of data. Asymmetric encryption is often limited to ONLY encrypting a symmetric key and other information that is needed in order to decrypt a data stream, and the remainder of the encrypted data uses the symmetric key method for performance reasons. This does not in any way diminish the security nor the ability to use a public key to encrypt the data, since the symmetric key method is likely to be even MORE secure than the asymmetric method.

For symmetric key ciphers, there are basically two types: BLOCK CIPHERS, in which a fixed length block is encrypted, and STREAM CIPHERS, in which the data is encrypted one 'data unit' (typically 1 byte) at a time, in the same order it was received in.

The following answers are incorrect:

Public Key cryptography. Is incorrect because Kerberos depends on Secret Keys or Symmetric Key cryptography and not Public Key or Asymmetric Key cryptography.

El Gamal cryptography. Is incorrect because El Gamal is an Asymmetric Key encryption algorithm.

Blowfish cryptography. Is incorrect because Blowfish is a Symmetric Key encryption algorithm.

References:

OIG CBK Access Control (pages 181 - 184)

AIOv3 Access Control (pages 151 - 155)

Wikipedia [http://en.wikipedia.org/wiki/Blowfish\\_%28cipher%29](http://en.wikipedia.org/wiki/Blowfish_%28cipher%29) ;

[http://en.wikipedia.org/wiki/El\\_Gamal](http://en.wikipedia.org/wiki/El_Gamal)

<http://www.mrp3.com/encrypt.html>

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**QUESTION 733**

The DES algorithm is an example of what type of cryptography?

- 
- A. Secret Key
  - B. Two-key
  - C. Asymmetric Key
  - D. Public Key

Answer: A

Explanation: DES is also known as a Symmetric Key or Secret Key algorithm.

DES is a Symmetric Key algorithm, meaning the same key is used for encryption and decryption.

For the exam remember that:

DES key Sequence is 8 Bytes or 64 bits ( $8 \times 8 = 64$  bits)

DES has an Effective key length of only 56 Bits. 8 of the Bits are used for parity purpose only.

DES has a total key length of 64 Bits.

The following answers are incorrect:

Two-key This is incorrect because DES uses the same key for encryption and decryption.

Asymmetric Key This is incorrect because DES is a Symmetric Key algorithm using the same key for encryption and decryption and an Asymmetric Key algorithm uses both a Public Key and a Private Key.

Public Key. This is incorrect because Public Key or algorithm Asymmetric Key does not use the same key is used for encryption and decryption.

References used for this question:

[http://en.wikipedia.org/wiki/Data\\_Encryption\\_Standard](http://en.wikipedia.org/wiki/Data_Encryption_Standard)

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### QUESTION 734

Which of the following encryption methods is known to be unbreakable?

- A. Symmetric ciphers.
- B. DES codebooks.
- C. One-time pads.
- D. Elliptic Curve Cryptography.

Answer: C

Explanation: A One-Time Pad uses a keystream string of bits that is generated completely at random that is used only once. Because it is used only once it is considered unbreakable.

The following answers are incorrect:

Symmetric ciphers. This is incorrect because a Symmetric Cipher is created by substitution and transposition. They can and have been broken

DES codebooks. This is incorrect because Data Encryption Standard (DES) has been broken, it was replaced by Advanced Encryption Standard (AES).

Elliptic Curve Cryptography. This is incorrect because Elliptic Curve Cryptography or ECC is typically used on wireless devices such as cellular phones that have small processors. Because of the lack of processing power the keys used are often small. The smaller the key, the easier it is considered to be breakable. Also, the technology has not been around long enough or tested thoroughly enough to be considered truly unbreakable.

**QUESTION 735**

What algorithm was DES derived from?

- A. Twofish.
- B. Skipjack.
- C. Brooks-Aldeman.
- D. Lucifer.

Answer: D

Explanation: NSA took the 128-bit algorithm Lucifer that IBM developed, reduced the key size to 64 bits and with that developed DES.

The following answers are incorrect:

Twofish. This is incorrect because Twofish is related to Blowfish as a possible replacement for DES.

Skipjack. This is incorrect, Skipjack was developed after DES by the NSA .

Brooks-Aldeman. This is incorrect because this is a distractor, no algorithm exists with this name.

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**QUESTION 736**

What is a characteristic of using the Electronic Code Book mode of DES encryption?

- A. A given block of plaintext and a given key will always produce the same ciphertext.
- B. Repetitive encryption obscures any repeated patterns that may have been present in the plaintext.
- C. Individual characters are encoded by combining output from earlier encryption routines with plaintext.
- D. The previous DES output is used as input.

Answer: A

Explanation: A given message and key always produce the same ciphertext.

The following answers are incorrect:

Repetitive encryption obscures any repeated patterns that may have been present in the plaintext. Is incorrect because with Electronic Code Book a given 64 bit block of plaintext always produces the same ciphertext

Individual characters are encoded by combining output from earlier encryption routines with plaintext. This is incorrect because with Electronic Code Book processing 64 bits at a time until the end of the file was reached. This is a characteristic of Cipher Feedback. Cipher Feedback the ciphertext is run through a key-generating device to create the key for the next block of plaintext. The previous DES output is used as input. Is incorrect because This is incorrect because with Electronic Code Book processing 64 bits at a time until the end of the file was reached . This is a characteristic of Cipher Block Chaining. Cipher Block Chaining uses the output from the previous block to encrypt the next block.

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**QUESTION 737**

Where parties do not have a shared secret and large quantities of sensitive information must be

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passed, the most efficient means of transferring information is to use Hybrid Encryption Methods. What does this mean?

- A. Use of public key encryption to secure a secret key, and message encryption using the secret key.
- B. Use of the recipient's public key for encryption and decryption based on the recipient's private key.
- C. Use of software encryption assisted by a hardware encryption accelerator.
- D. Use of elliptic curve encryption.

Answer: A

Explanation: A Public Key is also known as an asymmetric algorithm and the use of a secret key would be a symmetric algorithm.

The following answers are incorrect:

Use of the recipient's public key for encryption and decryption based on the recipient's private key.

Is incorrect this would be known as an asymmetric algorithm.

Use of software encryption assisted by a hardware encryption accelerator. This is incorrect, it is a distractor.

Use of Elliptic Curve Encryption. Is incorrect this would use an asymmetric algorithm.

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### QUESTION 738

Public Key Infrastructure (PKI) uses asymmetric key encryption between parties. The originator encrypts information using the intended recipient's "public" key in order to get confidentiality of the data being sent. The recipients use their own "private" key to decrypt the information. The "Infrastructure" of this methodology ensures that:

- A. The sender and recipient have reached a mutual agreement on the encryption key exchange that they will use.
- B. The channels through which the information flows are secure.
- C. The recipient's identity can be positively verified by the sender.
- D. The sender of the message is the only other person with access to the recipient's private key.

Answer: C

Explanation: Through the use of Public Key Infrastructure (PKI) the recipient's identity can be positively verified by the sender.

The sender of the message knows he is using a Public Key that belongs to a specific user. He can validate through the Certification Authority (CA) that a public key is in fact the valid public key of the receiver and the receiver is really who he claims to be. By using the public key of the recipient, only the recipient using the matching private key will be able to decrypt the message. When you wish to achieve confidentiality, you encrypt the message with the recipient public key.

If the sender would wish to prove to the recipient that he is really who he claims to be then the sender would apply a digital signature on the message before encrypting it with the public key of the receiver. This would provide Confidentiality and Authenticity of the message.

A PKI (Public Key Infrastructure) enables users of an insecure public network, such as the

Internet, to securely and privately exchange data through the use of public key-pairs that are obtained and shared through a trusted authority, usually referred to as a Certificate Authority. The PKI provides for digital certificates that can vouch for the identity of individuals or organizations, and for directory services that can store, and when necessary, revoke those digital certificates. A PKI is the underlying technology that addresses the issue of trust in a normally untrusted environment.

The following answers are incorrect:

The sender and recipient have reached a mutual agreement on the encryption key exchange that they will use. Is incorrect because through the use of Public Key Infrastructure (PKI), the parties do not have to have a mutual agreement. They have a trusted 3rd party Certificate Authority to perform the verification of the sender.

The channels through which the information flows are secure. Is incorrect because the use of Public Key Infrastructure (PKI) does nothing to secure the channels.

The sender of the message is the only other person with access to the recipient's private key. Is incorrect because the sender does not have access to the recipient's private key though Public Key Infrastructure (PKI).

Reference(s) used for this question:

OIG CBK Cryptography (pages 253 - 254)

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### **QUESTION 739**

Which of the following DoD Model layer provides non-repudiation services?

- A. network layer.
- B. application layer.
- C. transport layer.
- D. data link layer.

Answer: B

Explanation: The Application Layer determines the identity of the communication partners and this is where Non-Repudiation service would be provided as well. See the layers below:

DoD Model

The following answers are incorrect:

network layer. Is incorrect because the Network Layer mostly has routing protocols, ICMP, IP, and IPSEC. It is not a layer in the DoD Model. It is called the Internet Layer within the DoD model.

transport layer. Is incorrect because the Transport layer provides transparent transfer of data between end users. This is called Host-to-Host on the DoD model but sometimes some books will call it Transport as well on the DoD model.

data link layer. Is incorrect because the Data Link Layer defines the protocols that computers must follow to access the network for transmitting and receiving messages. It is part of the OSI Model. This does not exist on the DoD model, it is called the Link Layer on the DoD model.

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### **QUESTION 740**

Which of the following statements is true about data encryption as a method of protecting data?

- A. It should sometimes be used for password files

- B. It is usually easily administered
- C. It makes few demands on system resources
- D. It requires careful key management

Answer: D

Explanation: In cryptography, you always assume the "bad guy" has the encryption algorithm (indeed, many algorithms such as DES, Triple DES, AES, etc. are public domain). What the bad guy lacks is the key used to complete that algorithm and encrypt/decrypt information. Therefore, protection of the key, controlled distribution, scheduled key change, timely destruction, and several other factors require careful consideration. All of these factors are covered under the umbrella term of "key management".

Another significant consideration is the case of "data encryption as a method of protecting data" as the question states. If that data is to be stored over a long period of time (such as on backup), you must ensure that your key management scheme stores old keys for as long as they will be needed to decrypt the information they encrypted.

The other answers are not correct because:

"It should sometimes be used for password files." - Encryption is often used to encrypt passwords stored within password files, but it is not typically effective for the password file itself. On most systems, if a user cannot access the contents of a password file, they cannot authenticate.

Encrypting the entire file prevents that access.

"It is usually easily administered." - Developments over the last several years have made cryptography significantly easier to manage and administer. But it remains a significant challenge. This is not a good answer.

"It makes few demands on system resources." - Cryptography is, essentially, a large complex mathematical algorithm. In order to encrypt and decrypt information, the system must perform this algorithm hundreds, thousands, or even millions/billions/trillions of times. This becomes system resource intensive, making this a very bad answer.

Reference:

Official ISC2 Guide page: 266 (poor explanation)

All in One Third Edition page: 657 (excellent explanation)

Key Management - Page 732, All in One Fourth Edition

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## QUESTION 741

Which type of algorithm is considered to have the highest strength per bit of key length of any of the asymmetric algorithms?

- A. Rivest, Shamir, Adleman (RSA)
- B. El Gamal
- C. Elliptic Curve Cryptography (ECC)
- D. Advanced Encryption Standard (AES)

Answer: C

Explanation: The

Answer: "Elliptic Curve Cryptography (ECC)". This type of cryptography is

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based on the complex mathematics of elliptic curves. These algorithms are advantageous for their speed and strength.

The other answers are not correct because:

"Rivest, Shamir, Adleman (RSA)" is incorrect because RSA is a "traditional" asymmetric algorithm.

While it is reasonably strong, it is not considered to be as strong as ECC based systems.

"El Gamal" is incorrect because it is also a "traditional" asymmetric algorithm and not considered as strong as ECC based systems.

"Advanced Encryption Standard (AES)" is incorrect because the question asks specifically about asymmetric algorithms and AES is a symmetric algorithm.

References:

Official ISC2 Guide page: 258

All in One Third Edition page: 638

The RSA Crypto FAQ: <http://www.rsa.com/rsalabs/node.asp?id=2241>

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### QUESTION 742

How many bits is the effective length of the key of the Data Encryption Standard algorithm?

- A. 168
- B. 128
- C. 56
- D. 64

Answer: C

Explanation: The correct answer is "56". This is actually a bit of a trick question, since the actual key length is 64 bits. However, every eighth bit is ignored because it is used for parity. This makes the "effective length of the key" that the question actually asks for 56 bits.

The other answers are not correct because:

168 - This is the number of effective bits in Triple DES (56 times 3).

128 - Many encryption algorithms use 128 bit key, but not DES. Note that you may see 128 bit encryption referred to as "military strength encryption" because many military systems use key of this length.

64 - This is the actual length of a DES encryption key, but not the "effective length" of the DES key.

Reference:

Official ISC2 Guide page: 238

All in One Third Edition page: 622

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### QUESTION 743

The primary purpose for using one-way hashing of user passwords within a password file is which of the following?

- A. It prevents an unauthorized person from trying multiple passwords in one logon attempt.
- B. It prevents an unauthorized person from reading the password.
- C. It minimizes the amount of storage required for user passwords.
- D. It minimizes the amount of processing time used for encrypting passwords.

Answer: B

Explanation: The whole idea behind a one-way hash is that it should be just that - one-way. In other words, an attacker should not be able to figure out your password from the hashed version of that password in any mathematically feasible way (or within any reasonable length of time).

#### Password Hashing and Encryption

In most situations , if an attacker sniffs your password from the network wire, she still has some work to do before she actually knows your password value because most systems hash the password with a hashing algorithm, commonly MD4 or MD5, to ensure passwords are not sent in cleartext.

Although some people think the world is run by Microsoft, other types of operating systems are out there, such as Unix and Linux. These systems do not use registries and SAM databases, but contain their user passwords in a file cleverly called “shadow.” Now, this shadow file does not contain passwords in cleartext; instead, your password is run through a hashing algorithm, and the resulting value is stored in this file.

Unixtype systems zest things up by using salts in this process. Salts are random values added to the encryption process to add more complexity and randomness. The more randomness entered into the encryption process, the harder it is for the bad guy to decrypt and uncover your password. The use of a salt means that the same password can be encrypted into several thousand different formats. This makes it much more difficult for an attacker to uncover the right format for your system.

#### Password Cracking tools

Note that the use of one-way hashes for passwords does not prevent password crackers from guessing passwords. A password cracker runs a plain-text string through the same one-way hash algorithm used by the system to generate a hash, then compares that generated has with the one stored on the system. If they match, the password cracker has guessed your password.

This is very much the same process used to authenticate you to a system via a password. When you type your username and password, the system hashes the password you typed and compares that generated hash against the one stored on the system - if they match, you are authenticated.

Pre-Computed password tables exists today and they allow you to crack passwords on Lan Manager (LM) within a VERY short period of time through the use of Rainbow Tables. A Rainbow Table is a precomputed table for reversing cryptographic hash functions, usually for cracking password hashes. Tables are usually used in recovering a plaintext password up to a certain length consisting of a limited set of characters. It is a practical example of a space/time trade-off also called a Time-Memory trade off, using more computer processing time at the cost of less storage when calculating a hash on every attempt, or less processing time and more storage when compared to a simple lookup table with one entry per hash. Use of a key derivation function that employs a salt makes this attack unfeasible.

You may want to review "Rainbow Tables" at the links:

[http://en.wikipedia.org/wiki/Rainbow\\_table](http://en.wikipedia.org/wiki/Rainbow_table)

<http://www.antsight.com/zsl/rainbowcrack/>

Today's password crackers:

Meet oclHashcat. They are GPGPU-based multi-hash cracker using a brute-force attack (implemented as mask attack), combinator attack, dictionary attack, hybrid attack, mask attack, and rule-based attack.

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This GPU cracker is a fusioned version of oclHashcat-plus and oclHashcat-lite, both very wellknown suites at that time, but now deprecated. There also existed a now very old oclHashcat GPU cracker that was replaced w/ plus and lite, which - as said - were then merged into oclHashcat 1.00 again.

This cracker can crack Hashes of NTLM Version 2 up to 8 characters in less than a few hours. It is definitively a game changer. It can try hundreds of billions of tries per seconds on a very large cluster of GPU's. It supports up to 128 Video Cards at once.

I am stuck using Password what can I do to better protect myself?

You could look at safer alternative such as Bcrypt, PBKDF2, and Scrypt.

bcrypt is a key derivation function for passwords designed by Niels Provos and David Mazières, based on the Blowfish cipher, and presented at USENIX in 1999. Besides incorporating a salt to protect against rainbow table attacks, bcrypt is an adaptive function: over time, the iteration count can be increased to make it slower, so it remains resistant to brute-force search attacks even with increasing computation power.

In cryptography, scrypt is a password-based key derivation function created by Colin Percival, originally for the Tarsnap online backup service. The algorithm was specifically designed to make it costly to perform large-scale custom hardware attacks by requiring large amounts of memory. In 2012, the scrypt algorithm was published by the IETF as an Internet Draft, intended to become an informational RFC, which has since expired. A simplified version of scrypt is used as a proof-of-work scheme by a number of cryptocurrencies, such as Litecoin and Dogecoin.

PBKDF2 (Password-Based Key Derivation Function 2) is a key derivation function that is part of RSA Laboratories' Public-Key Cryptography Standards (PKCS) series, specifically PKCS #5 v2.0, also published as Internet Engineering Task Force's RFC 2898. It replaces an earlier standard, PBKDF1, which could only produce derived keys up to 160 bits long.

PBKDF2 applies a pseudorandom function, such as a cryptographic hash, cipher, or HMAC to the input password or passphrase along with a salt value and repeats the process many times to produce a derived key, which can then be used as a cryptographic key in subsequent operations. The added computational work makes password cracking much more difficult, and is known as key stretching. When the standard was written in 2000, the recommended minimum number of iterations was 1000, but the parameter is intended to be increased over time as CPU speeds increase. Having a salt added to the password reduces the ability to use precomputed hashes (rainbow tables) for attacks, and means that multiple passwords have to be tested individually, not all at once. The standard recommends a salt length of at least 64 bits.

The other answers are incorrect:

"It prevents an unauthorized person from trying multiple passwords in one logon attempt." is incorrect because the fact that a password has been hashed does not prevent this type of brute force password guessing attempt.

"It minimizes the amount of storage required for user passwords" is incorrect because hash algorithms always generate the same number of bits, regardless of the length of the input. Therefore, even short passwords will still result in a longer hash and not minimize storage requirements.

"It minimizes the amount of processing time used for encrypting passwords" is incorrect because the processing time to encrypt a password would be basically the same required to produce a oneway has of the same password.

Reference(s) used for this question:

<http://en.wikipedia.org/wiki/PBKDF2>

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<http://en.wikipedia.org/wiki/Scrypt>

<http://en.wikipedia.org/wiki/Bcrypt>

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 195) . McGraw-Hill. Kindle Edition.

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### QUESTION 744

Which of the following issues is not addressed by digital signatures?

- A. nonrepudiation
- B. authentication
- C. data integrity
- D. denial-of-service

Answer: D

Explanation: A digital signature directly addresses both confidentiality and integrity of the CIA triad. It does not directly address availability, which is what denial-of-service attacks.

The other answers are not correct because:

"nonrepudiation" is not correct because a digital signature can provide for nonrepudiation.

"authentication" is not correct because a digital signature can be used as an authentication mechanism

"data integrity" is not correct because a digital signature does verify data integrity (as part of nonrepudiation)

References:

Official ISC2 Guide page: 227 & 265

All in One Third Edition page: 648

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### QUESTION 745

Brute force attacks against encryption keys have increased in potency because of increased computing power. Which of the following is often considered a good protection against the brute force cryptography attack?

- A. The use of good key generators.
- B. The use of session keys.
- C. Nothing can defend you against a brute force crypto key attack.
- D. Algorithms that are immune to brute force key attacks.

Answer: B

Explanation: If we assume a crypto-system with a large key (and therefore a large key space) a brute force attack will likely take a good deal of time - anywhere from several hours to several years depending on a number of variables. If you use a session key for each message you encrypt, then the brute force attack provides the attacker with only the key for that one message. So, if you are encrypting 10 messages a day, each with a different session key, but it takes me a month to break each session key then I am fighting a losing battle.

The other answers are not correct because:

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"The use of good key generators" is not correct because a brute force key attack will eventually run through all possible combinations of key. Therefore, any key will eventually be broken in this manner given enough time.

"Nothing can defend you against a brute force crypto key attack" is incorrect, and not the best answer listed. While it is technically true that any key will eventually be broken by a brute force attack, the question remains "how long will it take?". In other words, if you encrypt something today but I can't read it for 10,000 years, will you still care? If the key is changed every session does it matter if it can be broken after the session has ended? Of the answers listed here, session keys are "often considered a good protection against the brute force cryptography attack" as the question asks.

"Algorithms that are immune to brute force key attacks" is incorrect because there currently are no such algorithms.

References:

Official ISC2 Guide page: 259

All in One Third Edition page: 623

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### QUESTION 746

The Data Encryption Standard (DES) encryption algorithm has which of the following characteristics?

- A. 64 bits of data input results in 56 bits of encrypted output
- B. 128 bit key with 8 bits used for parity
- C. 64 bit blocks with a 64 bit total key length
- D. 56 bits of data input results in 56 bits of encrypted output

Answer: C

Explanation: DES works with 64 bit blocks of text using a 64 bit key (with 8 bits used for parity, so the effective key length is 56 bits).

Some people are getting the Key Size and the Block Size mixed up. The block size is usually a specific length. For example DES uses block size of 64 bits which results in 64 bits of encrypted data for each block. AES uses a block size of 128 bits, the block size on AES can only be 128 as per the published standard FIPS-197.

A DES key consists of 64 binary digits ("0"s or "1"s) of which 56 bits are randomly generated and used directly by the algorithm. The other 8 bits, which are not used by the algorithm, may be used for error detection. The 8 error detecting bits are set to make the parity of each 8-bit byte of the key odd, i.e., there is an odd number of "1"s in each 8-bit byte1. Authorized users of encrypted computer data must have the key that was used to encipher the data in order to decrypt it.

#### IN CONTRAST WITH AES

The input and output for the AES algorithm each consist of sequences of 128 bits (digits with values of 0 or 1). These sequences will sometimes be referred to as blocks and the number of bits they contain will be referred to as their length. The Cipher Key for the AES algorithm is a sequence of 128, 192 or 256 bits. Other input, output and Cipher Key lengths are not permitted by this standard.

The Advanced Encryption Standard (AES) specifies the Rijndael algorithm, a symmetric block cipher that can process data blocks of 128 bits, using cipher keys with lengths of 128, 192, and

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256 bits. Rijndael was designed to handle additional block sizes and key lengths, however they are not adopted in the AES standard.

The AES algorithm may be used with the three different key lengths indicated above, and therefore these different "flavors" may be referred to as "AES-128", "AES-192", and "AES-256". The other answers are not correct because:

"64 bits of data input results in 56 bits of encrypted output" is incorrect because while DES does work with 64 bit block input, it results in 64 bit blocks of encrypted output.

"128 bit key with 8 bits used for parity" is incorrect because DES does not ever use a 128 bit key.

"56 bits of data input results in 56 bits of encrypted output" is incorrect because DES always works with 64 bit blocks of input/output, not 56 bits.

Reference(s) used for this question:

Official ISC2 Guide to the CISSP CBK, Second Edition, page: 336-343

<http://csrc.nist.gov/publications/fips/fips197/fips-197.pdf>

<http://csrc.nist.gov/publications/fips/fips46-3/fips46-3.pdf>

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### QUESTION 747

PGP uses which of the following to encrypt data?

- A. An asymmetric encryption algorithm
- B. A symmetric encryption algorithm
- C. A symmetric key distribution system
- D. An X.509 digital certificate

Answer: B

Explanation: Notice that the question specifically asks what PGP uses to encrypt. For this, PGP uses an symmetric key algorithm. PGP then uses an asymmetric key algorithm to encrypt the session key and then send it securely to the receiver. It is an hybrid system where both types of ciphers are being used for different purposes.

Whenever a question talks about the bulk of the data to be sent, Symmetric is always best to choice to use because of the inherent speed within Symmetric Ciphers. Asymmetric ciphers are 100 to 1000 times slower than Symmetric Ciphers.

The other answers are not correct because:

"An asymmetric encryption algorithm" is incorrect because PGP uses a symmetric algorithm to encrypt data.

"A symmetric key distribution system" is incorrect because PGP uses an asymmetric algorithm for the distribution of the session keys used for the bulk of the data.

"An X.509 digital certificate" is incorrect because PGP does not use X.509 digital certificates to encrypt the data, it uses a session key to encrypt the data.

References:

Official ISC2 Guide page: 275

All in One Third Edition page: 664 - 665

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### QUESTION 748

A public key algorithm that does both encryption and digital signature is which of the following?

- A. RSA
- B. DES
- C. IDEA
- D. Diffie-Hellman

Answer: A

Explanation: RSA can be used for encryption, key exchange, and digital signatures.

Key Exchange versus key Agreement

#### KEY EXCHANGE

Key exchange (also known as "key establishment") is any method in cryptography by which cryptographic keys are exchanged between users, allowing use of a cryptographic algorithm. If sender and receiver wish to exchange encrypted messages, each must be equipped to encrypt messages to be sent and decrypt messages received. The nature of the equipping they require depends on the encryption technique they might use. If they use a code, both will require a copy of the same codebook. If they use a cipher, they will need appropriate keys. If the cipher is a symmetric key cipher, both will need a copy of the same key. If an asymmetric key cipher with the public/private key property, both will need the other's public key.

#### KEY AGREEMENT

Diffie-Hellman is a key agreement algorithm used by two parties to agree on a shared secret. The Diffie Hellman (DH) key agreement algorithm describes a means for two parties to agree upon a shared secret over a public network in such a way that the secret will be unavailable to eavesdroppers. The DH algorithm converts the shared secret into an arbitrary amount of keying material. The resulting keying material is used as a symmetric encryption key.

The other answers are not correct because:

DES and IDEA are both symmetric algorithms.

Diffie-Hellman is a common asymmetric algorithm, but is used only for key agreement. It is not typically used for data encryption and does not have digital signature capability.

References:

<http://tools.ietf.org/html/rfc2631>

For Diffie-Hellman information: <http://www.netip.com/articles/keith/diffie-helman.htm>

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#### QUESTION 749

Which of the following is NOT true of Secure Sockets Layer (SSL)?

- A. By convention it uses 's-<http://>' instead of '<http://>'.
- B. Is the predecessor to the Transport Layer Security (TLS) protocol.
- C. It was developed by Netscape.
- D. It is used for transmitting private information, data, and documents over the Internet.

Answer: A

Explanation: Web pages that use SSL use '<https://>' instead of '<http://>', whereas documents that use Secure-[http](http://) start with s-<http://>.

The following answers are incorrect:

Is the predecessor to Transport Layer Security, It was developed by Netscape, and It is used for

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transmitting private documents over the Internet.

As these are all TRUE answers, therefore incorrect for this question.

References: TIPTON, Harold F. & HENRY, Kevin, Official (ISC)2 Guide to the CISSP CBK, 2007, pages 496, 976

KRUTZ, Ronald L. & VINES, Russell Dean, The CISSP Prep Guide, Gold Edition, 2003, page 117

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### QUESTION 750

There are parallels between the trust models in Kerberos and Public Key Infrastructure (PKI).

When we compare them side by side, Kerberos tickets correspond most closely to which of the following?

- A. public keys
- B. private keys
- C. public-key certificates
- D. private-key certificates

Answer: C

Explanation: A Kerberos ticket is issued by a trusted third party. It is an encrypted data structure that includes the service encryption key. In that sense it is similar to a public-key certificate.

However, the ticket is not the key.

The following answers are incorrect:

public keys. Kerberos tickets are not shared out publicly, so they are not like a PKI public key.  
private keys. Although a Kerberos ticket is not shared publicly, it is not a private key. Private keys are associated with Asymmetric crypto system which is not used by Kerberos. Kerberos uses only the Symmetric crypto system.

private key certificates. This is a detractor. There is no such thing as a private key certificate.

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### QUESTION 751

Which of the following identifies the encryption algorithm selected by NIST for the new Advanced Encryption Standard?

- A. Twofish
- B. Serpent
- C. RC6
- D. Rijndael

Answer: D

Explanation: The

Answer: Rijndael. Rijndael is the new approved method of encrypting sensitive but unclassified information for the U.S. government. It has been accepted by and is also widely used in the public arena as well. It has low memory requirements and has been constructed to easily defend against timing attacks.

The following answers are incorrect: Twofish. Twofish was among the final candidates chosen for AES, but was not selected.

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Serpent. Serpent was among the final candidates chosen for AES, but was not selected.

RC6. RC6 was among the final candidates chosen for AES, but was not selected.

The following reference(s) were/was used to create this question:

ISC2 OIG, 2007 p. 622, 629-630

Shon Harris AIO, v.3 p 247-250

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### QUESTION 752

Compared to RSA, which of the following is true of Elliptic Curve Cryptography(ECC)?

- A. It has been mathematically proved to be more secure.
- B. It has been mathematically proved to be less secure.
- C. It is believed to require longer key for equivalent security.
- D. It is believed to require shorter keys for equivalent security.

Answer: D

Explanation: The

Answer: It is believed to require shorter keys for equivalent security. Some experts believe that ECC with key length 160 bits is equivalent to RSA with key length 1024 bits. The following answers are incorrect: It has been mathematically proved to be less secure. ECC has not been proved to be more or less secure than RS

A. Since ECC is newer than RSA, it is considered riskier by some, but that is just a general assessment, not based on mathematical arguments.

It has been mathematically proved to be more secure. ECC has not been proved to be more or less secure than RS

A. Since ECC is newer than RSA, it is considered riskier by some, but that is just a general assessment, not based on mathematical arguments.

It is believed to require longer key for equivalent security. On the contrary, it is believed to require shorter keys for equivalent security of RSA.

Shon Harris, AIO v5 pg719 states:

"In most cases, the longer the key, the more protection that is provided, but ECC can provide the same level of protection with a key size that is shorter than what RSA requires"

The following reference(s) were/was used to create this question:

ISC2 OIG, 2007 p. 258

Shon Harris, AIO v5 pg719

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### QUESTION 753

What are the three most important functions that Digital Signatures perform?

- A. Integrity, Confidentiality and Authorization
- B. Integrity, Authentication and Nonrepudiation
- C. Authorization, Authentication and Nonrepudiation
- D. Authorization, Detection and Accountability

Answer: B

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Reference: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 2.

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**QUESTION 754**

Which of the following protocols that provide integrity and authentication for IPSec, can also provide non-repudiation in IPSec?

- A. Authentication Header (AH)
- B. Encapsulating Security Payload (ESP)
- C. Secure Sockets Layer (SSL)
- D. Secure Shell (SSH-2)

Answer: A

Explanation: As per the RFC in reference, the Authentication Header (AH) protocol is a mechanism for providing strong integrity and authentication for IP datagrams. It might also provide non-repudiation, depending on which cryptographic algorithm is used and how keying is performed. For example, use of an asymmetric digital signature algorithm, such as RSA, could provide non-repudiation.

from a cryptography point of view, so we will cover it from a VPN point of view here. IPSec is a suite of protocols that was developed to specifically protect IP traffic. IPv4 does not have any integrated security, so IPSec was developed to bolt onto IP and secure the data the protocol transmits. Where PPTP and L2TP work at the data link layer, IPSec works at the network layer of the OSI model. The main protocols that make up the IPSec suite and their basic functionality are as follows:

- A. Authentication Header (AH) provides data integrity, data origin authentication, and protection from replay attacks.
- B. Encapsulating Security Payload (ESP) provides confidentiality, data-origin authentication, and data integrity.
- C. Internet Security Association and Key Management Protocol (ISAKMP) provides a framework for security association creation and key exchange.
- D. Internet Key Exchange (IKE) provides authenticated keying material for use with ISAKMP.

The following are incorrect answers:

ESP is a mechanism for providing integrity and confidentiality to IP datagrams. It may also provide authentication, depending on which algorithm and algorithm mode are used. Non-repudiation and protection from traffic analysis are not provided by ESP (RFC 1827).

SSL is a secure protocol used for transmitting private information over the Internet. It works by using a public key to encrypt data that is transferred of the SSL connection. OIG 2007, page 976

SSH-2 is a secure, efficient, and portable version of SSH (Secure Shell) which is a secure replacement for telnet.

Reference(s) used for this question:

Shon Harris, CISSP All In One, 6th Edition , Page 705

and

RFC 1826, <http://tools.ietf.org/html/rfc1826>, paragraph 1.

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**QUESTION 755**

Which of the following is a cryptographic protocol and infrastructure developed to send encrypted

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credit card numbers over the Internet?

- A. Secure Electronic Transaction (SET)
- B. MONDEX
- C. Secure Shell (SSH-2)
- D. Secure Hypertext Transfer Protocol (S-HTTP)

Answer: A

Explanation: SET was developed by a consortium including Visa and MasterCard.

Source: Harris, Shon, CISSP All In One Exam Guide, pages 668-669.

Mondex is a smart card electronic cash system owned by MasterCard.

SSH-2 is a secure, efficient, and portable version of SSH (Secure Shell) which is a secure replacement for telnet.

Secure HTTP is a secure message-oriented communications protocol designed for use in conjunction with HTTP. It is designed to coexist with HTTP's messaging model and to be easily integrated with HTTP applications.

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### QUESTION 756

Which of the following cryptographic attacks describes when the attacker has a copy of the plaintext and the corresponding ciphertext?

- A. known plaintext
- B. brute force
- C. ciphertext only
- D. chosen plaintext

Answer: A

Explanation: The goal to this type of attack is to find the cryptographic key that was used to encrypt the message. Once the key has been found, the attacker would then be able to decrypt all messages that had been encrypted using that key.

The known-plaintext attack (KPA) or crib is an attack model for cryptanalysis where the attacker has samples of both the plaintext and its encrypted version (ciphertext), and is at liberty to make use of them to reveal further secret information such as secret keys and code books. The term "crib" originated at Bletchley Park, the British World War II decryption operation

In cryptography, a brute force attack or exhaustive key search is a strategy that can in theory be used against any encrypted data by an attacker who is unable to take advantage of any weakness in an encryption system that would otherwise make his task easier. It involves systematically checking all possible keys until the correct key is found. In the worst case, this would involve traversing the entire key space, also called search space.

In cryptography, a ciphertext-only attack (COA) or known ciphertext attack is an attack model for cryptanalysis where the attacker is assumed to have access only to a set of ciphertexts.

The attack is completely successful if the corresponding plaintexts can be deduced, or even better, the key. The ability to obtain any information at all about the underlying plaintext is still considered a success. For example, if an adversary is sending ciphertext continuously to maintain

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traffic-flow security, it would be very useful to be able to distinguish real messages from nulls. Even making an informed guess of the existence of real messages would facilitate traffic analysis. In the history of cryptography, early ciphers, implemented using pen-and-paper, were routinely broken using ciphertexts alone. Cryptographers developed statistical techniques for attacking ciphertext, such as frequency analysis. Mechanical encryption devices such as Enigma made these attacks much more difficult (although, historically, Polish cryptographers were able to mount a successful ciphertext-only cryptanalysis of the Enigma by exploiting an insecure protocol for indicating the message settings).

Every modern cipher attempts to provide protection against ciphertext-only attacks. The vetting process for a new cipher design standard usually takes many years and includes exhaustive testing of large quantities of ciphertext for any statistical departure from random noise. See: Advanced Encryption Standard process. Also, the field of steganography evolved, in part, to develop methods like mimic functions that allow one piece of data to adopt the statistical profile of another. Nonetheless poor cipher usage or reliance on home-grown proprietary algorithms that have not been subject to thorough scrutiny has resulted in many computer-age encryption systems that are still subject to ciphertext-only attack. Examples include:

Early versions of Microsoft's PPTP virtual private network software used the same RC4 key for the sender and the receiver (later versions had other problems). In any case where a stream cipher like RC4 is used twice with the same key it is open to ciphertext-only attack. See: stream cipher attack

Wired Equivalent Privacy (WEP), the first security protocol for Wi-Fi, proved vulnerable to several attacks, most of them ciphertext-only.

A chosen-plaintext attack (CPA) is an attack model for cryptanalysis which presumes that the attacker has the capability to choose arbitrary plaintexts to be encrypted and obtain the corresponding ciphertexts. The goal of the attack is to gain some further information which reduces the security of the encryption scheme. In the worst case, a chosen-plaintext attack could reveal the scheme's secret key.

This appears, at first glance, to be an unrealistic model; it would certainly be unlikely that an attacker could persuade a human cryptographer to encrypt large amounts of plaintexts of the attacker's choosing. Modern cryptography, on the other hand, is implemented in software or hardware and is used for a diverse range of applications; for many cases, a chosen-plaintext attack is often very feasible. Chosen-plaintext attacks become extremely important in the context of public key cryptography, where the encryption key is public and attackers can encrypt any plaintext they choose.

Any cipher that can prevent chosen-plaintext attacks is then also guaranteed to be secure against known-plaintext and ciphertext-only attacks; this is a conservative approach to security.

Two forms of chosen-plaintext attack can be distinguished:

Batch chosen-plaintext attack, where the cryptanalyst chooses all plaintexts before any of them are encrypted. This is often the meaning of an unqualified use of "chosen-plaintext attack".

Adaptive chosen-plaintext attack, where the cryptanalyst makes a series of interactive queries, choosing subsequent plaintexts based on the information from the previous encryptions.

References:

Source: TIPTON, Harold, Official (ISC)2 Guide to the CISSP CBK (2007), page 271.  
and

Wikipedia at the following links:

[http://en.wikipedia.org/wiki/Chosen-plaintext\\_attack](http://en.wikipedia.org/wiki/Chosen-plaintext_attack)

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[http://en.wikipedia.org/wiki/Known-plaintext\\_attack](http://en.wikipedia.org/wiki/Known-plaintext_attack)  
[http://en.wikipedia.org/wiki/Ciphertext-only\\_attack](http://en.wikipedia.org/wiki/Ciphertext-only_attack)  
[http://en.wikipedia.org/wiki/Brute\\_force\\_attack](http://en.wikipedia.org/wiki/Brute-force_attack)

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**QUESTION 757**

Which of the following is NOT a true statement regarding the implementation of the 3DES modes?

- A. DES-EEE1 uses one key
- B. DES-EEE2 uses two keys
- C. DES-EEE3 uses three keys
- D. DES-EDE2 uses two keys

Answer: A

Explanation: There is no DES mode called DES-EEE1. It does not exist.

The following are the correct modes for triple-DES (3DES):

DES-EEE3 uses three keys for encryption and the data is encrypted, encrypted, encrypted;

DES-EDE3 uses three keys and encrypts, decrypts and encrypts data.

DES-EEE2 and DES-EDE2 are the same as the previous modes, but the first and third operations use the same key.

Reference(s) used for this question:

Shon Harris, CISSP All In One (AIO) book, 6th edition , page 808

and

Official ISC2 Guide to the CISSP CBK, 2nd Edition (2010) , page 344-345

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**QUESTION 758**

Which one of the following is a key agreement protocol used to enable two entities to agree and generate a session key (secret key used for one session) over an insecure medium without any prior secrets or communications between the entities? The negotiated key will subsequently be used for message encryption using Symmetric Cryptography.

- A. RSA
- B. PKI
- C. Diffie\_Hellmann
- D. 3DES

Answer: C

Explanation: The Diffie-Hellman key agreement protocol (also called exponential key agreement) was developed by Diffie and Hellman [DH76] in 1976 and published in the ground-breaking paper "New Directions in Cryptography." The protocol allows two users to exchange a secret key over an insecure medium without any prior secrets.

The protocol has two system parameters p and g. They are both public and may be used by all the users in a system. Parameter p is a prime number and parameter g (usually called a generator) is an integer less than p, with the following property: for every number n between 1 and p-1 inclusive, there is a power k of g such that  $n = g^k \bmod p$ .

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Suppose Alice and Bob want to agree on a shared secret key using the Diffie-Hellman key agreement protocol. They proceed as follows: First, Alice generates a random private value  $a$  and Bob generates a random private value  $b$ . Both  $a$  and  $b$  are drawn from the set of integers. Then they derive their public values using parameters  $p$  and  $g$  and their private values. Alice's public value is  $ga \bmod p$  and Bob's public value is  $gb \bmod p$ . They then exchange their public values. Finally, Alice computes  $gab = (gb)a \bmod p$ , and Bob computes  $gba = (ga)b \bmod p$ . Since  $gab = gba = k$ , Alice and Bob now have a shared secret key  $k$ .

The protocol depends on the discrete logarithm problem for its security. It assumes that it is computationally infeasible to calculate the shared secret key  $k = gab \bmod p$  given the two public values  $ga \bmod p$  and  $gb \bmod p$  when the prime  $p$  is sufficiently large. Maurer [Mau94] has shown that breaking the Diffie-Hellman protocol is equivalent to computing discrete logarithms under certain assumptions.

The Diffie-Hellman key exchange is vulnerable to a man-in-the-middle attack. In this attack, an opponent Carol intercepts Alice's public value and sends her own public value to Bob. When Bob transmits his public value, Carol substitutes it with her own and sends it to Alice. Carol and Alice thus agree on one shared key and Carol and Bob agree on another shared key. After this exchange, Carol simply decrypts any messages sent out by Alice or Bob, and then reads and possibly modifies them before re-encrypting with the appropriate key and transmitting them to the other party. This vulnerability is present because Diffie-Hellman key exchange does not authenticate the participants. Possible solutions include the use of digital signatures and other protocol variants.

The authenticated Diffie-Hellman key agreement protocol, or Station-to-Station (STS) protocol, was developed by Diffie, van Oorschot, and Wiener in 1992 [DVW92] to defeat the man-in-the-middle attack on the Diffie-Hellman key agreement protocol. The immunity is achieved by allowing the two parties to authenticate themselves to each other by the use of digital signatures (see question 2.2.2) and public-key certificates (see question 4.1.3.10).

Roughly speaking, the basic idea is as follows. Prior to execution of the protocol, the two parties Alice and Bob each obtain a public/private key pair and a certificate for the public key. During the protocol, Alice computes a signature on certain messages, covering the public value  $ga \bmod p$ . Bob proceeds in a similar way. Even though Carol is still able to intercept messages between Alice and Bob, she cannot forge signatures without Alice's private key and Bob's private key. Hence, the enhanced protocol defeats the man-in-the-middle attack.

In recent years, the original Diffie-Hellman protocol has been understood to be an example of a much more general cryptographic technique, the common element being the derivation of a shared secret value (that is, key) from one party's public key and another party's private key. The parties' key pairs may be generated anew at each run of the protocol, as in the original Diffie-Hellman protocol. The public keys may be certified, so that the parties can be authenticated and there may be a combination of these attributes. The draft ANSI X9.42 (see question 5.3.1) illustrates some of these combinations, and a recent paper by Blake-Wilson, Johnson, and Menezes provides some relevant security proofs.

References:

TIPTON, et. al., Official (ISC)2 Guide to the CISSP CBK 2007 edition, page 257.

And

RSA laboratoires web site: <http://www.rsa.com/rsalabs/node.asp?id=2248> :

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**QUESTION 759**

Which of the following ciphers is a subset on which the Vigenere polyalphabetic cipher was based on?

- A. Caesar
- B. The Jefferson disks
- C. Enigma
- D. SIGABA

Answer: A

Explanation: In cryptography, a Caesar cipher, also known as Caesar's cipher, the shift cipher, Caesar's code or Caesar shift, is one of the simplest and most widely known encryption techniques. It is a type of substitution cipher in which each letter in the plaintext is replaced by a letter some fixed number of positions down the alphabet. For example, with a left shift of 3, D would be replaced by A, E would become B, and so on. The method is named after Julius Caesar, who used it in his private correspondence.

The encryption step performed by a Caesar cipher is often incorporated as part of more complex schemes, such as the Vigenère cipher, and still has modern application in the ROT13 system. As with all single alphabet substitution ciphers, the Caesar cipher is easily broken and in modern practice offers essentially no communication security.

The following answer were incorrect:

The Jefferson disk, or wheel cipher as Thomas Jefferson named it, also known as the Bazeries Cylinder, is a cipher system using a set of wheels or disks, each with the 26 letters of the alphabet arranged around their edge. The order of the letters is different for each disk and is usually scrambled in some random way. Each disk is marked with a unique number. A hole in the centre of the disks allows them to be stacked on an axle. The disks are removable and can be mounted on the axle in any order desired. The order of the disks is the cipher key, and both sender and receiver must arrange the disks in the same predefined order. Jefferson's device had 36 disks.

An Enigma machine is any of a family of related electro-mechanical rotor cipher machines used for the encryption and decryption of secret messages. Enigma was invented by the German engineer Arthur Scherbius at the end of World War I. The early models were used commercially from the early 1920s, and adopted by military and government services of several countries. Several different Enigma models were produced, but the German military models are the ones most commonly discussed.

SIGABA: In the history of cryptography, the ECM Mark II was a cipher machine used by the United States for message encryption from World War II until the 1950s. The machine was also known as the SIGABA or Converter M-134 by the Army, or CSP-888/889 by the Navy, and a modified Navy version was termed the CSP-2900. Like many machines of the era it used an electromechanical system of rotors in order to encipher messages, but with a number of security improvements over previous designs. No successful cryptanalysis of the machine during its service lifetime is publicly known.

Reference(s) used for this question:

- [http://en.wikipedia.org/wiki/Jefferson\\_disk](http://en.wikipedia.org/wiki/Jefferson_disk)
- <http://en.wikipedia.org/wiki/Sigaba>
- [http://en.wikipedia.org/wiki/Enigma\\_machine](http://en.wikipedia.org/wiki/Enigma_machine)

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**QUESTION 760**

In a known plaintext attack, the cryptanalyst has knowledge of which of the following?

- A. the ciphertext and the key
- B. the plaintext and the secret key
- C. both the plaintext and the associated ciphertext of several messages
- D. the plaintext and the algorithm

Answer: C

Explanation: In a known plaintext attack, the attacker has the plaintext and ciphertext of one or more messages. The goal is to discover the key used to encrypt the messages so that other messages can be deciphered and read.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 3rd Ed., chapter 8: Cryptography (page 676). Also check out: Handbook of Applied Cryptography 4th Edition by Alfred J. Menezes, Paul C. van Oorschot and Scott

A. Vanstone.

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**QUESTION 761**

What is the length of an MD5 message digest?

- A. 128 bits
- B. 160 bits
- C. 256 bits
- D. varies depending upon the message size.

Answer: A

Explanation: A hash algorithm (alternatively, hash "function") takes binary data, called the message, and produces a condensed representation, called the message digest. A cryptographic hash algorithm is a hash algorithm that is designed to achieve certain security properties. The Federal Information Processing Standard 180-3, Secure Hash Standard, specifies five cryptographic hash algorithms - SHA-1, SHA-224, SHA-256, SHA-384, and SHA-512 for federal use in the US; the standard was also widely adopted by the information technology industry and commercial companies.

The MD5 Message-Digest Algorithm is a widely used cryptographic hash function that produces a 128-bit (16-byte) hash value. Specified in RFC 1321, MD5 has been employed in a wide variety of security applications, and is also commonly used to check data integrity. MD5 was designed by Ron Rivest in 1991 to replace an earlier hash function, MD4. An MD5 hash is typically expressed as a 32-digit hexadecimal number.

However, it has since been shown that MD5 is not collision resistant; as such, MD5 is not suitable for applications like SSL certificates or digital signatures that rely on this property. In 1996, a flaw was found with the design of MD5, and while it was not a clearly fatal weakness, cryptographers began recommending the use of other algorithms, such as SHA-1 - which has since been found also to be vulnerable. In 2004, more serious flaws were discovered in MD5, making further use of

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the algorithm for security purposes questionable - specifically, a group of researchers described how to create a pair of files that share the same MD5 checksum. Further advances were made in breaking MD5 in 2005, 2006, and 2007. In December 2008, a group of researchers used this technique to fake SSL certificate validity, and US-CERT now says that MD5 "should be considered cryptographically broken and unsuitable for further use." and most U.S. government applications now require the SHA-2 family of hash functions.

#### NIST CRYPTOGRAPHIC HASH PROJECT

NIST announced a public competition in a Federal Register Notice on November 2, 2007 to develop a new cryptographic hash algorithm, called SHA-3, for standardization. The competition was NIST's response to advances made in the cryptanalysis of hash algorithms.

NIST received sixty-four entries from cryptographers around the world by October 31, 2008, and selected fifty-one first-round candidates in December 2008, fourteen second-round candidates in July 2009, and five finalists – BLAKE, Grøstl, JH, Keccak and Skein, in December 2010 to advance to the third and final round of the competition.

Throughout the competition, the cryptographic community has provided an enormous amount of feedback. Most of the comments were sent to NIST and a public hash forum; in addition, many of the cryptanalysis and performance studies were published as papers in major cryptographic conferences or leading cryptographic journals. NIST also hosted a SHA-3 candidate conference in each round to obtain public feedback. Based on the public comments and internal review of the candidates, NIST announced Keccak as the winner of the SHA-3 Cryptographic Hash Algorithm Competition on October 2, 2012, and ended the five-year competition.

#### Reference:

Tipton, Harold, et. al., Official (ISC)2 Guide to the CISSP CBK, 2007 edition, page 261.

and

<https://secure.wikimedia.org/wikipedia/en/wiki/Md5>

and

<http://csrc.nist.gov/groups/ST/hash/sha-3/index.html>

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### QUESTION 762

The Secure Hash Algorithm (SHA-1) creates:

- A. a fixed length message digest from a fixed length input message
- B. a variable length message digest from a variable length input message
- C. a fixed length message digest from a variable length input message
- D. a variable length message digest from a fixed length input message

Answer: C

Explanation: According to The CISSP Prep Guide, "The Secure Hash Algorithm (SHA-1) computes a fixed length message digest from a variable length input message."

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, page 160.

also see:

<http://csrc.nist.gov/publications/fips/fips180-2/fips180-2withchangenotice.pdf>

**QUESTION 763**

The RSA Algorithm uses which mathematical concept as the basis of its encryption?

- A. Geometry
- B. 16-round ciphers
- C. PI (3.14159...)
- D. Two large prime numbers

Answer: D

Explanation: Source: TIPTON, et. al, Official (ISC)2 Guide to the CISSP CBK, 2007 edition, page 254.

And from the RSA web site, <http://www.rsa.com/rsalabs/node.asp?id=2214> :

The RSA cryptosystem is a public-key cryptosystem that offers both encryption and digital signatures (authentication). Ronald Rivest, Adi Shamir, and Leonard Adleman developed the RSA system in 1977 [RSA78]; RSA stands for the first letter in each of its inventors' last names.

The RSA algorithm works as follows: take two large primes, p and q, and compute their product  $n = pq$ ; n is called the modulus. Choose a number, e, less than n and relatively prime to  $(p-1)(q-1)$ , which means e and  $(p-1)(q-1)$  have no common factors except 1. Find another number d such that  $(ed - 1)$  is divisible by  $(p-1)(q-1)$ . The values e and d are called the public and private exponents, respectively. The public key is the pair  $(n, e)$ ; the private key is  $(n, d)$ . The factors p and q may be destroyed or kept with the private key.

It is currently difficult to obtain the private key d from the public key  $(n, e)$ . However if one could factor n into p and q, then one could obtain the private key d. Thus the security of the RSA system is based on the assumption that factoring is difficult. The discovery of an easy method of factoring would "break" RSA (see question 3.1.3 and question 2.3.3).

Here is how the RSA system can be used for encryption and digital signatures (in practice, the actual use is slightly different; see questions 3.1.7 and 3.1.8):

#### Encryption

Suppose Alice wants to send a message m to Bob. Alice creates the ciphertext c by exponentiating:  $c = m^e \text{ mod } n$ , where e and n are Bob's public key. She sends c to Bob. To decrypt, Bob also exponentiates:  $m = c^d \text{ mod } n$ ; the relationship between e and d ensures that Bob correctly recovers m. Since only Bob knows d, only Bob can decrypt this message.

#### Digital Signature

Suppose Alice wants to send a message m to Bob in such a way that Bob is assured the message is both authentic, has not been tampered with, and from Alice. Alice creates a digital signature s by exponentiating:  $s = m^d \text{ mod } n$ , where d and n are Alice's private key. She sends m and s to Bob. To verify the signature, Bob exponentiates and checks that the message m is recovered:  $m = s^e \text{ mod } n$ , where e and n are Alice's public key.

Thus encryption and authentication take place without any sharing of private keys: each person uses only another's public key or their own private key. Anyone can send an encrypted message or verify a signed message, but only someone in possession of the correct private key can decrypt or sign a message.

**QUESTION 764**

The Clipper Chip utilizes which concept in public key cryptography?

- A. Substitution
- B. Key Escrow
- C. An undefined algorithm
- D. Super strong encryption

Answer: B

Explanation: The Clipper chip is a chipset that was developed and promoted by the U.S. Government as an encryption device to be adopted by telecommunications companies for voice transmission. It was announced in 1993 and by 1996 was entirely defunct.

The heart of the concept was key escrow. In the factory, any new telephone or other device with a Clipper chip would be given a "cryptographic key", that would then be provided to the government in "escrow". If government agencies "established their authority" to listen to a communication, then the password would be given to those government agencies, who could then decrypt all data transmitted by that particular telephone.

The CISSP Prep Guide states, "The idea is to divide the key into two parts, and to escrow two portions of the key with two separate 'trusted' organizations. Then, law enforcement officials, after obtaining a court order, can retrieve the two pieces of the key from the organizations and decrypt the message."

References:

[http://en.wikipedia.org/wiki/Clipper\\_Chip](http://en.wikipedia.org/wiki/Clipper_Chip)  
and

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, page 166.

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### QUESTION 765

Which of the following are suitable protocols for securing VPN connections at the lower layers of the OSI model?

- A. S/MIME and SSH
- B. TLS and SSL
- C. IPsec and L2TP
- D. PKCS#10 and X.509

Answer: C

Reference: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 2001, McGraw-Hill/Osborne, page 467; SMITH, Richard E., Internet Cryptography, 1997, Addison-Wesley Pub Co.

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### QUESTION 766

What is the role of IKE within the IPsec protocol?

- A. peer authentication and key exchange
- B. data encryption
- C. data signature

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D. enforcing quality of service

Answer: A

Reference: RFC 2409: The Internet Key Exchange (IKE); DORASWAMY, Naganand & HARKINS, Dan, Ipsec: The New Security Standard for the Internet, Intranets, and Virtual Private Networks, 1999, Prentice Hall PTR; SMITH, Richard E., Internet Cryptography, 1997, Addison-Wesley Pub Co.

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### QUESTION 767

In which phase of Internet Key Exchange (IKE) protocol is peer authentication performed?

- A. Pre Initialization Phase
- B. Phase 1
- C. Phase 2
- D. No peer authentication is performed

Answer: B

Explanation: The Internet Key Exchange (IKE) protocol is a key management protocol standard that is used in conjunction with the IPSec standard. IKE enhances IPSec by providing additional features, flexibility, and ease of configuration for the IPSec standard. IPSec can however, be configured without IKE by manually configuring the gateways communicating with each other for example.

A security association (SA) is a relationship between two or more entities that describes how the entities will use security services to communicate securely.

In phase 1 of this process, IKE creates an authenticated, secure channel between the two IKE peers, called the IKE security association. The Diffie-Hellman key agreement is always performed in this phase.

In phase 2 IKE negotiates the IPSec security associations and generates the required key material for IPSec. The sender offers one or more transform sets that are used to specify an allowed combination of transforms with their respective settings.

Benefits provided by IKE include:

Eliminates the need to manually specify all the IPSec security parameters in the crypto maps at both peers.

Allows you to specify a lifetime for the IPSec security association.

Allows encryption keys to change during IPSec sessions.

Allows IPSec to provide anti-replay services.

Permits Certification Authority (CA) support for a manageable, scalable IPSec implementation.

Allows dynamic authentication of peers.

References:

RFC 2409: The Internet Key Exchange (IKE);

DORASWAMY, Naganand & HARKINS, Dan, Ipsec: The New Security Standard for the Internet, Intranets, and Virtual Private Networks, 1999, Prentice Hall PTR;

SMITH, Richard E., Internet Cryptography, 1997, Addison-Wesley Pub Co.

Reference: <http://www.ciscopress.com/articles/article.asp?p=25474>

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**QUESTION 768**

What is NOT an authentication method within IKE and IPsec?

- A. CHAP
- B. Pre shared key
- C. certificate based authentication
- D. Public key authentication

Answer: A

Explanation: CHAP is not used within IPSEC or IKE. CHAP is an authentication scheme used by Point to Point Protocol (PPP) servers to validate the identity of remote clients. CHAP periodically verifies the identity of the client by using a three-way handshake. This happens at the time of establishing the initial link (LCP), and may happen again at any time afterwards. The verification is based on a shared secret (such as the client user's password).

After the completion of the link establishment phase, the authenticator sends a "challenge" message to the peer.

The peer responds with a value calculated using a one-way hash function on the challenge and the secret combined.

The authenticator checks the response against its own calculation of the expected hash value. If the values match, the authenticator acknowledges the authentication; otherwise it should terminate the connection.

At random intervals the authenticator sends a new challenge to the peer and repeats steps 1 through 3.

The following were incorrect answers:

#### Pre Shared Keys

In cryptography, a pre-shared key or PSK is a shared secret which was previously shared between the two parties using some secure channel before it needs to be used. To build a key from shared secret, the key derivation function should be used. Such systems almost always use symmetric key cryptographic algorithms. The term PSK is used in WiFi encryption such as WEP or WPA, where both the wireless access points (AP) and all clients share the same key.

The characteristics of this secret or key are determined by the system which uses it; some system designs require that such keys be in a particular format. It can be a password like 'bret13i', a passphrase like 'Idaho hung gear id gene', or a hexadecimal string like '65E4 E556 8622 EEE1'.

The secret is used by all systems involved in the cryptographic processes used to secure the traffic between the systems.

#### Certificat Based Authentication

The most common form of trusted authentication between parties in the wide world of Web commerce is the exchange of certificates. A certificate is a digital document that at a minimum includes a Distinguished Name (DN) and an associated public key.

The certificate is digitally signed by a trusted third party known as the Certificate Authority (CA). The CA vouches for the authenticity of the certificate holder. Each principal in the transaction presents certificate as its credentials. The recipient then validates the certificate's signature against its cache of known and trusted CA certificates. A "personal certificate" identifies an end user in a transaction; a "server certificate" identifies the service provider.

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Generally, certificate formats follow the X.509 Version 3 standard. X.509 is part of the Open Systems Interconnect (OSI) X.500 specification.

#### Public Key Authentication

Public key authentication is an alternative means of identifying yourself to a login server, instead of typing a password. It is more secure and more flexible, but more difficult to set up.

In conventional password authentication, you prove you are who you claim to be by proving that you know the correct password. The only way to prove you know the password is to tell the server what you think the password is. This means that if the server has been hacked, or spoofed an attacker can learn your password.

Public key authentication solves this problem. You generate a key pair, consisting of a public key (which everybody is allowed to know) and a private key (which you keep secret and do not give to anybody). The private key is able to generate signatures. A signature created using your private key cannot be forged by anybody who does not have a copy of that private key; but anybody who has your public key can verify that a particular signature is genuine.

So you generate a key pair on your own computer, and you copy the public key to the server. Then, when the server asks you to prove who you are, you can generate a signature using your private key. The server can verify that signature (since it has your public key) and allow you to log in. Now if the server is hacked or spoofed, the attacker does not gain your private key or password; they only gain one signature. And signatures cannot be re-used, so they have gained nothing.

There is a problem with this: if your private key is stored unprotected on your own computer, then anybody who gains access to your computer will be able to generate signatures as if they were you. So they will be able to log in to your server under your account. For this reason, your private key is usually encrypted when it is stored on your local machine, using a passphrase of your choice. In order to generate a signature, you must decrypt the key, so you have to type your passphrase.

#### References:

RFC 2409: The Internet Key Exchange (IKE); DORASWAMY, Naganand & HARKINS, Dan  
Ipsec: The New Security Standard for the Internet, Intranets, and Virtual Private Networks, 1999,  
Prentice Hall PTR; SMITH, Richard E.

Internet Cryptography, 1997, Addison-Wesley Pub Co.; HARRIS, Shon, All-In-One CISSP  
Certification Exam Guide, 2001, McGraw-Hill/Osborne, page 467.

[http://en.wikipedia.org/wiki/Pre-shared\\_key](http://en.wikipedia.org/wiki/Pre-shared_key)

<http://www.home.umk.pl/~mgw/LDAP/RS.C4.JUN.97.pdf>

<http://the.earth.li/~sgtatham/putty/0.55/htmldoc/Chapter8.html#S8.1>

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#### QUESTION 769

What is NOT true with pre shared key authentication within IKE / IPsec protocol?

- A. Pre shared key authentication is normally based on simple passwords
- B. Needs a Public Key Infrastructure (PKI) to work
- C. IKE is used to setup Security Associations
- D. IKE builds upon the Oakley protocol and the ISAKMP protocol.

Answer: B

Explanation: Internet Key Exchange (IKE or IKEv2) is the protocol used to set up a security association (SA) in the IPsec protocol suite. IKE builds upon the Oakley protocol and ISAKMP. IKE uses X.509 certificates for authentication which are either pre-shared or distributed using DNS (preferably with DNSSEC) and a Diffie–Hellman key exchange to set up a shared session secret from which cryptographic keys are derived.

Internet Key Exchange (IKE) Internet key exchange allows communicating partners to prove their identity to each other and establish a secure communication channel, and is applied as an authentication component of IPSec.

IKE uses two phases:

Phase 1: In this phase, the partners authenticate with each other, using one of the following:

Shared Secret: A key that is exchanged by humans via telephone, fax, encrypted e-mail, etc.

Public Key Encryption: Digital certificates are exchanged.

Revised mode of Public Key Encryption: To reduce the overhead of public key encryption, a nonce (a Cryptographic function that refers to a number or bit string used only once, in security engineering) is encrypted with the communicating partner's public key, and the peer's identity is encrypted with symmetric encryption using the nonce as the key. Next, IKE establishes a temporary security association and secure tunnel to protect the rest of the key exchange. Phase 2: The peers' security associations are established, using the secure tunnel and temporary SA created at the end of phase 1.

The following reference(s) were used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 7032-7048). Auerbach Publications. Kindle Edition.

and

RFC 2409 at <http://tools.ietf.org/html/rfc2409>

and

[http://en.wikipedia.org/wiki/Internet\\_Key\\_Exchange](http://en.wikipedia.org/wiki/Internet_Key_Exchange)

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### QUESTION 770

In a hierarchical PKI the highest CA is regularly called Root CA, it is also referred to by which one of the following term?

- A. Subordinate CA
- B. Top Level CA
- C. Big CA
- D. Master CA

Answer: B

Reference: Arsenault, Turner, Internet X.509 Public Key Infrastructure: Roadmap, Chapter "Terminology".

Also note that sometimes other terms such as Certification Authority Anchor (CAA) might be used within some government organization, Top level CA is another common term to indicate the top level CA, Top Level Anchor could also be used.

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### QUESTION 771

What is the primary role of cross certification?

- 
- A. Creating trust between different PKIs
  - B. Build an overall PKI hierarchy
  - C. set up direct trust to a second root CA
  - D. Prevent the nullification of user certificates by CA certificate revocation

Answer: A

Explanation: More and more organizations are setting up their own internal PKIs. When these independent PKIs need to interconnect to allow for secure communication to take place (either between departments or different companies), there must be a way for the two root CAs to trust each other.

These two CAs do not have a CA above them they can both trust, so they must carry out cross certification. A cross certification is the process undertaken by CAs to establish a trust relationship in which they rely upon each other's digital certificates and public keys as if they had issued them themselves.

When this is set up, a CA for one company can validate digital certificates from the other company and vice versa.

Reference(s) used for this question:

For more information and illustration on Cross certification:

<http://www.microsoft.com/technet/prodtechnol/windowsserver2003/technologies/security/ws03qswp.mspx> [http://www.entrust.com/resources/pdf/cross\\_certification.pdf](http://www.entrust.com/resources/pdf/cross_certification.pdf)

also see:

Shon Harris, CISSP All in one book, 4th Edition, Page 727

and

RFC 2459: Internet X.509 Public Key Infrastructure Certificate and CRL Profile; FORD, Warwick & BAUM, Michael S., Secure Electronic Commerce: Building the Infrastructure for Digital Signatures and Encryption (2nd Edition), 2000, Prentice Hall PTR, Page 254.

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## QUESTION 772

What kind of encryption is realized in the S/MIME-standard?

- A. Asymmetric encryption scheme
- B. Password based encryption scheme
- C. Public key based, hybrid encryption scheme
- D. Elliptic curve based encryption

Answer: C

Explanation: S/MIME (for Secure MIME, or Secure Multipurpose Mail Extension) is a security process used for e-mail exchanges that makes it possible to guarantee the confidentiality and nonrepudiation of electronic messages.

S/MIME is based on the MIME standard, the goal of which is to let users attach files other than ASCII text files to electronic messages. The MIME standard therefore makes it possible to attach all types of files to e-mails.

S/MIME was originally developed by the company RSA Data Security. Ratified in July 1999 by the

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IETF, S/MIME has become a standard, whose specifications are contained in RFCs 2630 to 2633.

How S/MIME works

The S/MIME standard is based on the principle of public-key encryption. S/MIME therefore makes it possible to encrypt the content of messages but does not encrypt the communication.

The various sections of an electronic message, encoded according to the MIME standard, are each encrypted using a session key.

The session key is inserted in each section's header, and is encrypted using the recipient's public key. Only the recipient can open the message's body, using his private key, which guarantees the confidentiality and integrity of the received message.

In addition, the message's signature is encrypted with the sender's private key. Anyone intercepting the communication can read the content of the message's signature, but this ensures the recipient of the sender's identity, since only the sender is capable of encrypting a message (with his private key) that can be decrypted with his public key.

Reference(s) used for this question:

<http://en.kioskea.net/contents/139-cryptography-s-mime>

RFC 2630: Cryptographic Message Syntax;

OPPLIGER, Rolf, Secure Messaging with PGP and S/MIME, 2000, Artech House;

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 2001, McGraw-Hill/Osborne, page 570;

SMITH, Richard E., Internet Cryptography, 1997, Addison-Wesley Pub Co.

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### QUESTION 773

What is the main problem of the renewal of a root CA certificate?

- A. It requires key recovery of all end user keys
- B. It requires the authentic distribution of the new root CA certificate to all PKI participants
- C. It requires the collection of the old root CA certificates from all the users
- D. It requires issuance of the new root CA certificate

Answer: B

Explanation: The main task here is the authentic distribution of the new root CA certificate as new trust anchor to all the PKI participants (e.g. the users).

In some of the rollover-scenarios there is no automatic way, often explicit assignment of trust from each user is needed, which could be very costly.

Other methods make use of the old root CA certificate for automatic trust establishment (see PKIX-reference), but these solutions works only well for scenarios with currently valid root CA certificates (and not for emergency cases e.g. compromise of the current root CA certificate).

The rollover of the root CA certificate is a specific and delicate problem and therefore are often ignored during PKI deployment.

Reference: Camphausen, I.; Petersen, H.; Stark, C.: Konzepte zum Root CA Zertifikatswechsel, conference Enterprise Security 2002, March 26-27, 2002, Paderborn; RFC 2459 : Internet X.509 Public Key Infrastructure Certificate and CRL Profile.

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### QUESTION 774

Virus scanning and content inspection of SMIME encrypted e-mail without doing any further

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processing is:

- A. Not possible
- B. Only possible with key recovery scheme of all user keys
- C. It is possible only if X509 Version 3 certificates are used
- D. It is possible only by "brute force" decryption

Answer: A

Explanation: Content security measures presumes that the content is available in cleartext on the central mail server.

Encrypted emails have to be decrypted before it can be filtered (e.g. to detect viruses), so you need the decryption key on the central "crypto mail server".

There are several ways for such key management, e.g. by message or key recovery methods. However, that would certainly require further processing in order to achieve such goal.

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### QUESTION 775

What attribute is included in a X.509-certificate?

- A. Distinguished name of the subject
- B. Telephone number of the department
- C. secret key of the issuing CA
- D. the key pair of the certificate holder

Answer: A

Explanation: RFC 2459 : Internet X.509 Public Key Infrastructure Certificate and CRL Profile; GUTMANN, P., X.509 style guide; SMITH, Richard E., Internet Cryptography, 1997, Addison-Wesley Pub Co.

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### QUESTION 776

Which of the following choices is a valid Public Key Cryptography Standard (PKCS) addressing RSA?

- A. PKCS #17799
- B. PKCS-RSA
- C. PKCS#1
- D. PKCS#11

Answer: C

Explanation: This document provides recommendations for the implementation of public-key cryptography based on the RSA algorithm, covering the following aspects: cryptographic primitives; encryption schemes; signature schemes with appendix; ASN.1 syntax for representing keys and for identifying the schemes.

Reference(s) used for this question:

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RSA Laboratories at <http://www.emc.com/emc-plus/rsa-labs/standards-initiatives/pkcs-rsacryptography-standard.htm>

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**QUESTION 777**

What is the primary role of smartcards in a PKI?

- A. Transparent renewal of user keys
- B. Easy distribution of the certificates between the users
- C. Fast hardware encryption of the raw data
- D. Tamper resistant, mobile storage and application of private keys of the users

Answer: D

Reference: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 2001, McGraw-Hill/Osborne, page 139;

SNYDER, J., What is a SMART CARD?.

Wikipedia has a nice definition at: [http://en.wikipedia.org/wiki/Tamper\\_resistance](http://en.wikipedia.org/wiki/Tamper_resistance)

Security

Tamper-resistant microprocessors are used to store and process private or sensitive information, such as private keys or electronic money credit. To prevent an attacker from retrieving or modifying the information, the chips are designed so that the information is not accessible through external means and can be accessed only by the embedded software, which should contain the appropriate security measures.

Examples of tamper-resistant chips include all secure cryptoprocessors, such as the IBM 4758 and chips used in smartcards, as well as the Clipper chip.

It has been argued that it is very difficult to make simple electronic devices secure against tampering, because numerous attacks are possible, including:

physical attack of various forms (microprobing, drills, files, solvents, etc.)

freezing the device

applying out-of-spec voltages or power surges

applying unusual clock signals

inducing software errors using radiation

measuring the precise time and power requirements of certain operations (see power analysis)

Tamper-resistant chips may be designed to zeroise their sensitive data (especially cryptographic keys) if they detect penetration of their security encapsulation or out-of-specification environmental parameters. A chip may even be rated for "cold zeroisation", the ability to zeroise itself even after its power supply has been crippled.

Nevertheless, the fact that an attacker may have the device in his possession for as long as he likes, and perhaps obtain numerous other samples for testing and practice, means that it is practically impossible to totally eliminate tampering by a sufficiently motivated opponent. Because of this, one of the most important elements in protecting a system is overall system design. In particular, tamper-resistant systems should "fail gracefully" by ensuring that compromise of one device does not compromise the entire system. In this manner, the attacker can be practically restricted to attacks that cost less than the expected return from compromising a single device (plus, perhaps, a little more for kudos). Since the most sophisticated attacks have been estimated to cost several hundred thousand dollars to carry out, carefully designed systems may be invulnerable in practice.

**QUESTION 778**

What kind of certificate is used to validate a user identity?

- A. Public key certificate
- B. Attribute certificate
- C. Root certificate
- D. Code signing certificate

Answer: A

Explanation: In cryptography, a public key certificate (or identity certificate) is an electronic document which incorporates a digital signature to bind together a public key with an identity — information such as the name of a person or an organization, their address, and so forth. The certificate can be used to verify that a public key belongs to an individual.

In a typical public key infrastructure (PKI) scheme, the signature will be of a certificate authority (CA). In a web of trust scheme, the signature is of either the user (a self-signed certificate) or other users ("endorsements"). In either case, the signatures on a certificate are attestations by the certificate signer that the identity information and the public key belong together.

In computer security, an authorization certificate (also known as an attribute certificate) is a digital document that describes a written permission from the issuer to use a service or a resource that the issuer controls or has access to use. The permission can be delegated.

Some people constantly confuse PKCs and ACs. An analogy may make the distinction clear. A PKC can be considered to be like a passport: it identifies the holder, tends to last for a long time, and should not be trivial to obtain. An AC is more like an entry visa: it is typically issued by a different authority and does not last for as long a time. As acquiring an entry visa typically requires presenting a passport, getting a visa can be a simpler process.

A real life example of this can be found in the mobile software deployments by large service providers and are typically applied to platforms such as Microsoft Smartphone (and related), Symbian OS, J2ME, and others.

In each of these systems a mobile communications service provider may customize the mobile terminal client distribution (ie. the mobile phone operating system or application environment) to include one or more root certificates each associated with a set of capabilities or permissions such as "update firmware", "access address book", "use radio interface", and the most basic one, "install and execute". When a developer wishes to enable distribution and execution in one of these controlled environments they must acquire a certificate from an appropriate CA, typically a large commercial CA, and in the process they usually have their identity verified using out-of-band mechanisms such as a combination of phone call, validation of their legal entity through government and commercial databases, etc., similar to the high assurance SSL certificate vetting process, though often there are additional specific requirements imposed on would-be developers/publishers.

Once the identity has been validated they are issued an identity certificate they can use to sign their software; generally the software signed by the developer or publisher's identity certificate is not distributed but rather it is submitted to processor to possibly test or profile the content before generating an authorization certificate which is unique to the particular software release. That certificate is then used with an ephemeral asymmetric key-pair to sign the software as the last step

of preparation for distribution. There are many advantages to separating the identity and authorization certificates especially relating to risk mitigation of new content being accepted into the system and key management as well as recovery from errant software which can be used as attack vectors.

References:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 2001, McGraw-Hill/Osborne, page 540.

[http://en.wikipedia.org/wiki/Attribute\\_certificate](http://en.wikipedia.org/wiki/Attribute_certificate)

[http://en.wikipedia.org/wiki/Public\\_key\\_certificate](http://en.wikipedia.org/wiki/Public_key_certificate)

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### QUESTION 779

What does the directive of the European Union on Electronic Signatures deal with?

- A. Encryption of classified data
- B. Encryption of secret data
- C. Non repudiation
- D. Authentication of web servers

Answer: C

Reference: FORD, Warwick & BAUM, Michael S., Secure Electronic Commerce: Building the Infrastructure for Digital Signatures and Encryption (2nd Edition), 2000, Prentice Hall PTR, Page 589; Directive 1999/93/EC of 13 December 1999 on a Community framework for electronic signatures.

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### QUESTION 780

A X.509 public key certificate with the key usage attribute "non repudiation" can be used for which of the following?

- A. encrypting messages
- B. signing messages
- C. verifying signed messages
- D. decrypt encrypted messages

Answer: C

Explanation: References: RFC 2459 : Internet X.509 Public Key Infrastructure Certificate and CRL Profile; GUTMANN, P., X.509 style guide.

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### QUESTION 781

Which of the following would best describe certificate path validation?

- A. Verification of the validity of all certificates of the certificate chain to the root certificate
- B. Verification of the integrity of the associated root certificate
- C. Verification of the integrity of the concerned private key
- D. Verification of the revocation status of the concerned certificate

Answer: A

Explanation: With the advent of public key cryptography (PKI), it is now possible to communicate securely with untrusted parties over the Internet without prior arrangement. One of the necessities arising from such communication is the ability to accurately verify someone's identity (i.e. whether the person you are communicating with is indeed the person who he/she claims to be). In order to be able to perform identity check for a given entity, there should be a fool-proof method of "binding" the entity's public key to its unique domain name (DN).

A X.509 digital certificate issued by a well known certificate authority (CA), like Verisign, Entrust, Thawte, etc., provides a way of positively identifying the entity by placing trust on the CA to have performed the necessary verifications. A X.509 certificate is a cryptographically sealed data object that contains the entity's unique DN, public key, serial number, validity period, and possibly other extensions.

The Windows Operating System offers a Certificate Viewer utility which allows you to double-click on any certificate and review its attributes in a human-readable format. For instance, the "General" tab in the Certificate Viewer Window (see below) shows who the certificate was issued to as well as the certificate's issuer, validation period and usage functions.

#### Certification Path graphic

The "Certification Path" tab contains the hierarchy for the chain of certificates. It allows you to select the certificate issuer or a subordinate certificate and then click on "View Certificate" to open the certificate in the Certificate Viewer.

Each end-user certificate is signed by its issuer, a trusted CA, by taking a hash value (MD5 or SHA-1) of ASN.1 DER (Distinguished Encoding Rule) encoded object and then encrypting the resulting hash with the issuer's private key (CA's Private Key) which is a digital signature. The encrypted data is stored in the "signatureValue" attribute of the entity's (CA) public certificate. Once the certificate is signed by the issuer, a party who wishes to communicate with this entity can then take the entity's public certificate and find out who the issuer of the certificate is. Once the issuer's of the certificate (CA) is identified, it would be possible to decrypt the value of the "signatureValue" attribute in the entity's certificate using the issuer's public key to retrieve the hash value. This hash value will be compared with the independently calculated hash on the entity's certificate. If the two hash values match, then the information contained within the certificate must not have been altered and, therefore, one must trust that the CA has done enough background check to ensure that all details in the entity's certificate are accurate.

The process of cryptographically checking the signatures of all certificates in the certificate chain is called "key chaining". An additional check that is essential to key chaining is verifying that the value of the "subjectKeyIdentifier" extension in one certificate matches the same in the subsequent certificate.

Similarly, the process of comparing the subject field of the issuer certificate to the issuer field of the subordinate certificate is called "name chaining". In this process, these values must match for each pair of adjacent certificates in the certification path in order to guarantee that the path represents unbroken chain of entities relating directly to one another and that it has no missing links.

The two steps above are the steps to validate the Certification Path by ensuring the validity of all certificates of the certificate chain to the root certificate as described in the two paragraphs above.

Reference(s) used for this question:

FORD, Warwick & BAUM, Michael S., Secure Electronic Commerce: Building the Infrastructure for

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Digital Signatures and Encryption (2nd Edition), 2000, Prentice Hall PTR, Page 262.  
and  
<https://www.tibcommunity.com/docs/DOC-2197>

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**QUESTION 782**

FIPS-140 is a standard for the security of which of the following?

- A. Cryptographic service providers
- B. Smartcards
- C. Hardware and software cryptographic modules
- D. Hardware security modules

Answer: C

Explanation: The 140 series of Federal Information Processing Standards (FIPS) are U.S. government computer security standards that specify requirements for cryptography modules. As of December 2006, the current version of the standard is FIPS 140-2, issued on 25 May 2001.

The other answers are all incorrect

Reference(s) used for this question:

FIPS PUB 140-1 Security Requirements for Cryptographic Modules.

and

[http://en.wikipedia.org/wiki/FIPS\\_140](http://en.wikipedia.org/wiki/FIPS_140)

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**QUESTION 783**

Which of the following can best define the "revocation request grace period"?

- A. The period of time allotted within which the user must make a revocation request upon a revocation reason
- B. Minimum response time for performing a revocation by the CA
- C. Maximum response time for performing a revocation by the CA
- D. Time period between the arrival of a revocation request and the publication of the revocation information

Answer: D

Explanation: The length of time between the Issuer's receipt of a revocation request and the time the Issuer is required to revoke the certificate should bear a reasonable relationship to the amount of risk the participants are willing to assume that someone may rely on a certificate for which a proper evocation request has been given but has not yet been acted upon.

How quickly revocation requests need to be processed (and CRLs or certificate status databases need to be updated) depends upon the specific application for which the Policy Authority is rafting the Certificate Policy.

A Policy Authority should recognize that there may be risk and lost tradeoffs with respect to grace periods for revocation notices.

If the Policy Authority determines that its PKI participants are willing to accept a grace period of a

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few hours in exchange for a lower implementation cost, the Certificate Policy may reflect that decision.

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**QUESTION 784**

Which is NOT a suitable method for distributing certificate revocation information?

- A. CA revocation mailing list
- B. Delta CRL
- C. OCSP (online certificate status protocol)
- D. Distribution point CRL

Answer: A

Explanation: The following are incorrect answers because they are all suitable methods.

A Delta CRL is a CRL that only provides information about certificates whose statuses have changed since the issuance of a specific, previously issued CRL.

The Online Certificate Status Protocol (OCSP) is an Internet protocol used for obtaining the revocation status of an X.509 digital certificate.

A Distribution point CRL or CRL Distribution Point, a location specified in the CRL Distribution Point (CRL DP) X.509, version 3, certificate extension when the certificate is issued.

References:

RFC 2459: Internet X.509 Public Key Infrastru

[http://csrc.nist.gov/groups/ST/crypto\\_apps\\_infra/documents/sliding\\_window.pdf](http://csrc.nist.gov/groups/ST/crypto_apps_infra/documents/sliding_window.pdf)

[http://www.ipswitch.eu/online\\_certificate\\_status\\_protocol\\_en.html](http://www.ipswitch.eu/online_certificate_status_protocol_en.html)

Computer Security Handbook By Seymour Bosworth, Arthur E. Hutt, Michel E. Kabay

<http://books.google.com/books?id=rCx5OfSFUPkC&printsec=frontcover&dq=Computer+Security+Handbook#PRA6-PA4,M1>

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**QUESTION 785**

Which of the following is true about digital certificate?

- A. It is the same as digital signature proving Integrity and Authenticity of the data
- B. Electronic credential proving that the person the certificate was issued to is who they claim to be
- C. You can only get digital certificate from Verisign, RSA if you wish to prove the key belong to a specific user.
- D. Can't contain geography data such as country for example.

Answer: B

Explanation: Digital certificate helps others verify that the public keys presented by users are genuine and valid. It is a form of Electronic credential proving that the person the certificate was issued to is who they claim to be.

The certificate is used to identify the certificate holder when conducting electronic transactions. It is issued by a certification authority (CA). It contains the name of an organization or individual, the business address, a serial number, expiration dates, a copy of the certificate holder's public

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key (used for encrypting messages), and the digital signature of the certificate-issuing authority so that a recipient can verify that the certificate is real. Some digital certificates conform to a standard, X.509. Digital certificates can be kept in registries so that authenticating users can look up other users' public keys.

Digital certificates are key to the PKI process. The digital certificate serves two roles. First, it ensures the integrity of the public key and makes sure that the key remains unchanged and in a valid state. Second, it validates that the public key is tied to the stated owner and that all associated information is true and correct. The information needed to accomplish these goals is added into the digital certificate.

A Certificate Authority (CA) is an entity trusted by one or more users as an authority in a network that issues, revokes, and manages digital certificates.

A Registration Authority (RA) performs certificate registration services on behalf of a C A. The RA,

a single purpose server, is responsible for the accuracy of the information contained in a certificate request. The RA is also expected to perform user validation before issuing a certificate request.

A Digital Certificate is not like same as a digital signature, they are two different things, a digital Signature is created by using your Private key to encrypt a message digest and a Digital Certificate is issued by a trusted third party who vouch for your identity.

There are many other third parties which are providing Digital Certificates and not just Verisign, RSA.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 14894-14903). Auerbach Publications. Kindle Edition.

Gregg, Michael; Haines, Billy (2012-02-16). CASP: CompTIA Advanced Security Practitioner Study Guide Authorized Courseware: Exam CAS-001 (p. 24). Wiley. Kindle Edition.

Please refer to [http://en.wikipedia.org/wiki/Digital\\_certificate](http://en.wikipedia.org/wiki/Digital_certificate)

What is Digital certificate:

[http://searchsecurity.techtarget.com/sDefinition/0,,sid14\\_gci211947,00.html](http://searchsecurity.techtarget.com/sDefinition/0,,sid14_gci211947,00.html)

another definition on [http://www.webopedia.com/TERM/D/digital\\_certificate.html](http://www.webopedia.com/TERM/D/digital_certificate.html)

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## QUESTION 786

What kind of Encryption technology does SSL utilize?

- A. Secret or Symmetric key
- B. Hybrid (both Symmetric and Asymmetric)
- C. Public Key
- D. Private key

Answer: B

Explanation: SSL uses public-key cryptography to secure session key, while the session key (secret key) is used to secure the whole session taking place between both parties communicating with each other.

The SSL protocol was originally developed by Netscape. Version 1.0 was never publicly released; version 2.0 was released in February 1995 but "contained a number of security flaws which ultimately led to the design of SSL version 3.0." SSL version 3.0, released in 1996, was a

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complete redesign of the protocol produced by Paul Kocher working with Netscape engineers Phil Karlton and Alan Freier.

All of the other answers are incorrect

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### QUESTION 787

What is the name of a one way transformation of a string of characters into a usually shorter fixedlength value or key that represents the original string? Such a transformation cannot be reversed?

- A. One-way hash
- B. DES
- C. Transposition
- D. Substitution

Answer: A

Explanation: A cryptographic hash function is a transformation that takes an input (or 'message') and returns a fixed-size string, which is called the hash value (sometimes termed a message digest, a digital fingerprint, a digest or a checksum).

The ideal hash function has three main properties - it is extremely easy to calculate a hash for any given data, it is extremely difficult or almost impossible in a practical sense to calculate a text that has a given hash, and it is extremely unlikely that two different messages, however close, will have the same hash.

Functions with these properties are used as hash functions for a variety of purposes, both within and outside cryptography. Practical applications include message integrity checks, digital signatures, authentication, and various information security applications. A hash can also act as a concise representation of the message or document from which it was computed, and allows easy indexing of duplicate or unique data files.

In various standards and applications, the two most commonly used hash functions are MD5 and SHA-1. In 2005, security flaws were identified in both of these, namely that a possible mathematical weakness might exist, indicating that a stronger hash function would be desirable. In 2007 the National Institute of Standards and Technology announced a contest to design a hash function which will be given the name SHA-3 and be the subject of a FIPS standard.

A hash function takes a string of any length as input and produces a fixed length string which acts as a kind of "signature" for the data provided. In this way, a person knowing the hash is unable to work out the original message, but someone knowing the original message can prove the hash is created from that message, and none other. A cryptographic hash function should behave as much as possible like a random function while still being deterministic and efficiently computable. A cryptographic hash function is considered "insecure" from a cryptographic point of view, if either of the following is computationally feasible:

finding a (previously unseen) message that matches a given digest

finding "collisions", wherein two different messages have the same message digest.

An attacker who can do either of these things might, for example, use them to substitute an authorized message with an unauthorized one.

Ideally, it should not even be feasible to find two messages whose digests are substantially similar; nor would one want an attacker to be able to learn anything useful about a message given only its digest. Of course the attacker learns at least one piece of information, the digest itself,

which for instance gives the attacker the ability to recognise the same message should it occur again.

**REFERENCES:**

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Pages 40-41.

also see:

[http://en.wikipedia.org/wiki/Cryptographic\\_hash\\_function](http://en.wikipedia.org/wiki/Cryptographic_hash_function)

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**QUESTION 788**

Which of the following is NOT an asymmetric key algorithm?

- A. RSA
- B. Elliptic Curve Cryptosystem (ECC)
- C. El Gamal
- D. Data Encryption System (DES)

Answer: D

Explanation: Data Encryption Standard (DES) is a symmetric key algorithm. Originally developed by IBM, under project name Lucifer, this 128-bit algorithm was accepted by the NIST in 1974, but the key size was reduced to 56 bits, plus 8 bits for parity. It somehow became a national cryptographic standard in 1977, and an American National Standard Institute (ANSI) standard in 1978. DES was later replaced by the Advanced Encryption Standard (AES) by the NIST. All other options are asymmetric algorithms.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 8: Cryptography (page 525).

Reference: DES: <http://csrc.nist.gov/publications/fips/fips46-3/fips46-3.pdf>

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**QUESTION 789**

Which of the following is NOT a symmetric key algorithm?

- A. Blowfish
- B. Digital Signature Standard (DSS)
- C. Triple DES (3DES)
- D. RC5

Answer: B

Explanation: Digital Signature Standard (DSS) specifies a Digital Signature Algorithm (DSA) appropriate for applications requiring a digital signature, providing the capability to generate signatures (with the use of a private key) and verify them (with the use of the corresponding public key).

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 8: Cryptography (page 550).

Reference: DSS: <http://www.itl.nist.gov/fipspubs/fip186.htm>.

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**QUESTION 790**

Which of the following ASYMMETRIC encryption algorithms is based on the difficulty of FACTORING LARGE NUMBERS?

- A. El Gamal
- B. Elliptic Curve Cryptosystems (ECCs)
- C. RSA
- D. International Data Encryption Algorithm (IDEA)

Answer: C

Explanation: Named after its inventors Ron Rivest , Adi Shamir and Leonard Adleman is based on the difficulty of factoring large prime numbers.

Factoring a number means representing it as the product of prime numbers. Prime numbers, such as 2, 3, 5, 7, 11, and 13, are those numbers that are not evenly divisible by any smaller number, except 1. A non-prime, or composite number, can be written as the product of smaller primes, known as its prime factors. 665, for example is the product of the primes 5, 7, and 19. A number is said to be factored when all of its prime factors are identified. As the size of the number increases, the difficulty of factoring increases rapidly.

The other answers are incorrect because:

El Gamal is based on the discrete logarithms in a finite field.

Elliptic Curve Cryptosystems (ECCs) computes discrete logarithms of elliptic curves.

International Data Encryption Algorithm (IDEA) is a block cipher and operates on 64 bit blocks of data and is a SYMMETRIC algorithm.

Reference : Shon Harris , AIO v3 , Chapter-8 : Cryptography , Page : 638

**QUESTION 791**

The Diffie-Hellman algorithm is primarily used to provide which of the following?

- A. Confidentiality
- B. Key Agreement
- C. Integrity
- D. Non-repudiation

Answer: B

Explanation: Diffie and Hellman describe a means for two parties to agree upon a shared secret in such a way that the secret will be unavailable to eavesdroppers. This secret may then be converted into cryptographic keying material for other (symmetric) algorithms. A large number of minor variants of this process exist. See RFC 2631 Diffie-Hellman Key Agreement Method for more details.

In 1976, Diffie and Hellman were the first to introduce the notion of public key cryptography, requiring a system allowing the exchange of secret keys over non-secure channels. The Diffie-Hellman algorithm is used for key exchange between two parties communicating with each other, it cannot be used for encrypting and decrypting messages, or digital signature.

Diffie and Hellman sought to address the issue of having to exchange keys via courier and other

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unsecure means. Their efforts were the FIRST asymmetric key agreement algorithm. Since the Diffie-Hellman algorithm cannot be used for encrypting and decrypting it cannot provide confidentiality nor integrity. This algorithm also does not provide for digital signature functionality and thus non-repudiation is not a choice.

NOTE: The DH algorithm is susceptible to man-in-the-middle attacks.

#### KEY AGREEMENT VERSUS KEY EXCHANGE

A key exchange can be done multiple way. It can be done in person, I can generate a key and then encrypt the key to get it securely to you by encrypting it with your public key. A Key Agreement protocol is done over a public medium such as the internet using a mathematical formula to come out with a common value on both sides of the communication link, without the ennemy being able to know what the common agreement is.

The following answers were incorrect:

All of the other choices were not correct choices

Reference(s) used for this question:

Shon Harris, CISSP All In One (AIO), 6th edition . Chapter 7, Cryptography, Page 812.

[http://en.wikipedia.org/wiki/Diffie%20%93Hellman\\_key\\_exchange](http://en.wikipedia.org/wiki/Diffie%20%93Hellman_key_exchange)

<http://www.google.com/patents?vid=4200770>

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#### QUESTION 792

Which protocol makes USE of an electronic wallet on a customer's PC and sends encrypted credit card information to merchant's Web server, which digitally signs it and sends it on to its processing bank?

- A. SSH ( Secure Shell)
- B. S/MIME (Secure MIME)
- C. SET (Secure Electronic Transaction)
- D. SSL (Secure Sockets Layer)

Answer: C

Explanation: As protocol was introduced by Visa and Mastercard to allow for more credit card transaction possibilities. It is comprised of three different pieces of software, running on the customer's PC (an electronic wallet), on the merchant's Web server and on the payment server of the merchant's bank. The credit card information is sent by the customer to the merchant's Web server, but it does not open it and instead digitally signs it and sends it to its bank's payment server for processing.

The following answers are incorrect because :

SSH (Secure Shell) is incorrect as it functions as a type of tunneling mechanism that provides terminal like access to remote computers.

S/MIME is incorrect as it is a standard for encrypting and digitally signing electronic mail and for providing secure data transmissions.

SSL is incorrect as it uses public key encryption and provides data encryption, server authentication, message integrity, and optional client authentication.

Reference : Shon Harris AIO v3 , Chapter-8: Cryptography , Page : 667-669

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**QUESTION 793**

Which of the following algorithms does NOT provide hashing?

- A. SHA-1
- B. MD2
- C. RC4
- D. MD5

Answer: C

Explanation: As it is an algorithm used for encryption and does not provide hashing functions , it is also commonly implemented ' Stream Ciphers '.

The other answers are incorrect because :

SHA-1 was designed by NIST and NSA to be used with the Digital Signature Standard (DSS).

SHA was designed to be used in digital signatures and was developed when a more secure hashing algorithm was required for U.S. government applications.

MD2 is a one-way hash function designed by Ron Rivest that creates a 128-bit message digest value. It is not necessarily any weaker than the other algorithms in the "MD" family, but it is much slower.

MD5 was also created by Ron Rivest and is the newer version of MD4. It still produces a 128-bit hash, but the algorithm is more complex, which makes it harder to break.

Reference : Shon Harris , AIO v3 , Chapter - 8 : Cryptography , Page : 644 - 645

**QUESTION 794**

In what type of attack does an attacker try, from several encrypted messages, to figure out the key used in the encryption process?

- A. Known-plaintext attack
- B. Ciphertext-only attack
- C. Chosen-Ciphertext attack
- D. Plaintext-only attack

Answer: B

Explanation: In a ciphertext-only attack, the attacker has the ciphertext of several messages encrypted with the same encryption algorithm. Its goal is to discover the plaintext of the messages by figuring out the key used in the encryption process. In a known-plaintext attack, the attacker has the plaintext and the ciphertext of one or more messages. In a chosen-ciphertext attack, the attacker can chose the ciphertext to be decrypted and has access to the resulting plaintext.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 8: Cryptography (page 578).

**QUESTION 795**

Which encryption algorithm is BEST suited for communication with handheld wireless devices?

- A. ECC (Elliptic Curve Cryptosystem)

- B. RSA
- C. SHA
- D. RC4

Answer: A

Explanation: As it provides much of the same functionality that RSA provides: digital signatures, secure key distribution, and encryption. One differing factor is ECC's efficiency. ECC is more efficient than RSA and any other asymmetric algorithm.

The following answers are incorrect because :

RSA is incorrect as it is less efficient than ECC to be used in handheld devices.

SHA is also incorrect as it is a hashing algorithm.

RC4 is also incorrect as it is a symmetric algorithm.

Reference : Shon Harris AIO v3 , Chapter-8 : Cryptography , Page : 631 , 638.

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### QUESTION 796

Which of the following keys has the SHORTEST lifespan?

- A. Secret key
- B. Public key
- C. Session key
- D. Private key

Answer: C

Explanation: As session key is a symmetric key that is used to encrypt messages between two users. A session key is only good for one communication session between users.

For example , If Tanya has a symmetric key that she uses to encrypt messages between Lance and herself all the time , then this symmetric key would not be regenerated or changed. They would use the same key every time they communicated using encryption. However , using the same key repeatedly increases the chances of the key being captured and the secure communication being compromised. If , on the other hand , a new symmetric key were generated each time Lance and Tanya wanted to communicate , it would be used only during their dialog and then destroyed. if they wanted to communicate an hour later , a new session key would be created and shared.

The other answers are not correct because :

Public Key can be known to anyone.

Private Key must be known and used only by the owner.

Secret Keys are also called as Symmetric Keys, because this type of encryption relies on each user to keep the key a secret and properly protected.

REFERENCES:

SHON HARRIS , ALL IN ONE THIRD EDITION : Chapter 8 : Cryptography , Page : 619-620

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### QUESTION 797

What is the RESULT of a hash algorithm being applied to a message?

- A. A digital signature
- B. A ciphertext
- C. A message digest
- D. A plaintext

Answer: C

Explanation: As when a hash algorithm is applied on a message , it produces a message digest.

The other answers are incorrect because :

A digital signature is a hash value that has been encrypted with a sender's private key.

A ciphertext is a message that appears to be unreadable.

A plaintext is a readable data.

Reference : Shon Harris , AIO v3 , Chapter-8 : Cryptography , Page : 593-594 , 640 , 648

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### QUESTION 798

Secure Sockets Layer (SSL) uses a Message Authentication Code (MAC) for what purpose?

- A. message non-repudiation.
- B. message confidentiality.
- C. message interleave checking.
- D. message integrity.

Answer: D

Explanation: A keyed hash also called a MAC (message authentication code) is used for integrity protection and authenticity.

In cryptography, a message authentication code (MAC) is a generated value used to authenticate a message. A MAC can be generated by HMAC or CBC-MAC methods. The MAC protects both a message's integrity (by ensuring that a different MAC will be produced if the message has changed) as well as its authenticity, because only someone who knows the secret key could have modified the message.

MACs differ from digital signatures as MAC values are both generated and verified using the same secret key. This implies that the sender and receiver of a message must agree on the same key before initiating communications, as is the case with symmetric encryption. For the same reason, MACs do not provide the property of non-repudiation offered by signatures specifically in the case of a network-wide shared secret key: any user who can verify a MAC is also capable of generating MACs for other messages.

#### HMAC

When using HMAC the symmetric key of the sender would be concatenated (added at the end) with the message. The result of this process (message + secret key) would be put through a hashing algorithm, and the result would be a MAC value. This MAC value is then appended to the message being sent. If an enemy were to intercept this message and modify it, he would not have the necessary symmetric key to create a valid MAC value. The receiver would detect the tampering because the MAC value would not be valid on the receiving side.

#### CBC-MAC

If a CBC-MAC is being used, the message is encrypted with a symmetric block cipher in CBC

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mode, and the output of the final block of ciphertext is used as the MAC. The sender does not send the encrypted version of the message, but instead sends the plaintext version and the MAC attached to the message. The receiver receives the plaintext message and encrypts it with the same symmetric block cipher in CBC mode and calculates an independent MAC value. The receiver compares the new MAC value with the MAC value sent with the message. This method does not use a hashing algorithm as does HMAC.

#### Cipher-Based Message Authentication Code (CMAC)

Some security issues with CBC-MAC were found and they created Cipher-Based Message Authentication Code (CMAC) as a replacement. CMAC provides the same type of data origin authentication and integrity as CBC-MAC, but is more secure mathematically. CMAC is a variation of CBC-MAC. It is approved to work with AES and Triple DES. HMAC, CBC-MAC, and CMAC work higher in the network stack and can identify not only transmission errors (accidental), but also more nefarious modifications, as in an attacker messing with a message for her own benefit. This means all of these technologies can identify intentional, unauthorized modifications and accidental changes— three in one.

The following are all incorrect answers:

"Message non-repudiation" is incorrect.

Nonrepudiation is the assurance that someone cannot deny something. Typically, nonrepudiation refers to the ability to ensure that a party to a contract or a communication cannot deny the authenticity of their signature on a document or the sending of a message that they originated.

To repudiate means to deny. For many years, authorities have sought to make repudiation impossible in some situations. You might send registered mail, for example, so the recipient cannot deny that a letter was delivered. Similarly, a legal document typically requires witnesses to signing so that the person who signs cannot deny having done so.

On the Internet, a digital signature is used not only to ensure that a message or document has been electronically signed by the person that purported to sign the document, but also, since a digital signature can only be created by one person, to ensure that a person cannot later deny that they furnished the signature.

"Message confidentiality" is incorrect. The Message confidentiality is protected by encryption not by hashing algorithms.

"Message interleave checking" is incorrect. This is a nonsense term included as a distractor.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 1384). McGraw-Hill. Kindle Edition.

and

[http://csrc.nist.gov/publications/nistpubs/800-38B/SP\\_800-38B.pdf](http://csrc.nist.gov/publications/nistpubs/800-38B/SP_800-38B.pdf)

and

<http://searchsecurity.techtarget.com/definition/nonrepudiation>

and

[https://en.wikipedia.org/wiki/Message\\_authentication\\_code](https://en.wikipedia.org/wiki/Message_authentication_code)

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#### QUESTION 799

Which of the following services is NOT provided by the digital signature standard (DSS)?

- A. Encryption
- B. Integrity

- 
- C. Digital signature
  - D. Authentication

Answer: A

Explanation: DSS provides Integrity, digital signature and Authentication, but does not provide Encryption.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 160).

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### QUESTION 800

What can be defined as an instance of two different keys generating the same ciphertext from the same plaintext?

- A. Key collision
- B. Key clustering
- C. Hashing
- D. Ciphertext collision

Answer: B

Explanation: Key clustering happens when a plaintext message generates identical ciphertext messages using the same transformation algorithm, but with different keys.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 130).

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### QUESTION 801

Which of the following is true about link encryption?

- A. Each entity has a common key with the destination node.
- B. Encrypted messages are only decrypted by the final node.
- C. This mode does not provide protection if anyone of the nodes along the transmission path is compromised.
- D. Only secure nodes are used in this type of transmission.

Answer: C

Explanation: In link encryption, each entity has keys in common with its two neighboring nodes in the transmission chain.

Thus, a node receives the encrypted message from its predecessor, decrypts it, and then reencrypts it with a new key, common to the successor node. Obviously, this mode does not provide protection if anyone of the nodes along the transmission path is compromised.

Encryption can be performed at different communication levels, each with different types of protection and implications. Two general modes of encryption implementation are link encryption and end-to-end encryption.

Link encryption encrypts all the data along a specific communication path, as in a satellite link, T3

line, or telephone circuit. Not only is the user information encrypted, but the header, trailers, addresses, and routing data that are part of the packets are also encrypted. The only traffic not encrypted in this technology is the data link control messaging information, which includes instructions and parameters that the different link devices use to synchronize communication methods. Link encryption provides protection against packet sniffers and eavesdroppers. In end-to-end encryption, the headers, addresses, routing, and trailer information are not encrypted, enabling attackers to learn more about a captured packet and where it is headed.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (pp. 845-846). McGraw-Hill.

And:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 132).

## QUESTION 802

What uses a key of the same length as the message where each bit or character from the plaintext is encrypted by a modular addition?

- A. Running key cipher
- B. One-time pad
- C. Steganography
- D. Cipher block chaining

Answer: B

Explanation: In cryptography, the one-time pad (OTP) is a type of encryption that is impossible to crack if used correctly. Each bit or character from the plaintext is encrypted by a modular addition with a bit or character from a secret random key (or pad) of the same length as the plaintext, resulting in a ciphertext. If the key is truly random, at least as long as the plaintext, never reused in whole or part, and kept secret, the ciphertext will be impossible to decrypt or break without knowing the key. It has also been proven that any cipher with the perfect secrecy property must use keys with effectively the same requirements as OTP keys. However, practical problems have prevented one-time pads from being widely used.

First described by Frank Miller in 1882, the one-time pad was re-invented in 1917 and patented a couple of years later. It is derived from the Vernam cipher, named after Gilbert Vernam, one of its inventors. Vernam's system was a cipher that combined a message with a key read from a punched tape. In its original form, Vernam's system was vulnerable because the key tape was a loop, which was reused whenever the loop made a full cycle. One-time use came a little later when Joseph Mauborgne recognized that if the key tape were totally random, cryptanalysis would be impossible.

The "pad" part of the name comes from early implementations where the key material was distributed as a pad of paper, so the top sheet could be easily torn off and destroyed after use. For easy concealment, the pad was sometimes reduced to such a small size that a powerful magnifying glass was required to use it. Photos show captured KGB pads that fit in the palm of one's hand, or in a walnut shell. To increase security, one-time pads were sometimes printed onto sheets of highly flammable nitrocellulose so they could be quickly burned.

The following are incorrect answers:

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A running key cipher uses articles in the physical world rather than an electronic algorithm. In classical cryptography, the running key cipher is a type of polyalphabetic substitution cipher in which a text, typically from a book, is used to provide a very long keystream. Usually, the book to be used would be agreed ahead of time, while the passage to use would be chosen randomly for each message and secretly indicated somewhere in the message.

The Running Key cipher has the same internal workings as the Vigenere cipher. The difference lies in how the key is chosen; the Vigenere cipher uses a short key that repeats, whereas the running key cipher uses a long key such as an excerpt from a book. This means the key does not repeat, making cryptanalysis more difficult. The cipher can still be broken though, as there are statistical patterns in both the key and the plaintext which can be exploited.

Steganography is a method where the very existence of the message is concealed. It is the art and science of encoding hidden messages in such a way that no one, apart from the sender and intended recipient, suspects the existence of the message. It is sometimes referred to as Hiding in Plain Sight.

Cipher block chaining is a DES operating mode. IBM invented the cipher-block chaining (CBC) mode of operation in 1976. In CBC mode, each block of plaintext is XORed with the previous ciphertext block before being encrypted. This way, each ciphertext block depends on all plaintext blocks processed up to that point. To make each message unique, an initialization vector must be used in the first block.

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 8: Cryptography (page 555).

and

[http://en.wikipedia.org/wiki/One-time\\_pad](http://en.wikipedia.org/wiki/One-time_pad)

[http://en.wikipedia.org/wiki/Running\\_key\\_cipher](http://en.wikipedia.org/wiki/Running_key_cipher)

[http://en.wikipedia.org/wiki/Cipher\\_block\\_chaining#Cipher-block\\_chaining\\_.28CBC.29](http://en.wikipedia.org/wiki/Cipher_block_chaining#Cipher-block_chaining_.28CBC.29)

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## QUESTION 803

What can be defined as secret communications where the very existence of the message is hidden?

- A. Clustering
- B. Steganography
- C. Cryptology
- D. Vernam cipher

Answer: B

Explanation: Steganography is a secret communication where the very existence of the message is hidden. For example, in a digital image, the least significant bit of each word can be used to comprise a message without causing any significant change in the image. Key clustering is a situation in which a plaintext message generates identical ciphertext messages using the same transformation algorithm but with different keys. Cryptology encompasses cryptography and cryptanalysis. The Vernam Cipher, also called a one-time pad, is an encryption scheme using a random key of the same size as the message and is used only once. It is said to be unbreakable, even with infinite resources.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 134).

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**QUESTION 804**

What is the maximum number of different keys that can be used when encrypting with Triple DES?

- A. 1
- B. 2
- C. 3
- D. 4

Answer: C

Explanation: Triple DES encrypts a message three times. This encryption can be accomplished in several ways. The most secure form of triple DES is when the three encryptions are performed with three different keys.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 152).

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**QUESTION 805**

What algorithm has been selected as the AES algorithm, replacing the DES algorithm?

- A. RC6
- B. Twofish
- C. Rijndael
- D. Blowfish

Answer: C

Explanation: On October 2, 2000, NIST announced the selection of the Rijndael Block Cipher, developed by the Belgian cryptographers Dr. Joan Daemen and Dr. Vincent Rijmen, as the proposed AES algorithm. Twofish and RC6 were also candidates. Blowfish is also a symmetric algorithm but wasn't a finalist for a replacement for DES.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 152).

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**QUESTION 806**

Which of the following is a symmetric encryption algorithm?

- A. RSA
- B. Elliptic Curve
- C. RC5
- D. El Gamal

Answer: C

Explanation: RC5 is a symmetric encryption algorithm. It is a block cipher of variable block length, encrypts through integer addition, the application of a bitwise Exclusive OR (XOR), and variable rotations.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 153).

### QUESTION 807

Which of the following is NOT a property of the Rijndael block cipher algorithm?

- A. The key sizes must be a multiple of 32 bits
- B. Maximum block size is 256 bits
- C. Maximum key size is 512 bits
- D. The key size does not have to match the block size

Answer: C

Explanation: The above statement is NOT true and thus the correct answer. The maximum key size on Rijndael is 256 bits.

There are some differences between Rijndael and the official FIPS-197 specification for AES. Rijndael specification per se is specified with block and key sizes that must be a multiple of 32 bits, both with a minimum of 128 and a maximum of 256 bits. Namely, Rijndael allows for both key and block sizes to be chosen independently from the set of { 128, 160, 192, 224, 256 } bits. (And the key size does not in fact have to match the block size).

However, FIPS-197 specifies that the block size must always be 128 bits in AES, and that the key size may be either 128, 192, or 256 bits. Therefore AES-128, AES-192, and AES-256 are actually:

Key Size (bits) Block Size (bits)

AES-128 128 128

AES-192 192 128

AES-256 256 128

So in short:

Rijndael and AES differ only in the range of supported values for the block length and cipher key length.

For Rijndael, the block length and the key length can be independently specified to any multiple of 32 bits, with a minimum of 128 bits, and a maximum of 256 bits.

AES fixes the block length to 128 bits, and supports key lengths of 128, 192 or 256 bits only.

References used for this question:

<http://blogs.msdn.com/b/shawnfa/archive/2006/10/09/the-differences-between rijndael-andaes.aspx>

and

<http://csrc.nist.gov/CryptoToolkit/aes/rijndael/Rijndael.pdf>

### QUESTION 808

Which of the following is not a property of the Rijndael block cipher algorithm?

- A. It employs a round transformation that is comprised of three layers of distinct and invertible transformations.

- B. It is suited for high speed chips with no area restrictions.
- C. It operates on 64-bit plaintext blocks and uses a 128 bit key.
- D. It could be used on a smart card.

Answer: C

Explanation: All other properties above apply to the Rijndael algorithm, chosen as the AES standard to replace DES.

The AES algorithm is capable of using cryptographic keys of 128, 192, and 256 bits to encrypt and decrypt data in blocks of 128 bits. Rijndael was designed to handle additional block sizes and key lengths, however they are not adopted in the AES standard.

IDEA cipher algorithm operates on 64-bit plaintext blocks and uses a 128 bit key.

Reference(s) used for this question:

<http://csrc.nist.gov/publications/fips/fips197/fips-197.pdf>

and

[http://en.wikipedia.org/wiki/Advanced\\_Encryption\\_Standard](http://en.wikipedia.org/wiki/Advanced_Encryption_Standard)

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### QUESTION 809

What is the maximum allowable key size of the Rijndael encryption algorithm?

- A. 128 bits
- B. 192 bits
- C. 256 bits
- D. 512 bits

Answer: C

Explanation: The Rijndael algorithm, chosen as the Advanced Encryption Standard (AES) to replace DES, can be categorized as an iterated block cipher with a variable block length and key length that can be independently chosen as 128, 192 or 256 bits.

Below you have a summary of the differences between AES and Rijndael.

AES is the advanced encryption standard defined by FIPS 197. It is implemented differently than Rijndael:

FIPS-197 specifies that the block size must always be 128 bits in AES, and that the key size may be either 128, 192, or 256 bits. Therefore AES-128, AES-192, and AES-256 are actually:

Key Size (bits) Number of rounds

Block Size (bits)

AES-128

128 10 Rounds

128

AES-192

192 12 Rounds

128

AES-256

256 14 Rounds

128

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Some book will say "up to 9 rounds will be done with a 128 bits keys". Really it is 10 rounds because you must include round zero which is the first round.

By contrast, the Rijndael specification per se is specified with block and key sizes that may be any multiple of 32 bits, both with a minimum of 128 and a maximum of 256 bits.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 153).

and

FIPS 197

and

[https://en.wikipedia.org/wiki/Advanced\\_Encryption\\_Standard](https://en.wikipedia.org/wiki/Advanced_Encryption_Standard)

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### QUESTION 810

Which of the following algorithms is used today for encryption in PGP?

- A. RSA
- B. IDEA
- C. Blowfish
- D. RC5

Answer: B

Explanation: The Pretty Good Privacy (PGP) email encryption system was developed by Phil Zimmerman. For encrypting messages, it actually uses AES with up to 256-bit keys, CAST, TripleDES, IDEA and Twofish. RSA is also used in PGP, but only for symmetric key exchange and for digital signatures, but not for encryption.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (pages 154, 169).

More info on PGP can be found on their site at <http://www.pgp.com/display.php?pageID=29>.

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### QUESTION 811

Which of the following protects Kerberos against replay attacks?

- A. Tokens
- B. Passwords
- C. Cryptography
- D. Time stamps

Answer: D

Explanation: A replay attack refers to the recording and retransmission of packets on the network. Kerberos uses time stamps, which protect against this type of attack.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 8: Cryptography (page 581).

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**QUESTION 812**

What is the name for a substitution cipher that shifts the alphabet by 13 places?

- A. Caesar cipher
- B. Polyalphabetic cipher
- C. ROT13 cipher
- D. Transposition cipher

Answer: C

Explanation: An extremely simple example of conventional cryptography is a substitution cipher. A substitution cipher substitutes one piece of information for another. This is most frequently done by offsetting letters of the alphabet. Two examples are Captain Midnight's Secret Decoder Ring, which you may have owned when you were a kid, and Julius Caesar's cipher. In both cases, the algorithm is to offset the alphabet and the key is the number of characters to offset it. So the offset could be one, two, or any number you wish. ROT-13 is an example where it is shifted 13 spaces. The Ceaser Cipher is another example where it is shifted 3 letters to the left.

ROT13 ("rotate by 13 places", sometimes hyphenated ROT-13) is a simple letter substitution cipher that replaces a letter with the letter 13 letters after it in the alphabet. ROT13 is an example of the Caesar cipher, developed in ancient Rome.

In the basic Latin alphabet, ROT13 is its own inverse; that is, to undo ROT13, the same algorithm is applied, so the same action can be used for encoding and decoding. The algorithm provides virtually no cryptographic security, and is often cited as a canonical example of weak encryption. ROT13 is used in online forums as a means of hiding spoilers, puzzle solutions, and offensive materials from the casual glance. ROT13 has been described as the "Usenet equivalent of a magazine printing the answer to a quiz upside down". ROT13 has inspired a variety of letter and word games on-line, and is frequently mentioned in newsgroup conversations. See diagram Below:

#### Rot 13 Cipher

The following are incorrect:

The Caesar cipher is a simple substitution cipher that involves shifting the alphabet three positions to the right. In cryptography, a Caesar cipher, also known as Caesar's cipher, the shift cipher, Caesar's code or Caesar shift, is one of the simplest and most widely known encryption techniques. It is a type of substitution cipher in which each letter in the plaintext is replaced by a letter some fixed number of positions down the alphabet. For example, with a left shift of 3, D would be replaced by A, E would become B, and so on. The method is named after Julius Caesar, who used it in his private correspondence.

#### Caesar Cipher

Polyalphabetic cipher refers to using multiple alphabets at a time. A polyalphabetic cipher is any cipher based on substitution, using multiple substitution alphabets. The Vigenère cipher is probably the best-known example of a polyalphabetic cipher, though it is a simplified special case.

#### Viginere Cipher

Transposition cipher is a different type of cipher. In cryptography, a transposition cipher is a method of encryption by which the positions held by units of plaintext (which are commonly characters or groups of characters) are shifted according to a regular system, so that the ciphertext constitutes a permutation of the plaintext. That is, the order of the units is changed. See

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the reference below for multiple examples of Transpositio Ciphers.

An exemple of Transposition cipher could be columnar transposition, the message is written out in rows of a fixed length, and then read out again column by column, and the columns are chosen in some scrambled order. Both the width of the rows and the permutation of the columns are usually defined by a keyword. For example, the word ZEBRAS is of length 6 (so the rows are of length 6), and the permutation is defined by the alphabetical order of the letters in the keyword. In this case, the order would be "6 3 2 4 1 5".

In a regular columnar transposition cipher, any spare spaces are filled with nulls; in an irregular columnar transposition cipher, the spaces are left blank. Finally, the message is read off in columns, in the order specified by the keyword. For example, suppose we use the keyword ZEBRAS and the message WE ARE DISCOVERED. FLEE AT ONCE. In a regular columnar transposition, we write this into the grid as Follows:

#### Transposition Cipher

Providing five nulls (QKJEU) at the end. The ciphertext is then read off as:

EVLNE ACDTK ESEAQ ROFOJ DEECU WIREE

Reference(s) used for this question:

<http://en.wikipedia.org/wiki/ROT13>

[http://en.wikipedia.org/wiki/Caesar\\_cipher](http://en.wikipedia.org/wiki/Caesar_cipher)

[http://en.wikipedia.org/wiki/Polyalphabetic\\_cipher](http://en.wikipedia.org/wiki/Polyalphabetic_cipher)

[http://en.wikipedia.org/wiki/Transposition\\_cipher](http://en.wikipedia.org/wiki/Transposition_cipher)

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#### QUESTION 813

Which of the following standards concerns digital certificates?

- A. X.400
- B. X.25
- C. X.509
- D. X.75

Answer: C

Explanation: X.509 is used in digital certificates. X.400 is used in e-mail as a message handling protocol. X.25 is a standard for the network and data link levels of a communication network and X.75 is a standard defining ways of connecting two X.25 networks.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 164).

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#### QUESTION 814

Which of the following offers security to wireless communications?

- A. S-WAP
- B. WTLS
- C. WSP
- D. WDP

Answer: B

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Explanation: Wireless Transport Layer Security (WTLS) is a communication protocol that allows wireless devices to send and receive encrypted information over the Internet. S-WAP is not defined. WSP (Wireless Session Protocol) and WDP (Wireless Datagram Protocol) are part of Wireless Access Protocol (WAP).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 173).

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### QUESTION 815

What is the effective key size of DES?

- A. 56 bits
- B. 64 bits
- C. 128 bits
- D. 1024 bits

Answer: A

Explanation: Data Encryption Standard (DES) is a symmetric key algorithm. Originally developed by IBM, under project name Lucifer, this 128-bit algorithm was accepted by the NIST in 1974, but the total key size was reduced to 64 bits, 56 of which make up the effective key, plus an extra 8 bits for parity. It somehow became a national cryptographic standard in 1977, and an American National Standard Institute (ANSI) standard in 1978. DES was later replaced by the Advanced Encryption Standard (AES) by the NIST.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 8: Cryptography (page 525).

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### QUESTION 816

Which of the following offers confidentiality to an e-mail message?

- A. The sender encrypting it with its private key.
- B. The sender encrypting it with its public key.
- C. The sender encrypting it with the receiver's public key.
- D. The sender encrypting it with the receiver's private key.

Answer: C

Explanation: An e-mail message's confidentiality is protected when encrypted with the receiver's public key, because he is the only one able to decrypt the message. The sender is not supposed to have the receiver's private key. By encrypting a message with its private key, anybody possessing the corresponding public key would be able to read the message. By encrypting the message with its public key, not even the receiver would be able to read the message.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 8: Cryptography (page 517).

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**QUESTION 817**

Which of the following is not a DES mode of operation?

- A. Cipher block chaining
- B. Electronic code book
- C. Input feedback
- D. Cipher feedback

Answer: C

Explanation: Output feedback (OFB) is a DES mode of operation, not input feedback.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 149).

**QUESTION 818**

What size is an MD5 message digest (hash)?

- A. 128 bits
- B. 160 bits
- C. 256 bits
- D. 128 bytes

Answer: A

Explanation: MD5 is a one-way hash function producing a 128-bit message digest from the input message, through 4 rounds of transformation. MD5 is specified as an Internet Standard (RFC1312).

Reference(s) used for this question:

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

**QUESTION 819**

Which of the following service is not provided by a public key infrastructure (PKI)?

- A. Access control
- B. Integrity
- C. Authentication
- D. Reliability

Answer: D

Explanation: A Public Key Infrastructure (PKI) provides confidentiality, access control, integrity, authentication and non-repudiation.

It does not provide reliability services.

Reference(s) used for this question:

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

**QUESTION 820**

In a Public Key Infrastructure, how are public keys published?

- A. They are sent via e-mail.
- B. Through digital certificates.
- C. They are sent by owners.
- D. They are not published.

Answer: B

Explanation: Public keys are published through digital certificates, signed by certification authority (CA), binding the certificate to the identity of its bearer.

A bit more details:

Although “Digital Certificates” is the best (or least wrong!) in the list of answers presented, for the past decade public keys have been published (ie: made known to the World) by the means of a LDAP server or a key distribution server (ex.: <http://pgp.mit.edu/>). An indirect publishing method is through OCSP servers (to validate digital signatures’ CRL)

Reference used for this question:

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

and

<http://technet.microsoft.com/en-us/library/dd361898.aspx>

**QUESTION 821**

What principle focuses on the uniqueness of separate objects that must be joined together to perform a task? It is sometimes referred to as “what each must bring” and joined together when getting access or decrypting a file. Each of which does not reveal the other?

- A. Dual control
- B. Separation of duties
- C. Split knowledge
- D. Need to know

Answer: C

Explanation: Split knowledge involves encryption keys being separated into two components, each of which does not reveal the other. Split knowledge is the other complementary access control principle to dual control.

In cryptographic terms, one could say dual control and split knowledge are properly implemented if no one person has access to or knowledge of the content of the complete cryptographic key being protected by the two processes.

The sound implementation of dual control and split knowledge in a cryptographic environment necessarily means that the quickest way to break the key would be through the best attack known for the algorithm of that key. The principles of dual control and split knowledge primarily apply to access to plaintext keys.

Access to cryptographic keys used for encrypting and decrypting data or access to keys that are encrypted under a master key (which may or may not be maintained under dual control and split

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knowledge) do not require dual control and split knowledge. Dual control and split knowledge can be summed up as the determination of any part of a key being protected must require the collusion between two or more persons with each supplying unique cryptographic materials that must be joined together to access the protected key.

Any feasible method to violate the axiom means that the principles of dual control and split knowledge are not being upheld.

Split knowledge is the unique “what each must bring” and joined together when implementing dual control. To illustrate, a box containing petty cash is secured by one combination lock and one keyed lock. One employee is given the combination to the combo lock and another employee has possession of the correct key to the keyed lock.

In order to get the cash out of the box both employees must be present at the cash box at the same time. One cannot open the box without the other. This is the aspect of dual control.

On the other hand, split knowledge is exemplified here by the different objects (the combination to the combo lock and the correct physical key), both of which are unique and necessary, that each brings to the meeting. Split knowledge focuses on the uniqueness of separate objects that must be joined together.

Dual control has to do with forcing the collusion of at least two or more persons to combine their split knowledge to gain access to an asset. Both split knowledge and dual control complement each other and are necessary functions that implement the segregation of duties in high integrity cryptographic environments.

The following are incorrect answers:

Dual control is a procedure that uses two or more entities (usually persons) operating in concert to protect a system resource, such that no single entity acting alone can access that resource. Dual control is implemented as a security procedure that requires two or more persons to come together and collude to complete a process. In a cryptographic system the two (or more) persons would each supply a unique key, that when taken together, performs a cryptographic process.

Split knowledge is the other complementary access control principle to dual control.

Separation of duties - The practice of dividing the steps in a system function among different individuals, so as to keep a single individual from subverting the process.

The need-to-know principle requires a user having necessity for access to, knowledge of, or possession of specific information required to perform official tasks or services.

Reference(s) used for this question:

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Cryptography (Kindle Locations 1621-1635). . Kindle Edition.

and

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Cryptography (Kindle Locations 1643-1650). . Kindle Edition.

and

Shon Harris, CISSP All In One (AIO), 6th Edition , page 126

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## QUESTION 822

What level of assurance for a digital certificate verifies a user's name, address, social security number, and other information against a credit bureau database?

- A. Level 1/Class 1
- B. Level 2/Class 2

- 
- C. Level 3/Class 3
  - D. Level 4/Class 4

Answer: B

Explanation: Users can obtain certificates with various levels of assurance. Here is a list that describe each of them:

- Class 1/Level 1 for individuals, intended for email, no proof of identity

For example, level 1 certificates verify electronic mail addresses. This is done through the use of a personal information number that a user would supply when asked to register. This level of certificate may also provide a name as well as an electronic mail address; however, it may or may not be a genuine name (i.e., it could be an alias). This proves that a human being will reply back if you send an email to that name or email address.

- Class 2/Level 2 is for organizations and companies for which proof of identity is required

Level 2 certificates verify a user's name, address, social security number, and other information against a credit bureau database.

- Class 3/Level 3 is for servers and software signing, for which independent verification and checking of identity and authority is done by the issuing certificate authority

Level 3 certificates are available to companies. This level of certificate provides photo identification to accompany the other items of information provided by a level 2 certificate.

- Class 4 for online business transactions between companies

- Class 5 for private organizations or governmental security

References:

[http://en.wikipedia.org/wiki/Digital\\_certificate](http://en.wikipedia.org/wiki/Digital_certificate) veriSign introduced the concept of classes of digital certificates:

Also see:

Source: TIPTON, Harold F. & KRAUSE, Micki, Information Security Management Handbook, 4th edition (volume 1), 2000, CRC Press, Chapter 3, Secured Connections to External Networks (page 54).

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### QUESTION 823

Which of the following statements pertaining to stream ciphers is correct?

- A. A stream cipher is a type of asymmetric encryption algorithm.

- B. A stream cipher generates what is called a keystream.

- C. A stream cipher is slower than a block cipher.

- D. A stream cipher is not appropriate for hardware-based encryption.

Answer: B

Explanation: A stream cipher is a type of symmetric encryption algorithm that operates on continuous streams of plain text and is appropriate for hardware-based encryption.

Stream ciphers can be designed to be exceptionally fast, much faster than any block cipher. A stream cipher generates what is called a keystream (a sequence of bits used as a key).

Stream ciphers can be viewed as approximating the action of a proven unbreakable cipher, the one-time pad (OTP), sometimes known as the Vernam cipher. A one-time pad uses a keystream

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of completely random digits. The keystream is combined with the plaintext digits one at a time to form the ciphertext. This system was proved to be secure by Claude Shannon in 1949. However, the keystream must be (at least) the same length as the plaintext, and generated completely at random. This makes the system very cumbersome to implement in practice, and as a result the one-time pad has not been widely used, except for the most critical applications.

A stream cipher makes use of a much smaller and more convenient key — 128 bits, for example. Based on this key, it generates a pseudorandom keystream which can be combined with the plaintext digits in a similar fashion to the one-time pad. However, this comes at a cost: because the keystream is now pseudorandom, and not truly random, the proof of security associated with the one-time pad no longer holds: it is quite possible for a stream cipher to be completely insecure if it is not implemented properly as we have seen with the Wired Equivalent Privacy (WEP) protocol.

Encryption is accomplished by combining the keystream with the plaintext, usually with the bitwise XOR operation.

Source: DUPUIS, Clement, CISSP Open Study Guide on domain 5, cryptography, April 1999.

More details can be obtained on Stream Ciphers in RSA Security's FAQ on Stream Ciphers.

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### QUESTION 824

Which of the following statements pertaining to block ciphers is incorrect?

- A. It operates on fixed-size blocks of plaintext.
- B. It is more suitable for software than hardware implementations.
- C. Plain text is encrypted with a public key and decrypted with a private key.
- D. Some Block ciphers can operate internally as a stream.

Answer: C

Explanation: Block ciphers do not use public cryptography (private and public keys).

Block ciphers is a type of symmetric-key encryption algorithm that transforms a fixed-size block of plaintext (unencrypted text) data into a block of ciphertext (encrypted text) data of the same length. They are appropriate for software implementations and can operate internally as a stream. See more info below about DES in Output Feedback Mode (OFB), which makes use internally of a stream cipher.

The output feedback (OFB) mode makes a block cipher into a synchronous stream cipher. It generates keystream blocks, which are then XORed with the plaintext blocks to get the ciphertext. Just as with other stream ciphers, flipping a bit in the ciphertext produces a flipped bit in the plaintext at the same location. This property allows many error correcting codes to function normally even when applied before encryption.

Reference(s) used for this question:

Wikipedia on Block Cipher mode at: [https://en.wikipedia.org/wiki/Block\\_cipher\\_mode\\_of\\_operation](https://en.wikipedia.org/wiki/Block_cipher_mode_of_operation) and

<http://www.itl.nist.gov/fipspubs/fip81.htm>

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### QUESTION 825

Cryptography does NOT help in:

- A. Detecting fraudulent insertion.
- B. Detecting fraudulent deletion.
- C. Detecting fraudulent modification.
- D. Detecting fraudulent disclosure.

Answer: D

Explanation: Cryptography is a detective control in the fact that it allows the detection of fraudulent insertion, deletion or modification. It also is a preventive control in the fact that it prevents disclosure, but it usually does not offer any means of detecting disclosure.

Source: DUPUIS, Clement, CISSP Open Study Guide on domain 5, cryptography, April 1999.

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### QUESTION 826

What is used to bind a document to its creation at a particular time?

- A. Network Time Protocol (NTP)
- B. Digital Signature
- C. Digital Timestamp
- D. Certification Authority (CA)

Answer: C

Explanation: While a digital signature binds a document to the possessor of a particular key, a digital timestamp binds a document to its creation at a particular time.

Trusted timestamping is the process of securely keeping track of the creation and modification time of a document. Security here means that no one — not even the owner of the document — should be able to change it once it has been recorded provided that the timestamp's integrity is never compromised.

The administrative aspect involves setting up a publicly available, trusted timestamp management infrastructure to collect, process and renew timestamps or to make use of a commercially available time stamping service.

A modern example of using a Digital Timestamp is the case of an industrial research organization that may later need to prove, for patent purposes, that they made a particular discovery on a particular date; since magnetic media can be altered easily, this may be a nontrivial issue. One possible solution is for a researcher to compute and record in a hardcopy laboratory notebook a cryptographic hash of the relevant data file. In the future, should there be a need to prove the version of this file retrieved from a backup tape has not been altered, the hash function could be recomputed and compared with the hash value recorded in that paper notebook.

According to the RFC 3161 standard, a trusted timestamp is a timestamp issued by a trusted third party (TTP) acting as a Time Stamping Authority (TSA). It is used to prove the existence of certain data before a certain point (e.g. contracts, research data, medical records,...) without the possibility that the owner can backdate the timestamps. Multiple TSAs can be used to increase reliability and reduce vulnerability.

The newer ANSI ASC X9.95 Standard for trusted timestamps augments the RFC 3161 standard with data-level security requirements to ensure data integrity against a reliable time source that is provable to any third party. This standard has been applied to authenticating digitally signed data

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for regulatory compliance, financial transactions, and legal evidence.

Digital TimeStamp

The following are incorrect answers:

Network Time Protocol (NTP) is used to achieve high accuracy time synchronization for computers across a network.

A Certification Authority (CA) is the entity responsible for the issuance of digital certificates.

A Digital Signature provides integrity and authentication but does not bind a document to a specific time it was created.

Reference used for this question:

[http://en.m.wikipedia.org/wiki/File:Trusted\\_timestamping.gif](http://en.m.wikipedia.org/wiki/File:Trusted_timestamping.gif)

and

[http://en.wikipedia.org/wiki/Trusted\\_timestamping](http://en.wikipedia.org/wiki/Trusted_timestamping)

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**QUESTION 827**

Which of the following is best at defeating frequency analysis?

- A. Substitution cipher
- B. Polyalphabetic cipher
- C. Transposition cipher
- D. Ceasar Cipher

Answer: B

Explanation: Simple substitution and transposition ciphers are vulnerable to attacks that perform frequency analysis.

In every language, there are words and patterns that are used more than others.

Some patterns common to a language can actually help attackers figure out the transformation between plaintext and ciphertext, which enables them to figure out the key that was used to perform the transformation. Polyalphabetic ciphers use different alphabets to defeat frequency analysis.

The ceasar cipher is a very simple substitution cipher that can be easily defeated and it does show repeating letters.

Out of list presented, it is the Polyalphabetic cipher that would provide the best protection against simple frequency analysis attacks.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 8: Cryptography (page 507)

And : DUPUIS, Clement, CISSP Open Study Guide on domain 5, cryptography, April 1999.

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**QUESTION 828**

A code, as is pertains to cryptography:

- A. Is a generic term for encryption.
- B. Is specific to substitution ciphers.
- C. Deals with linguistic units.
- D. Is specific to transposition ciphers.

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Answer: C

Explanation: Historically, a code refers to a cryptosystem that deals with linguistic units: words, phrases, sentences, and so forth. Codes are only useful for specialized circumstances where the message to transmit has an already defined equivalent ciphertext word.

Source: DUPUIS, Cl?ment, CISSP Open Study Guide on domain 5, cryptography, April 1999.

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### QUESTION 829

Which of the following is the most secure form of triple-DES encryption?

- A. DES-EDE3
- B. DES-EDE1
- C. DES-EEE4
- D. DES-EDE2

Answer: A

Explanation: Triple DES with three distinct keys is the most secure form of triple-DES encryption. It can either be DES-EEE3 (encrypt-encrypt-encrypt) or DES-EDE3 (encrypt-decrypt-encrypt). DES-EDE1 is not defined and would mean using a single key to encrypt, decrypt and encrypt again, equivalent to single DES. DES-EEE4 is not defined and DES-EDE2 uses only 2 keys (encrypt with first key, decrypt with second key, encrypt with first key again).

Source: DUPUIS, Cl?ment, CISSP Open Study Guide on domain 5, cryptography, April 1999.

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### QUESTION 830

Which of the following is NOT a known type of Message Authentication Code (MAC)?

- A. Keyed-hash message authentication code (HMAC)
- B. DES-CBC
- C. Signature-based MAC (SMAC)
- D. Universal Hashing Based MAC (UMAC)

Answer: C

Explanation: There is no such thing as a Signature-Based MAC. Being the wrong choice in the list, it is the best answer to this question.

#### WHAT IS A Message Authentication Code (MAC)?

In Cryptography, a MAC (Message Authentication Code) also known as a cryptographic checksum, is a small block of data that is generated using a secret key and then appended to the message. When the message is received, the recipient can generate their own MAC using the secret key, and thereby know that the message has not changed either accidentally or intentionally in transit. Of course, this assurance is only as strong as the trust that the two parties have that no one else has access to the secret key.

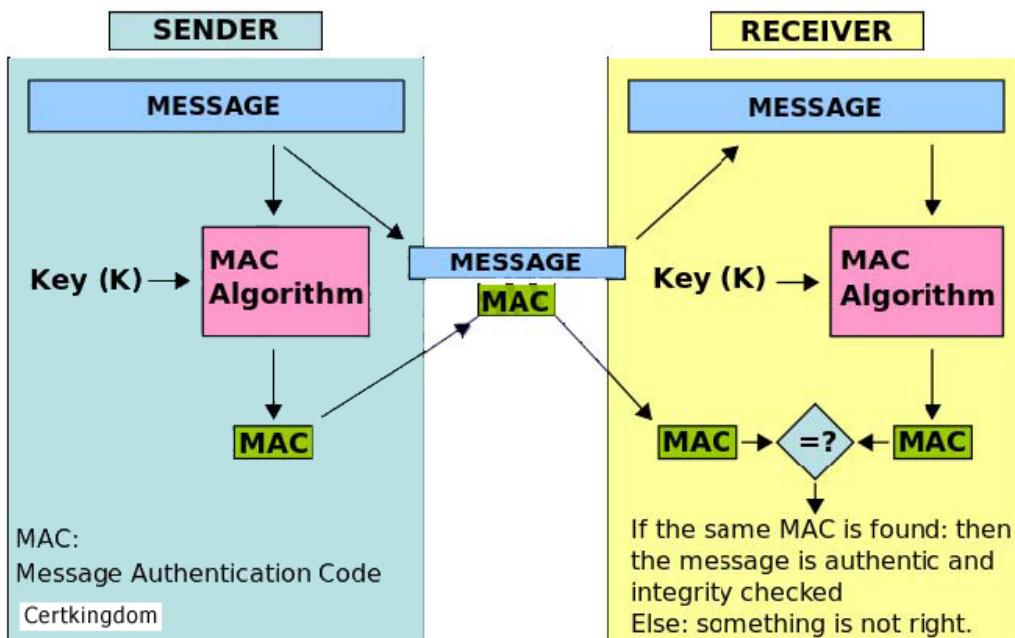
A MAC is a small representation of a message and has the following characteristics:

A MAC is much smaller than the message generating it.

Given a MAC, it is impractical to compute the message that generated it.

Given a MAC and the message that generated it, it is impractical to find another message generating the same MAC.

See the graphic below from Wikipedia showing the creation of a MAC value:



### Message Authentication Code MAC HMAC

In the example above, the sender of a message runs it through a MAC algorithm to produce a MAC data tag. The message and the MAC tag are then sent to the receiver. The receiver in turn runs the message portion of the transmission through the same MAC algorithm using the same key, producing a second MAC data tag. The receiver then compares the first MAC tag received in the transmission to the second generated MAC tag. If they are identical, the receiver can safely assume that the integrity of the message was not compromised, and the message was not altered or tampered with during transmission.

However, to allow the receiver to be able to detect replay attacks, the message itself must contain data that assures that this same message can only be sent once (e.g. time stamp, sequence number or use of a one-time MAC). Otherwise an attacker could — without even understanding its content — record this message and play it back at a later time, producing the same result as the original sender.

**NOTE:** There are many ways of producing a MAC value. Below you have a short list of some implementation.

The following were incorrect answers for this question:

They were all incorrect answers because they are all real type of MAC implementation.

In the case of DES-CBC, a MAC is generated using the DES algorithm in CBC mode, and the secret DES key is shared by the sender and the receiver. The MAC is actually just the last block of ciphertext generated by the algorithm. This block of data (64 bits) is attached to the unencrypted message and transmitted to the far end. All previous blocks of encrypted data are discarded to prevent any attack on the MAC itself. The receiver can just generate his own MAC using the secret DES key he shares to ensure message integrity and authentication. He knows that the message has not changed because the chaining function of CBC would significantly alter the last

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block of data if any bit had changed anywhere in the message. He knows the source of the message (authentication) because only one other person holds the secret key.

A Keyed-hash message authentication code (HMAC) is a specific construction for calculating a message authentication code (MAC) involving a cryptographic hash function in combination with a secret cryptographic key. As with any MAC, it may be used to simultaneously verify both the data integrity and the authentication of a message. Any cryptographic hash function, such as MD5, SHA-1, may be used in the calculation of an HMAC; the resulting MAC algorithm is termed HMACMD5 or HMAC-SHA1 accordingly. The cryptographic strength of the HMAC depends upon the cryptographic strength of the underlying hash function, the size of its hash output, and on the size and quality of the key.

A message authentication code based on universal hashing, or UMAC, is a type of message authentication code (MAC) calculated choosing a hash function from a class of hash functions according to some secret (random) process and applying it to the message. The resulting digest or fingerprint is then encrypted to hide the identity of the hash function used. As with any MAC, it may be used to simultaneously verify both the data integrity and the authenticity of a message. UMAC is specified in RFC 4418, it has provable cryptographic strength and is usually a lot less computationally intensive than other MACs.

What is the MicMac (confusion) with MIC and MAC?

The term message integrity code (MIC) is frequently substituted for the term MAC, especially in communications, where the acronym MAC traditionally stands for Media Access Control when referring to Networking. However, some authors use MIC as a distinctly different term from a MAC; in their usage of the term the MIC operation does not use secret keys. This lack of security means that any MIC intended for use gauging message integrity should be encrypted or otherwise be protected against tampering. MIC algorithms are created such that a given message will always produce the same MIC assuming the same algorithm is used to generate both. Conversely, MAC algorithms are designed to produce matching MACs only if the same message, secret key and initialization vector are input to the same algorithm. MICs do not use secret keys and, when taken on their own, are therefore a much less reliable gauge of message integrity than MACs. Because MACs use secret keys, they do not necessarily need to be encrypted to provide the same level of assurance.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 15799-15815). Auerbach Publications. Kindle Edition.

and

[http://en.wikipedia.org/wiki/Message\\_authentication\\_code](http://en.wikipedia.org/wiki/Message_authentication_code)

and

<http://tools.ietf.org/html/rfc4418>

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## QUESTION 831

What is the maximum key size for the RC5 algorithm?

- A. 128 bits
- B. 256 bits
- C. 1024 bits
- D. 2040 bits

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Answer: D

Explanation: RC5 is a fast block cipher created by Ron Rivest and analyzed by RSA Data Security, Inc.

It is a parameterized algorithm with a variable block size, a variable key size, and a variable number of rounds.

Allowable choices for the block size are 32 bits (for experimentation and evaluation purposes only), 64 bits (for use a drop-in replacement for DES), and 128 bits.

The number of rounds can range from 0 to 255, while the key can range from 0 bits to 2040 bits in size.

Please note that some sources such as the latest Shon Harris book mentions that RC5 maximum key size is of 2048, not 2040 bits. I would definitely use RSA as the authoritative source which specifies a key of 2040 bits. It is an error in Shon's book.

The OIG book says:

RC5 was developed by Ron Rivest of RSA and is deployed in many of RSA's products. It is a very adaptable product useful for many applications, ranging from software to hardware implementations. The key for RC5 can vary from 0 to 2040 bits, the number of rounds it executes can be adjusted from 0 to 255, and the length of the input words can also be chosen from 16-, 32-, and 64-bit lengths.

The following answers were incorrect choices:

All of the other answers were wrong.

Reference(s) used for this question:

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Cryptography (Kindle Locations 1098-1101). . Kindle Edition.

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 16744-16747). McGraw-Hill. Kindle Edition.

<http://www.rsa.com/rsalabs/node.asp?id=2251>, What are RC5 and RC6, RSA The Security Division of EMC.

From Rivest himself, see <http://people.csail.mit.edu/rivest/Rivest-rc5rev.pdf>

Also see the draft IETF IPSEC standard which clearly mention that it is in fact 2040 bits as a MAXIMUM key size:

<http://www.tools.ietf.org/html/draft-ietf-ipsec-esp-rc5-cbc-00>

<http://en.wikipedia.org/wiki/RC5>, Mention a maximum key size of 2040 as well.

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## QUESTION 832

Which of the following algorithms is a stream cipher?

- A. RC2
- B. RC4
- C. RC5
- D. RC6

Answer: B

Explanation: RC2, RC4, RC5 and RC6 were developed by Ronal Rivest from RSA Security. In the RC family only RC4 is a stream cipher.

RC4 allows a variable key length.

RC2 works with 64-bit blocks and variable key lengths,

RC5 has variable block sizes, key length and number of processing rounds.

RC6 was designed to fix a flaw in RC5.

Source: ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 6: Cryptography (page 103).

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### QUESTION 833

In a SSL session between a client and a server, who is responsible for generating the master secret that will be used as a seed to generate the symmetric keys that will be used during the session?

- A. Both client and server
- B. The client's browser
- C. The web server
- D. The merchant's Certificate Server

Answer: B

Explanation: Once the merchant server has been authenticated by the browser client, the browser generates a master secret that is to be shared only between the server and client. This secret serves as a seed to generate the session (private) keys. The master secret is then encrypted with the merchant's public key and sent to the server. The fact that the master secret is generated by the client's browser provides the client assurance that the server is not reusing keys that would have been used in a previous session with another client.

Source: ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 6: Cryptography (page 112).

Also: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, page 569.

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### QUESTION 834

Which of the following statements pertaining to PPTP (Point-to-Point Tunneling Protocol) is incorrect?

- A. PPTP allow the tunnelling of any protocols that can be carried within PPP.
- B. PPTP does not provide strong encryption.
- C. PPTP does not support any token-based authentication method for users.
- D. PPTP is derived from L2TP.

Answer: D

Explanation: PPTP is an encapsulation protocol based on PPP that works at OSI layer 2 (Data Link) and that enables a single point-to-point connection, usually between a client and a server. While PPTP depends on IP to establish its connection.

As currently implemented, PPTP encapsulates PPP packets using a modified version of the generic routing encapsulation (GRE) protocol, which gives PPTP to the flexibility of handling

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protocols other than IP, such as IPX and NETBEUI over IP networks.

PPTP does have some limitations:

It does not provide strong encryption for protecting data, nor does it support any token-based methods for authenticating users.

L2TP is derived from L2F and PPTP, not the opposite.

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### QUESTION 835

Which of the following is less likely to be used today in creating a Virtual Private Network?

- A. L2TP
- B. PPTP
- C. IPSec
- D. L2F

Answer: D

Explanation: L2F (Layer 2 Forwarding) provides no authentication or encryption. It is a Protocol that supports the creation of secure virtual private dial-up networks over the Internet.

At one point L2F was merged with PPTP to produce L2TP to be used on networks and not only on dial up links.

IPSec is now considered the best VPN solution for IP environments.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 8: Cryptography (page 507).

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### QUESTION 836

Which of the following was not designed to be a proprietary encryption algorithm?

- A. RC2
- B. RC4
- C. Blowfish
- D. Skipjack

Answer: C

Explanation: Blowfish is a symmetric block cipher with variable-length key (32 to 448 bits) designed in 1993 by Bruce Schneier as an unpatented, license-free, royalty-free replacement for DES or IDEA

A. See attributes below:

Block cipher: 64-bit block

Variable key length: 32 bits to 448 bits

Designed by Bruce Schneier

Much faster than DES and IDEA

Unpatented and royalty-free

No license required

Free source code available

Rivest Cipher #2 (RC2) is a proprietary, variable-key-length block cipher invented by Ron Rivest

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for RSA Data Security, Inc.

Rivest Cipher #4 (RC4) is a proprietary, variable-key-length stream cipher invented by Ron Rivest for RSA Data Security, Inc.

The Skipjack algorithm is a Type II block cipher [NIST] with a block size of 64 bits and a key size of 80 bits that was developed by NSA and formerly classified at the U.S. Department of Defense "Secret" level. The NSA announced on June 23, 1998, that Skipjack had been declassified.

References:

RSA Laboratories

<http://www.rsa.com/rsalabs/node.asp?id=2250>

RFC 2828 - Internet Security Glossary

<http://www.faqs.org/rfcs/rfc2828.html>

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### QUESTION 837

Which of the following is not an encryption algorithm?

- A. Skipjack
- B. SHA-1
- C. Twofish
- D. DEA

Answer: B

Explanation: The SHA-1 is a hashing algorithm producing a 160-bit hash result from any data. It does not perform encryption.

In cryptography, SHA-1 is a cryptographic hash function designed by the United States National Security Agency and published by the United States NIST as a U.S. Federal Information Processing Standard.

SHA stands for "secure hash algorithm". The four SHA algorithms are structured differently and are distinguished as SHA-0, SHA-1, SHA-2, and SHA-3. SHA-1 is very similar to SHA-0, but corrects an error in the original SHA hash specification that led to significant weaknesses. The SHA-0 algorithm was not adopted by many applications. SHA-2 on the other hand significantly differs from the SHA-1 hash function.

SHA-1 is the most widely used of the existing SHA hash functions, and is employed in several widely used applications and protocols.

In 2005, cryptanalysts found attacks on SHA-1 suggesting that the algorithm might not be secure enough for ongoing use. NIST required many applications in federal agencies to move to SHA-2 after 2010 because of the weakness. Although no successful attacks have yet been reported on SHA-2, they are algorithmically similar to SHA-1.

In 2012, following a long-running competition, NIST selected an additional algorithm, Keccak, for standardization as SHA-3

NOTE:

A Cryptographic Hash Function is not the same as an Encryption Algorithm even thou both are Algorithms. An algorithm is defined as a step-by-step procedure for calculations. Hashing Algorithm do not encrypt the data. People sometimes will say they encrypted a password with SHA-1 but really they simply created a Message Digest of the password using SHA-1, putting the input through a series of steps to come out with the message digest or hash value.

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A cryptographic hash function is a hash function; that is, an algorithm that takes an arbitrary block of data and returns a fixed-size bit string, the (cryptographic) hash value, such that any (accidental or intentional) change to the data will (with very high probability) change the hash value. The data to be encoded are often called the "message," and the hash value is sometimes called the message digest or simply digest.

Encryption Algorithms are reversible but Hashing Algorithms are not meant to be reversible if the input is large enough.

The following are incorrect answers:

The Skipjack algorithm is a Type II block cipher with a block size of 64 bits and a key size of 80 bits that was developed by NSA and formerly classified at the U.S. Department of Defense "Secret" level.

Twofish is a freely available 128-bit block cipher designed by Counterpane Systems (Bruce Schneier et al.).

DEA is a symmetric block cipher, defined as part of the U.S. Government's Data Encryption Standard (DES). DEA uses a 64-bit key, of which 56 bits are independently chosen and 8 are parity bits, and maps a 64-bit block into another 64-bit block.

Reference(s) used for this question:

<http://en.wikipedia.org/wiki/SHA-1>

and

SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

and

Counterpane Labs, at <http://www.counterpane.com/twofish.html>.

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### QUESTION 838

What key size is used by the Clipper Chip?

- A. 40 bits
- B. 56 bits
- C. 64 bits
- D. 80 bits

Answer: D

Explanation: The Clipper Chip is a NSA designed tamperproof chip for encrypting data and it uses the SkipJack algorithm. Each Clipper Chip has a unique serial number and a copy of the unit key is stored in the database under this serial number. The sending Clipper Chip generates and sends a Law Enforcement Access Field (LEAF) value included in the transmitted message. It is based on a 80-bit key and a 16-bit checksum.

Source: WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 1).

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### QUESTION 839

Which of the following would best describe a Concealment cipher?

- A. Permutation is used, meaning that letters are scrambled.
- B. Every X number of words within a text, is a part of the real message.
- C. Replaces bits, characters, or blocks of characters with different bits, characters or blocks.

- 
- D. Hiding data in another message so that the very existence of the data is concealed.

Answer: B

Explanation: When a concealment cipher is used, every X number of words within a text, is a part of the real message. The message is within another message.

A concealment cipher is a message within a message. If my other super-secret spy buddy and I decide our key value is every third word, then when I get a message from him, I will pick out every third word and write it down. Suppose he sends me a message that reads, “The saying, ‘The time is right’ is not cow language, so is now a dead subject.” Because my key is every third word, I come up with “The right cow is dead.” This again means nothing to me, and I am now turning in my decoder ring.

Concealment ciphers include the plaintext within the ciphertext. It is up to the recipient to know which letters or symbols to exclude from the ciphertext in order to yield the plaintext. Here is an example of a concealment cipher:

i2l32i5321k34e1245ch456oc12ol234at567e

Remove all the numbers, and you'll have i like chocolate. How about this one?

Larry even appears very excited. No one worries.

The first letter from each word reveals the message leave now. Both are easy, indeed, but many people have crafted more ingenious ways of concealing the messages. By the way, this type of cipher doesn't even need ciphertext, such as that in the above examples.

Consider the invisible drying ink that kids use to send secret messages. In a more extreme example, a man named Histiaeus, during 5th century B.C., shaved the head of a trusted slave, then tattooed the message onto his bald head. When the slave's hair grew back, Histiaeus sent the slave to the message's intended recipient, Aristagoras, who shaved the slave's head and read the message instructing him to revolt.

The following answers are incorrect:

A transposition cipher uses permutations.

A substitution cipher replaces bits, characters, or blocks of characters with different bits, characters or blocks.

Steganography refers to hiding the very existence of the message.

Source: WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 1).  
and also see:

<http://www.go4expert.com/forums/showthread.php?t=415>

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## QUESTION 840

Which of the following is best provided by symmetric cryptography?

- A. Confidentiality
- B. Integrity
- C. Availability
- D. Non-repudiation

Answer: A

Explanation: When using symmetric cryptography, both parties will be using the same key for

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encryption and decryption. Symmetric cryptography is generally fast and can be hard to break, but it offers limited overall security in the fact that it can only provide confidentiality.

Source: WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 2).

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**QUESTION 841**

Which of the following is not a disadvantage of symmetric cryptography when compared with Asymmetric Ciphers?

- A. Provides Limited security services
- B. Has no built in Key distribution
- C. Speed
- D. Large number of keys are needed

Answer: C

Explanation: Symmetric cryptography ciphers are generally fast and hard to break. So speed is one of the key advantage of Symmetric ciphers and NOT a disadvantage. Symmetric Ciphers uses simple encryption steps such as XOR, substitution, permutation, shifting columns, shifting rows, etc... Such steps does not required a large amount of processing power compare to the complex mathematical problem used within Asymmetric Ciphers.

Some of the weaknesses of Symmetric Ciphers are:

The lack of automated key distribution. Usually an Asymmetric cipher would be use to protect the symmetric key if it needs to be communicated to another entity securely over a public network. In the good old day this was done manually where it was distributed using the Floppy Net sometimes called the Sneaker Net (you run to someone's office to give them the key).

As far as the total number of keys are required to communicate securely between a large group of users, it does not scale very well. 10 users would require 45 keys for them to communicate securely with each other. If you have 1000 users then you would need almost half a million key to communicate secure. On Asymmetric ciphers there is only 2000 keys required for 1000 users. The formula to calculate the total number of keys required for a group of users who wishes to communicate securely with each others using Symmetric encryption is Total Number of Users (N) \* Total Number of users minus one Divided by 2 or N (N-1)/2

Symmetric Ciphers are limited when it comes to security services, they cannot provide all of the security services provided by Asymmetric ciphers. Symmetric ciphers provides mostly confidentiality but can also provide integrity and authentication if a Message Authentication Code (MAC) is used and could also provide user authentication if Kerberos is used for example.

Symmetric Ciphers cannot provide Digital Signature and Non-Repudiation.

Reference used for theis question:

WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 2).

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**QUESTION 842**

Which of the following is more suitable for a hardware implementation?

- A. Stream ciphers
- B. Block ciphers
- C. Cipher block chaining

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D. Electronic code book

Answer: B

Explanation: A stream cipher treats the message as a stream of bits or bytes and performs mathematical functions on them individually. The key is a random value input into the stream cipher, which it uses to ensure the randomness of the keystream data. They are more suitable for hardware implementations, because they encrypt and decrypt one bit at a time. They are intensive because each bit must be manipulated, which works better at the silicon level. Block ciphers operate at the block level, dividing the message into blocks of bits. Cipher Block Chaining (CBC) and Electronic Code Book (ECB) are operation modes of DES, a block encryption algorithm.  
Source: WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 2).

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**QUESTION 843**

How many rounds are used by DES?

- A. 16
- B. 32
- C. 64
- D. 48

Answer: A

Explanation: DES is a block encryption algorithm using 56-bit keys and 64-bit blocks that are divided in half and each character is encrypted one at a time. The characters are put through 16 rounds of transposition and substitution functions. Triple DES uses 48 rounds.

Source: WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 3).

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**QUESTION 844**

What is the key size of the International Data Encryption Algorithm (IDEA)?

- A. 64 bits
- B. 128 bits
- C. 160 bits
- D. 192 bits

Answer: B

Explanation: The International Data Encryption Algorithm (IDEA) is a block cipher that operates on 64-bit blocks of data with a 128-bit key. The data blocks are divided into 16 smaller blocks and each has eight rounds of mathematical functions performed on it. It is used in the PGP encryption software.

Source: WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 3).

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**QUESTION 845**

Which of the following is not an example of a block cipher?

- A. Skipjack
- B. IDEA
- C. Blowfish
- D. RC4

Answer: D

Explanation: RC4 is a proprietary, variable-key-length stream cipher invented by Ron Rivest for RSA Data Security, Inc. Skipjack, IDEA and Blowfish are examples of block ciphers.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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### QUESTION 846

The Diffie-Hellman algorithm is used for:

- A. Encryption
- B. Digital signature
- C. Key agreement
- D. Non-repudiation

Answer: C

Explanation: The Diffie-Hellman algorithm is used for Key agreement (key distribution) and cannot be used to encrypt and decrypt messages.

Source: WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 4).

Note: key agreement, is different from key exchange, the functionality used by the other asymmetric algorithms.

References:

AIO, third edition Cryptography (Page 632)

AIO, fourth edition Cryptography (Page 709)

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### QUESTION 847

A one-way hash provides which of the following?

- A. Confidentiality
- B. Availability
- C. Integrity
- D. Authentication

Answer: C

Explanation: A one-way hash is a function that takes a variable-length string a message, and compresses and transforms it into a fixed length value referred to as a hash value. It provides integrity, but no confidentiality, availability or authentication.

Source: WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 5).

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**QUESTION 848**

Which of the following is not a one-way hashing algorithm?

- A. MD2
- B. RC4
- C. SHA-1
- D. HAVAL

Answer: B

Explanation: RC4 was designed by Ron Rivest of RSA Security in 1987. While it is officially termed "Rivest Cipher 4", the RC acronym is alternatively understood to stand for "Ron's Code" (see also RC2, RC5 and RC6).

RC4 was initially a trade secret, but in September 1994 a description of it was anonymously posted to the Cypherpunks mailing list. It was soon posted on the sci.crypt newsgroup, and from there to many sites on the Internet. The leaked code was confirmed to be genuine as its output was found to match that of proprietary software using licensed RC4. Because the algorithm is known, it is no longer a trade secret. The name RC4 is trademarked, so RC4 is often referred to as ARCFOUR or ARC4 (meaning alleged RC4) to avoid trademark problems. RSA Security has never officially released the algorithm; Rivest has, however, linked to the English Wikipedia article on RC4 in his own course notes. RC4 has become part of some commonly used encryption protocols and standards, including WEP and WPA for wireless cards and TLS.

The main factors in RC4's success over such a wide range of applications are its speed and simplicity: efficient implementations in both software and hardware are very easy to develop.

The following answer were not correct choices:

SHA-1 is a one-way hashing algorithms. SHA-1 is a cryptographic hash function designed by the United States National Security Agency and published by the United States NIST as a U.S. Federal Information Processing Standard. SHA stands for "secure hash algorithm".

The three SHA algorithms are structured differently and are distinguished as SHA-0, SHA-1, and SHA-2. SHA-1 is very similar to SHA-0, but corrects an error in the original SHA hash specification that led to significant weaknesses. The SHA-0 algorithm was not adopted by many applications.

SHA-2 on the other hand significantly differs from the SHA-1 hash function.

SHA-1 is the most widely used of the existing SHA hash functions, and is employed in several widely used security applications and protocols. In 2005, security flaws were identified in SHA-1, namely that a mathematical weakness might exist, indicating that a stronger hash function would be desirable. Although no successful attacks have yet been reported on the SHA-2 variants, they are algorithmically similar to SHA-1 and so efforts are underway to develop improved alternatives. A new hash standard, SHA-3, is currently under development — an ongoing NIST hash function competition is scheduled to end with the selection of a winning function in 2012.

SHA-1 produces a 160-bit message digest based on principles similar to those used by Ronald L. Rivest of MIT in the design of the MD4 and MD5 message digest algorithms, but has a more conservative design.

MD2 is a one-way hashing algorithms. The MD2 Message-Digest Algorithm is a cryptographic hash function developed by Ronald Rivest in 1989. The algorithm is optimized for 8-bit computers. MD2 is specified in RFC 1319. Although MD2 is no longer considered secure, even as of 2010 it remains in use in public key infrastructures as part of certificates generated with MD2 and RSA.

Haval is a one-way hashing algorithms. HAVAL is a cryptographic hash function. Unlike MD5, but like most modern cryptographic hash functions, HAVAL can produce hashes of different lengths. HAVAL can produce hashes in lengths of 128 bits, 160 bits, 192 bits, 224 bits, and 256 bits. HAVAL also allows users to specify the number of rounds (3, 4, or 5) to be used to generate the hash.

The following reference(s) were used for this question:

SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

and

<https://en.wikipedia.org/wiki/HAVAL>

and

[https://en.wikipedia.org/wiki/MD2\\_%28cryptography%29](https://en.wikipedia.org/wiki/MD2_%28cryptography%29)

and

<https://en.wikipedia.org/wiki/SHA-1>

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### QUESTION 849

Which of the following statements pertaining to key management is incorrect?

- A. The more a key is used, the shorter its lifetime should be.
- B. When not using the full keyspace, the key should be extremely random.
- C. Keys should be backed up or escrowed in case of emergencies.
- D. A key's lifetime should correspond with the sensitivity of the data it is protecting.

Answer: B

Explanation: A key should always be using the full spectrum of the keyspace and be extremely random. Other statements are correct.

Source: WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 6).

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### QUESTION 850

Which of the following statements pertaining to link encryption is false?

- A. It encrypts all the data along a specific communication path.
- B. It provides protection against packet sniffers and eavesdroppers.
- C. Information stays encrypted from one end of its journey to the other.
- D. User information, header, trailers, addresses and routing data that are part of the packets are encrypted.

Answer: C

Explanation: When using link encryption, packets have to be decrypted at each hop and encrypted again.

Information staying encrypted from one end of its journey to the other is a characteristic of end-to-end encryption, not link encryption.

Link Encryption vs. End-to-End Encryption

Link encryption encrypts the entire packet, including headers and trailers, and has to be decrypted at each hop.

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End-to-end encryption does not encrypt the IP Protocol headers, and therefore does not need to be decrypted at each hop.

Reference: All in one, Page 735 & Glossary

and

Source: WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 6).

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### QUESTION 851

Which of the following should be used as a replacement for Telnet for secure remote login over an insecure network?

- A. S-Telnet
- B. SSL
- C. Rlogin
- D. SSH

Answer: D

Explanation: SSH is a protocol for secure remote login and other secure network services over an insecure network. It consists of three major components: a transport layer protocol (providing server authentication, confidentiality, and integrity), a user authentication protocol (authenticating the client-side user to the server) and a connection protocol (multiplexing the encrypted tunnel into several logical channels). It should be used instead of Telnet, FTP, rlogin, rexec and rsh.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

And: WALLHOFF, John, CBK#5 Cryptography (CISSP Study Guide), April 2002 (page 8).

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### QUESTION 852

Cryptography does not concern itself with which of the following choices?

- A. Availability
- B. Integrity
- C. Confidentiality
- D. Validation

Answer: D

Explanation: The cryptography domain addresses the principles, means, and methods of disguising information to ensure its integrity, confidentiality, and authenticity. Unlike the other domains, cryptography does not completely support the standard of availability.

Availability

Cryptography supports all three of the core principles of information security. Many access control systems use cryptography to limit access to systems through the use of passwords. Many tokenbased authentication systems use cryptographic-based hash algorithms to compute one-time passwords. Denying unauthorized access prevents an attacker from entering and damaging the system or network, thereby denying access to authorized users if they damage or corrupt the data.

Confidentiality

Cryptography provides confidentiality through altering or hiding a message so that ideally it cannot

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be understood by anyone except the intended recipient.

#### Integrity

Cryptographic tools provide integrity checks that allow a recipient to verify that a message has not been altered. Cryptographic tools cannot prevent a message from being altered, but they are effective to detect either intentional or accidental modification of the message.

**Additional Features of Cryptographic Systems** In addition to the three core principles of information security listed above, cryptographic tools provide several more benefits.

#### Nonrepudiation

In a trusted environment, the authentication of the origin can be provided through the simple control of the keys. The receiver has a level of assurance that the message was encrypted by the sender, and the sender has trust that the message was not altered once it was received. However, in a more stringent, less trustworthy environment, it may be necessary to provide assurance via a third party of who sent a message and that the message was indeed delivered to the right recipient. This is accomplished through the use of digital signatures and public key encryption. The use of these tools provides a level of nonrepudiation of origin that can be verified by a third party. Once a message has been received, what is to prevent the recipient from changing the message and contesting that the altered message was the one sent by the sender? The nonrepudiation of delivery prevents a recipient from changing the message and falsely claiming that the message is in its original state. This is also accomplished through the use of public key cryptography and digital signatures and is verifiable by a trusted third party.

#### Authentication

Authentication is the ability to determine if someone or something is what it declares to be. This is primarily done through the control of the keys, because only those with access to the key are able to encrypt a message. This is not as strong as the nonrepudiation of origin, which will be reviewed shortly. Cryptographic functions use several methods to ensure that a message has not been changed or altered. These include hash functions, digital signatures, and message authentication codes (MACs). The main concept is that the recipient is able to detect any change that has been made to a message, whether accidentally or intentionally.

#### Access Control

Through the use of cryptographic tools, many forms of access control are supported—from log-ins via passwords and passphrases to the prevention of access to confidential files or messages. In all cases, access would only be possible for those individuals that had access to the correct cryptographic keys.

#### NOTE FROM CLEMENT:

As you have seen this question was very recently updated with the latest content of the Official ISC2 Guide (OIG) to the CISSP CBK, Version 3.

Myself, I agree with most of you that cryptography does not help on the availability side and it is even the contrary sometimes if you loose the key for example. In such case you would loose access to the data and negatively impact availability. But the ISC2 is not about what I think or what you think, they have their own view of the world where they claim and state clearly that cryptography does address availability even thou it does not fully address it.

They look at crypto as the ever encompassing tool it has become today. Where it can be used for authentication purpose for example where it would help to avoid corruption of the data through illegal access by an unauthorized user.

The question is worded this way in purpose, it is VERY specific to the CISSP exam context where ISC2 preaches that cryptography address availability even thou they state it does not fully address

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it. This is something new in the last edition of their book and something you must be aware of.

Best regards

Clement

The following terms are from the Software Development Security domain:

Validation: The assurance that a product, service, or system meets the needs of the customer and other identified stakeholders. It often involves acceptance and suitability with external customers.  
Contrast with verification below."

Verification: The evaluation of whether or not a product, service, or system complies with a regulation, requirement, specification, or imposed condition. It is often an internal process.  
Contrast with validation."

The terms above are from the Software Development Security Domain.

Reference(s) used for this question:

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Cryptography (Kindle Locations 227-244). . Kindle Edition.

and

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Cryptography (Kindle Locations 206-227). . Kindle Edition.

and

[http://en.wikipedia.org/wiki/Verification\\_and\\_validation](http://en.wikipedia.org/wiki/Verification_and_validation)

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### QUESTION 853

Which of the following does NOT concern itself with key management?

- A. Internet Security Association Key Management Protocol (ISAKMP)
- B. Diffie-Hellman (DH)
- C. Cryptology (CRYPTO)
- D. Key Exchange Algorithm (KEA)

Answer: C

Explanation: Cryptology is the science that includes both cryptography and cryptanalysis and is not directly concerned with key management. Cryptology is the mathematics, such as number theory, and the application of formulas and algorithms, that underpin cryptography and cryptanalysis.

The following are all concerned with Key Management which makes them the wrong choices:  
Internet Security Association Key Management Protocol (ISAKMP) is a key management protocol used by IPsec. ISAKMP (Internet Security Association and Key Management Protocol) is a protocol defined by RFC 2408 for establishing Security Associations (SA) and cryptographic keys in an Internet environment. ISAKMP only provides a framework for authentication and key exchange. The actual key exchange is done by the Oakley Key Determination Protocol which is a key-agreement protocol that allows authenticated parties to exchange keying material across an insecure connection using the Diffie-Hellman key exchange algorithm.

Diffie-Hellman and one variation of the Diffie-Hellman algorithm called the Key Exchange Algorithm (KEA) are also key exchange protocols. Key exchange (also known as "key establishment") is any method in cryptography by which cryptographic keys are exchanged between users, allowing use of a cryptographic algorithm. Diffie–Hellman key exchange (D–H) is a

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specific method of exchanging keys. It is one of the earliest practical examples of key exchange implemented within the field of cryptography. The Diffie–Hellman key exchange method allows two parties that have no prior knowledge of each other to jointly establish a shared secret key over an insecure communications channel. This key can then be used to encrypt subsequent communications using a symmetric key cipher.

Reference(s) used for this question:

Mike Meyers CISSP Certification Passport, by Shon Harris and Mike Meyers, page 228.

It is highlighted as an EXAM TIP. Which tells you that it is a must know for the purpose of the exam.

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, Fifth Edition, Chapter 8: Cryptography (page 713-715).

and

<https://en.wikipedia.org/wiki/ISAKMP>

and

<http://searchsecurity.techtarget.com/definition/cryptology>

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### QUESTION 854

Which of the following encryption algorithms does not deal with discrete logarithms?

- A. El Gamal
- B. Diffie-Hellman
- C. RSA
- D. Elliptic Curve

Answer: C

Explanation: The security of the RSA system is based on the assumption that factoring the product into two original large prime numbers is difficult

Source:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 159).

Shon Harris, CISSP All-in-One Examine Guide, Third Edition, McGraw-Hill Companies, August 2005, Chapter 8: Cryptography, Page 636 – 639

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### QUESTION 855

Which of the following statements pertaining to message digests is incorrect?

- A. The original file cannot be created from the message digest.
- B. Two different files should not have the same message digest.
- C. The message digest should be calculated using at least 128 bytes of the file.
- D. Messages digests are usually of fixed size.

Answer: C

Explanation: A message digest should be calculated using all of the original file's data, not the first 128 bytes.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 160).

**QUESTION 856**

Which type of attack is based on the probability of two different messages using the same hash function producing a common message digest?

- A. Differential cryptanalysis
- B. Differential linear cryptanalysis
- C. Birthday attack
- D. Statistical attack

Answer: C

Explanation: A Birthday attack is usually applied to the probability of two different messages using the same hash function producing a common message digest.

The term "birthday" comes from the fact that in a room with 23 people, the probability of two or more people having the same birthday is greater than 50%.

Linear cryptanalysis is a general form of cryptanalysis based on finding affine approximations to the action of a cipher. Attacks have been developed for block ciphers and stream ciphers. Linear cryptanalysis is one of the two most widely used attacks on block ciphers; the other being differential cryptanalysis.

Differential Cryptanalysis is a potent cryptanalytic technique introduced by Biham and Shamir. Differential cryptanalysis is designed for the study and attack of DES-like cryptosystems. A DES-like cryptosystem is an iterated cryptosystem which relies on conventional cryptographic techniques such as substitution and diffusion.

Differential cryptanalysis is a general form of cryptanalysis applicable primarily to block ciphers, but also to stream ciphers and cryptographic hash functions. In the broadest sense, it is the study of how differences in an input can affect the resultant difference at the output. In the case of a block cipher, it refers to a set of techniques for tracing differences through the network of transformations, discovering where the cipher exhibits non-random behaviour, and exploiting such properties to recover the secret key.

Source:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 163).

and

[http://en.wikipedia.org/wiki/Differential\\_cryptanalysis](http://en.wikipedia.org/wiki/Differential_cryptanalysis)

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**QUESTION 857**

Which of the following elements is NOT included in a Public Key Infrastructure (PKI)?

- A. Timestamping
- B. Repository
- C. Certificate revocation
- D. Internet Key Exchange (IKE)

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Answer: D

Explanation: Other elements are included in a PKI.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 165).

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### QUESTION 858

Which of the following was developed in order to protect against fraud in electronic fund transfers (EFT) by ensuring the message comes from its claimed originator and that it has not been altered in transmission?

- A. Secure Electronic Transaction (SET)
- B. Message Authentication Code (MAC)
- C. Cyclic Redundancy Check (CRC)
- D. Secure Hash Standard (SHS)

Answer: B

Explanation: In order to protect against fraud in electronic fund transfers (EFT), the Message Authentication Code (MAC), ANSI X9.9, was developed. The MAC is a check value, which is derived from the contents of the message itself, that is sensitive to the bit changes in a message. It is similar to a Cyclic Redundancy Check (CRC).

The aim of message authentication in computer and communication systems is to verify that the message comes from its claimed originator and that it has not been altered in transmission. It is particularly needed for EFT Electronic Funds Transfer). The protection mechanism is generation of a Message Authentication Code (MAC), attached to the message, which can be recalculated by the receiver and will reveal any alteration in transit. One standard method is described in (ANSI, X9.9). Message authentication mechanisms can also be used to achieve non-repudiation of messages.

The Secure Electronic Transaction (SET) was developed by a consortium including MasterCard and VISA as a means of preventing fraud from occurring during electronic payment.

The Secure Hash Standard (SHS), NIST FIPS 180, available at

<http://www.itl.nist.gov/fipspubs/fip180-1.htm>, specifies the Secure Hash Algorithm (SHA-1).

Source:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 170)

also see:

<http://luizfirmino.blogspot.com/2011/04/message-authentication-code-mac.html>

and

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.22.2312&rep=rep1&type=pdf>

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### QUESTION 859

Which of the following statements pertaining to Secure Sockets Layer (SSL) is false?

- A. The SSL protocol was developed by Netscape to secure Internet client-server transactions.
- B. The SSL protocol's primary use is to authenticate the client to the server using public key

- cryptography and digital certificates.
- C. Web pages using the SSL protocol start with HTTPS
- D. SSL can be used with applications such as Telnet, FTP and email protocols.

Answer: B

Explanation: All of these statements pertaining to SSL are true except that its primary use is to authenticate the client to the server using public key cryptography and digital certificates. It is the opposite, Its primary use is to authenticate the server to the client.

The following reference(s) were used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 170).

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### QUESTION 860

What is the name of the protocol use to set up and manage Security Associations (SA) for IP Security (IPSec)?

- A. Internet Key Exchange (IKE)
- B. Secure Key Exchange Mechanism
- C. Oakley
- D. Internet Security Association and Key Management Protocol

Answer: A

Explanation: The Key management for IPSec is called the Internet Key Exchange (IKE)

Note: IKE underwent a series of improvements establishing IKEv2 with RFC 4306. The basis of this answer is IKEv2.

The IKE protocol is a hybrid of three other protocols: ISAKMP (Internet Security Association and Key Management Protocol), Oakley and SKEME. ISAKMP provides a framework for authentication and key exchange, but does not define them (neither authentication nor key exchange). The Oakley protocol describes a series of modes for key exchange and the SKEME protocol defines key exchange techniques.

IKE—Internet Key Exchange. A hybrid protocol that implements Oakley and Skeme key exchanges inside the ISAKMP framework. IKE can be used with other protocols, but its initial implementation is with the IPSec protocol. IKE provides authentication of the IPSec peers, negotiates IPSec keys, and negotiates IPSec security associations.

IKE is implemented in accordance with RFC 2409, The Internet Key Exchange.

The Internet Key Exchange (IKE) security protocol is a key management protocol standard that is used in conjunction with the IPSec standard. IPSec can be configured without IKE, but IKE enhances IPSec by providing additional features, flexibility, and ease of configuration for the IPSec standard.

IKE is a hybrid protocol that implements the Oakley key exchange and the SKEME key exchange inside the Internet Security Association and Key Management Protocol (ISAKMP) framework. (ISAKMP, Oakley, and SKEME are security protocols implemented by IKE.)

IKE automatically negotiates IPSec security associations (SAs) and enables IPSec secure communications without costly manual preconfiguration. Specifically, IKE provides these benefits:

- Eliminates the need to manually specify all the IPSec security parameters in the crypto maps at both peers.
- Allows you to specify a lifetime for the IPSec security association.
- Allows encryption keys to change during IPSec sessions.
- Allows IPSec to provide anti-replay services.
- Permits certification authority (CA) support for a manageable, scalable IPSec implementation.
- Allows dynamic authentication of peers.

#### About ISAKMP

The Internet Security Association and Key Management Protocol (ISAKMP) is a framework that defines the phases for establishing a secure relationship and support for negotiation of security attributes, it does not establish session keys by itself, it is used along with the Oakley session key establishment protocol. The Secure Key Exchange Mechanism (SKEME) describes a secure exchange mechanism and Oakley defines the modes of operation needed to establish a secure connection.

ISAKMP provides a framework for Internet key management and provides the specific protocol support for negotiation of security attributes. Alone, it does not establish session keys. However it can be used with various session key establishment protocols, such as Oakley, to provide a complete solution to Internet key management.

#### About Oakley

The Oakley protocol uses a hybrid Diffie-Hellman technique to establish session keys on Internet hosts and routers. Oakley provides the important security property of Perfect Forward Secrecy (PFS) and is based on cryptographic techniques that have survived substantial public scrutiny. Oakley can be used by itself, if no attribute negotiation is needed, or Oakley can be used in conjunction with ISAKMP. When ISAKMP is used with Oakley, key escrow is not feasible.

The ISAKMP and Oakley protocols have been combined into a hybrid protocol. The resolution of ISAKMP with Oakley uses the framework of ISAKMP to support a subset of Oakley key exchange modes. This new key exchange protocol provides optional PFS, full security association attribute negotiation, and authentication methods that provide both repudiation and non-repudiation.

Implementations of this protocol can be used to establish VPNs and also allow for users from remote sites (who may have a dynamically allocated IP address) access to a secure network.

#### About IPSec

The IETF's IPSec Working Group develops standards for IP-layer security mechanisms for both IPv4 and IPv6. The group also is developing generic key management protocols for use on the Internet. For more information, refer to the IP Security and Encryption Overview.

IPSec is a framework of open standards developed by the Internet Engineering Task Force (IETF) that provides security for transmission of sensitive information over unprotected networks such as the Internet. It acts at the network level and implements the following standards:

- IPSec
- Internet Key Exchange (IKE)
- Data Encryption Standard (DES)
- MD5 (HMAC variant)
- SHA (HMAC variant)
- Authentication Header (AH)
- Encapsulating Security Payload (ESP)

IPSec services provide a robust security solution that is standards-based. IPSec also provides data authentication and anti-replay services in addition to data confidentiality services.

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For more information regarding IPSec, refer to the chapter "Configuring IPSec Network Security."

#### About SKEME

SKEME constitutes a compact protocol that supports a variety of realistic scenarios and security models over Internet. It provides clear tradeoffs between security and performance as required by the different scenarios without incurring in unnecessary system complexity. The protocol supports key exchange based on public key, key distribution centers, or manual installation, and provides for fast and secure key refreshment. In addition, SKEME selectively provides perfect forward secrecy, allows for replaceability and negotiation of the underlying cryptographic primitives, and addresses privacy issues as anonymity and repudiability.

SKEME's basic mode is based on the use of public keys and a Diffie-Hellman shared secret generation.

However, SKEME is not restricted to the use of public keys, but also allows the use of a pre-shared key. This key can be obtained by manual distribution or by the intermediary of a key distribution center (KDC) such as Kerberos.

In short, SKEME contains four distinct modes:

Basic mode, which provides a key exchange based on public keys and ensures PFS thanks to Diffie-Hellman.

A key exchange based on the use of public keys, but without Diffie-Hellman.

A key exchange based on the use of a pre-shared key and on Diffie-Hellman.

A mechanism of fast rekeying based only on symmetrical algorithms.

In addition, SKEME is composed of three phases: SHARE, EXCH and AUTH.

During the SHARE phase, the peers exchange half-keys, encrypted with their respective public keys. These two half-keys are used to compute a secret key K. If anonymity is wanted, the identities of the two peers are also encrypted. If a shared secret already exists, this phase is skipped.

The exchange phase (EXCH) is used, depending on the selected mode, to exchange either Diffie-Hellman public values or nonces. The Diffie-Hellman shared secret will only be computed after the end of the exchanges.

The public values or nonces are authenticated during the authentication phase (AUTH), using the secret key established during the SHARE phase.

The messages from these three phases do not necessarily follow the order described above; in actual practice they are combined to minimize the number of exchanged messages.

References used for this question:

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 4: Cryptography (page 172).

<http://tools.ietf.org/html/rfc4306>

<http://tools.ietf.org/html/rfc4301>

[http://en.wikipedia.org/wiki/Internet\\_Key\\_Exchange](http://en.wikipedia.org/wiki/Internet_Key_Exchange)

CISCO ISAKMP and OAKLEY information

CISCO Configuring Internet Key Exchange Protocol

<http://www.hsc.fr/ressources/articles/ipsec-tech/index.html.en>

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#### QUESTION 861

Which of the following binds a subject name to a public key value?

- A. A public-key certificate

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- B. A public key infrastructure
  - C. A secret key infrastructure
  - D. A private key certificate

Answer: B

Explanation: Remember the term Public-Key Certificate is synonymous with Digital Certificate or Identity certificate.

The certificate itself provides the binding but it is the certificate authority who will go through the Certificate Practice Statements (CPS) actually validating the bindings and vouch for the identity of the owner of the key within the certificate.

As explained in Wikipedia:

In cryptography, a public key certificate (also known as a digital certificate or identity certificate) is an electronic document which uses a digital signature to bind together a public key with an identity — information such as the name of a person or an organization, their address, and so forth. The certificate can be used to verify that a public key belongs to an individual.

In a typical public key infrastructure (PKI) scheme, the signature will be of a certificate authority (CA). In a web of trust scheme such as PGP or GPG, the signature is of either the user (a selfsigned certificate) or other users ("endorsements") by getting people to sign each other keys. In either case, the signatures on a certificate are attestations by the certificate signer that the identity information and the public key belong together.

RFC 2828 defines the certification authority (CA) as:

An entity that issues digital certificates (especially X.509 certificates) and vouches for the binding between the data items in a certificate.

An authority trusted by one or more users to create and assign certificates. Optionally, the certification authority may create the user's keys.

X509 Certificate users depend on the validity of information provided by a certificate. Thus, a CA should be someone that certificate users trust, and usually holds an official position created and granted power by a government, a corporation, or some other organization. A CA is responsible for managing the life cycle of certificates and, depending on the type of certificate and the CPS that applies, may be responsible for the life cycle of key pairs associated with the certificates

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

and

[http://en.wikipedia.org/wiki/Public\\_key\\_certificate](http://en.wikipedia.org/wiki/Public_key_certificate)

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## QUESTION 862

What can be defined as a digital certificate that binds a set of descriptive data items, other than a public key, either directly to a subject name or to the identifier of another certificate that is a publickey certificate?

- A. A public-key certificate
- B. An attribute certificate
- C. A digital certificate
- D. A descriptive certificate

Answer: B

Explanation: The Internet Security Glossary (RFC2828) defines an attribute certificate as a digital certificate that binds a set of descriptive data items, other than a public key, either directly to a subject name or to the identifier of another certificate that is a public-key certificate. A public-key certificate binds a subject name to a public key value, along with information needed to perform certain cryptographic functions. Other attributes of a subject, such as a security clearance, may be certified in a separate kind of digital certificate, called an attribute certificate. A subject may have multiple attribute certificates associated with its name or with each of its public-key certificates.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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**QUESTION 863**

What can be defined as a data structure that enumerates digital certificates that were issued to CAs but have been invalidated by their issuer prior to when they were scheduled to expire?

- A. Certificate revocation list
- B. Certificate revocation tree
- C. Authority revocation list
- D. Untrusted certificate list

Answer: C

Explanation: The Internet Security Glossary (RFC2828) defines the Authority Revocation List (ARL) as a data structure that enumerates digital certificates that were issued to CAs but have been invalidated by their issuer prior to when they were scheduled to expire.

Do not confuse with an ARL with a Certificate Revocation List (CRL). A certificate revocation list is a mechanism for distributing notices of certificate revocations. The question specifically mentions "issued to CAs" which makes ARL a better answer than CRL.

<http://rfclibrary.hosting.com/rfc/rfc2828/rfc2828-29.asp>

\$ certificate revocation list (CRL)

(I) A data structure that enumerates digital certificates that have been invalidated by their issuer prior to when they were scheduled to expire. (See: certificate expiration, X.509 certificate revocation list.)

<http://rfclibrary.hosting.com/rfc/rfc2828/rfc2828-17.asp>

\$ authority revocation list (ARL)

(I) A data structure that enumerates digital certificates that were issued to CAs but have been invalidated by their issuer prior to when they were scheduled to expire. (See: certificate expiration, X.509 authority revocation list.)

In a few words: We use CRL's for end-user cert revocation and ARL's for CA cert revocation - both can be placed in distribution points.

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**QUESTION 864**

Who vouches for the binding between the data items in a digital certificate?

- A. Registration authority
- B. Certification authority
- C. Issuing authority

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D. Vouching authority

Answer: B

Explanation: A certification authority (CA) is an entity that issues digital certificates (especially X.509 certificates) and vouches for the binding between the data items in a certificate. An issuing authority could be considered a correct answer, but not the best answer, since it is too generic.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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**QUESTION 865**

What enables users to validate each other's certificate when they are certified under different certification hierarchies?

- A. Cross-certification
- B. Multiple certificates
- C. Redundant certification authorities
- D. Root certification authorities

Answer: A

Explanation: Cross-certification is the act or process by which two CAs each certify a public key of the other, issuing a public-key certificate to that other CA, enabling users that are certified under different certification hierarchies to validate each other's certificate.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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**QUESTION 866**

Which of the following would best define a digital envelope?

- A. A message that is encrypted and signed with a digital certificate.
- B. A message that is signed with a secret key and encrypted with the sender's private key.
- C. A message encrypted with a secret key attached with the message. The secret key is encrypted with the public key of the receiver.
- D. A message that is encrypted with the recipient's public key and signed with the sender's private key.

Answer: C

Explanation: It consists of a hybrid encryption scheme in sealing a message, by encrypting the data and sending both it and a protected form of the key to the intended recipient, so that one else can open the message.

In PKCS #7, it means first encrypting the data using a symmetric encryption algorithm and a secret key, and then encrypting the secret key using an asymmetric encryption algorithm and the public key of the intended recipient.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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**QUESTION 867**

What can be defined as a value computed with a cryptographic algorithm and appended to a data object in such a way that any recipient of the data can use the signature to verify the data's origin and integrity?

- A. A digital envelope
- B. A cryptographic hash
- C. A Message Authentication Code
- D. A digital signature

Answer: D

Explanation: RFC 2828 (Internet Security Glossary) defines a digital signature as a value computed with a cryptographic algorithm and appended to a data object in such a way that any recipient of the data can use the signature to verify the data's origin and integrity.

The steps to create a Digital Signature are very simple:

1. You create a Message Digest of the message you wish to send
2. You encrypt the message digest using your Private Key which is the action of Signing
3. You send the Message along with the Digital Signature to the recipient

To validate the Digital Signature the recipient will make use of the sender Public Key. Here are the steps:

1. The receiver will decrypt the Digital Signature using the sender Public Key producing a clear text message digest.
2. The receiver will produce his own message digest of the message received.
3. At this point the receiver will compare the two message digest (the one sent and the one produced by the receiver), if the two matches, it proves the authenticity of the message and it confirms that the message was not modified in transit validating the integrity as well. Digital Signatures provides for Authenticity and Integrity only. There is no confidentiality in place, if you wish to get confidentiality it would be needed for the sender to encrypt everything with the receiver public key as a last step before sending the message.

A Digital Envelope is a combination of encrypted data and its encryption key in an encrypted form that has been prepared for use of the recipient. In simple term it is a type of security that uses two layers of encryption to protect a message. First, the message itself is encoded using symmetric encryption, and then the key to decode the message is encrypted using public-key encryption. This technique overcomes one of the problems of public-key encryption, which is that it is slower than symmetric encryption. Because only the key is protected with public-key encryption, there is very little overhead.

A cryptographic hash is the result of a cryptographic hash function such as MD5, SHA-1, or SHA-2. A hash value also called a Message Digest is like a fingerprint of a message. It is used to prove integrity and ensure the message was not changed either in transit or in storage.

A Message Authentication Code (MAC) refers to an ANSI standard for a checksum that is computed with a keyed hash that is based on DES or it can also be produced without using DES by concatenating the Secret Key at the end of the message (simply adding it at the end of the message) being sent and then producing a Message digest of the Message+Secret Key together. The MAC is then attached and sent along with the message but the Secret Key is NEVER sent in clear text over the network.

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In cryptography, HMAC (Hash-based Message Authentication Code), is a specific construction for calculating a message authentication code (MAC) involving a cryptographic hash function in combination with a secret key. As with any MAC, it may be used to simultaneously verify both the data integrity and the authenticity of a message. Any cryptographic hash function, such as MD5 or SHA-1, may be used in the calculation of an HMAC; the resulting MAC algorithm is termed HMACMD5 or HMAC-SHA1 accordingly. The cryptographic strength of the HMAC depends upon the cryptographic strength of the underlying hash function, the size of its hash output length in bits and on the size and quality of the cryptographic key.

There is more than one type of MAC: Meet CBC-MAC

In cryptography, a Cipher Block Chaining Message Authentication Code, abbreviated CBC-MAC, is a technique for constructing a message authentication code from a block cipher. The message is encrypted with some block cipher algorithm in CBC mode to create a chain of blocks such that each block depends on the proper encryption of the previous block. This interdependence ensures that a change to any of the plaintext bits will cause the final encrypted block to change in a way that cannot be predicted or counteracted without knowing the key to the block cipher.

References:

SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

and

[http://www.webopedia.com/TERM/D/digital\\_envelope.html](http://www.webopedia.com/TERM/D/digital_envelope.html)

and

<http://en.wikipedia.org/wiki/CBC-MAC>

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### QUESTION 868

Which of the following can be best defined as computing techniques for inseparably embedding unobtrusive marks or labels as bits in digital data and for detecting or extracting the marks later?

- A. Steganography
- B. Digital watermarking
- C. Digital enveloping
- D. Digital signature

Answer: B

Explanation: RFC 2828 (Internet Security Glossary) defines digital watermarking as computing techniques for inseparably embedding unobtrusive marks or labels as bits in digital data-text, graphics, images, video, or audio#and for detecting or extracting the marks later. The set of embedded bits (the digital watermark) is sometimes hidden, usually imperceptible, and always intended to be unobtrusive. It is used as a measure to protect intellectual property rights.

Steganography involves hiding the very existence of a message. A digital signature is a value computed with a cryptographic algorithm and appended to a data object in such a way that any recipient of the data can use the signature to verify the data's origin and integrity. A digital envelope is a combination of encrypted data and its encryption key in an encrypted form that has been prepared for use of the recipient.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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**QUESTION 869**

Which of the following is an Internet IPsec protocol to negotiate, establish, modify, and delete security associations, and to exchange key generation and authentication data, independent of the details of any specific key generation technique, key establishment protocol, encryption algorithm, or authentication mechanism?

- A. OAKLEY
- B. Internet Security Association and Key Management Protocol (ISAKMP)
- C. Simple Key-management for Internet Protocols (SKIP)
- D. IPsec Key exchange (IKE)

Answer: B

Explanation: RFC 2828 (Internet Security Glossary) defines the Internet Security Association and Key Management Protocol (ISAKMP) as an Internet IPsec protocol to negotiate, establish, modify, and delete security associations, and to exchange key generation and authentication data, independent of the details of any specific key generation technique, key establishment protocol, encryption algorithm, or authentication mechanism. Simple Key-management for Internet Protocols (SKIP) is a key distribution protocol that uses hybrid encryption to convey session keys that are used to encrypt data in IP packets. OAKLEY is a key establishment protocol (proposed for IPsec but superseded by IKE) based on the Diffie-Hellman algorithm and designed to be a compatible component of ISAKMP. IPsec Key Exchange (IKE) is an Internet, IPsec, keyestablishment protocol [R2409] (partly based on OAKLEY) that is intended for putting in place authenticated keying material for use with ISAKMP and for other security associations, such as in AH and ESP.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

**QUESTION 870**

Which of the following is defined as a key establishment protocol based on the Diffie-Hellman algorithm proposed for IPsec but superseded by IKE?

- A. Diffie-Hellman Key Exchange Protocol
- B. Internet Security Association and Key Management Protocol (ISAKMP)
- C. Simple Key-management for Internet Protocols (SKIP)
- D. OAKLEY

Answer: D

Explanation: RFC 2828 (Internet Security Glossary) defines OAKLEY as a key establishment protocol (proposed for IPsec but superseded by IKE) based on the Diffie-Hellman algorithm and designed to be a compatible component of ISAKMP.

ISAKMP is an Internet IPsec protocol to negotiate, establish, modify, and delete security associations, and to exchange key generation and authentication data, independent of the details of any specific key generation technique, key establishment protocol, encryption algorithm, or authentication mechanism.

SKIP is a key distribution protocol that uses hybrid encryption to convey session keys that are

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used to encrypt data in IP packets.

ISAKMP provides a framework for authentication and key exchange but does not define them. ISAKMP is designed to be key exchange independent; that is, it is designed to support many different key exchanges.

Oakley and SKEME each define a method to establish an authenticated key exchange. This includes payloads construction, the information payloads carry, the order in which they are processed and how they are used.

Oakley describes a series of key exchanges-- called modes and details the services provided by each (e.g. perfect forward secrecy for keys, identity protection, and authentication).

SKEME describes a versatile key exchange technique which provides anonymity, repudiability, and quick key refreshment.

RFC 2049 describes the IKE protocol using part of Oakley and part of SKEME in conjunction with ISAKMP to obtain authenticated keying material for use with ISAKMP, and for other security associations such as AH and ESP for the IETF IPsec DOI.

While Oakley defines "modes", ISAKMP defines "phases". The relationship between the two is very straightforward and IKE presents different exchanges as modes which operate in one of two phases.

Phase 1 is where the two ISAKMP peers establish a secure, authenticated channel with which to communicate. This is called the ISAKMP Security Association (SA). "Main Mode" and "Aggressive Mode" each accomplish a phase 1 exchange. "Main Mode" and "Aggressive Mode" MUST ONLY be used in phase 1.

Phase 2 is where Security Associations are negotiated on behalf of services such as IPsec or any other service which needs key material and/or parameter negotiation. "Quick Mode" accomplishes a phase 2 exchange. "Quick Mode" MUST ONLY be used in phase 2.

#### References:

CISSP: Certified Information Systems Security Professional Study Guide By James Michael Stewart, Ed Tittel, Mike Chappl, page 397

RFC 2049 at: <http://www.ietf.org/rfc/rfc2409>

SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

The All-in-one CISSP Exam Guide, 3rd Edition, by Shon Harris, page 674

The CISSP and CAP Prep Guide, Platinum Edition, by Krutz and Vines

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### QUESTION 871

Which of the following is defined as an Internet, IPsec, key-establishment protocol, partly based on OAKLEY, that is intended for putting in place authenticated keying material for use with ISAKMP and for other security associations?

- A. Internet Key exchange (IKE)
- B. Security Association Authentication Protocol (SAAP)
- C. Simple Key-management for Internet Protocols (SKIP)
- D. Key Exchange Algorithm (KEA)

Answer: A

Explanation: RFC 2828 (Internet Security Glossary) defines IKE as an Internet, IPsec, keyestablishment protocol (partly based on OAKLEY) that is intended for putting in place

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authenticated keying material for use with ISAKMP and for other security associations, such as in AH and ESP.

The following are incorrect answers:

SKIP is a key distribution protocol that uses hybrid encryption to convey session keys that are used to encrypt data in IP packets.

The Key Exchange Algorithm (KEA) is defined as a key agreement algorithm that is similar to the Diffie-Hellman algorithm, uses 1024-bit asymmetric keys, and was developed and formerly classified at the secret level by the NSA.

Security Association Authentication Protocol (SAAP) is a distracter.

Reference(s) used for this question:

SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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### QUESTION 872

Which of the following can best be defined as a key distribution protocol that uses hybrid encryption to convey session keys. This protocol establishes a long-term key once, and then requires no prior communication in order to establish or exchange keys on a session-by-session basis?

- A. Internet Security Association and Key Management Protocol (ISAKMP)
- B. Simple Key-management for Internet Protocols (SKIP)
- C. Diffie-Hellman Key Distribution Protocol
- D. IPsec Key exchange (IKE)

Answer: B

Explanation: RFC 2828 (Internet Security Glossary) defines Simple Key Management for Internet Protocols (SKIP) as:

A key distribution protocol that uses hybrid encryption to convey session keys that are used to encrypt data in IP packets.

SKIP is an hybrid Key distribution protocol similar to SSL, except that it establishes a long-term key once, and then requires no prior communication in order to establish or exchange keys on a session-by-session basis. Therefore, no connection setup overhead exists and new keys values are not continually generated. SKIP uses the knowledge of its own secret key or private component and the destination's public component to calculate a unique key that can only be used between them.

IKE stand for Internet Key Exchange, it makes use of ISAKMP and OAKLEY internally.

Internet Key Exchange (IKE or IKEv2) is the protocol used to set up a security association (SA) in the IPsec protocol suite. IKE builds upon the Oakley protocol and ISAKMP. IKE uses X.509 certificates for authentication and a Diffie–Hellman key exchange to set up a shared session secret from which cryptographic keys are derived.

The following are incorrect answers:

ISAKMP is an Internet IPsec protocol to negotiate, establish, modify, and delete security associations, and to exchange key generation and authentication data, independent of the details of any specific key generation technique, key establishment protocol, encryption algorithm, or authentication mechanism.

IKE is an Internet, IPsec, key-establishment protocol (partly based on OAKLEY) that is intended

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for putting in place authenticated keying material for use with ISAKMP and for other security associations, such as in AH and ESP.

IPsec Key exchange (IKE) is only a detracto.

Reference(s) used for this question:

SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

and

[http://en.wikipedia.org/wiki/Simple\\_Key-Management\\_for\\_Internet\\_Protocol](http://en.wikipedia.org/wiki/Simple_Key-Management_for_Internet_Protocol)

and

[http://en.wikipedia.org/wiki/Simple\\_Key-Management\\_for\\_Internet\\_Protocol](http://en.wikipedia.org/wiki/Simple_Key-Management_for_Internet_Protocol)

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### QUESTION 873

Which of the following can best be defined as a key recovery technique for storing knowledge of a cryptographic key by encrypting it with another key and ensuring that that only certain third parties can perform the decryption operation to retrieve the stored key?

- A. Key escrow
- B. Fair cryptography
- C. Key encapsulation
- D. Zero-knowledge recovery

Answer: C

Explanation: RFC 2828 (Internet Security Glossary) defines Key recovery as a process for learning the value of a cryptographic key that was previously used to perform some cryptographic operation.

Key encapsulation is one class of key recovery techniques and is defined as a key recovery technique for storing knowledge of a cryptographic key by encrypting it with another key and ensuring that that only certain third parties called "recovery agents" can perform the decryption operation to retrieve the stored key. Key encapsulation typically allows direct retrieval of the secret key used to provide data confidentiality.

The other class of key recovery technique is Key escrow, defined as a technique for storing knowledge of a cryptographic key or parts thereof in the custody of one or more third parties called "escrow agents", so that the key can be recovered and used in specified circumstances.

Fair public-key cryptography is a key splitting method proposed by Silvio Micali in which the pieces of a private key can be individually verified by the Key Escrow Agencies to be correct, without having to reconstruct the key.

Zero-knowledge is used in a zero-knowledge proof, where a prover convinces a verifier of a statement (with high probability) without revealing any information about how to go about proving that statement.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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### QUESTION 874

Which of the following can best be defined as a cryptanalysis technique in which the analyst tries to determine the key from knowledge of some plaintext-ciphertext pairs?

- A. A known-plaintext attack

- B. A known-algorithm attack
- C. A chosen-ciphertext attack
- D. A chosen-plaintext attack

Answer: A

Explanation: RFC2828 (Internet Security Glossary) defines a known-plaintext attack as a cryptanalysis technique in which the analyst tries to determine the key from knowledge of some plaintext-ciphertext pairs (although the analyst may also have other clues, such as the knowing the cryptographic algorithm). A chosen-ciphertext attack is defined as a cryptanalysis technique in which the analyst tries to determine the key from knowledge of plaintext that corresponds to ciphertext selected (i.e., dictated) by the analyst. A chosen-plaintext attack is a cryptanalysis technique in which the analyst tries to determine the key from knowledge of ciphertext that corresponds to plaintext selected (i.e., dictated) by the analyst. The other choice is a distracter.

The following are incorrect answers:

A chosen-plaintext attacks

The attacker has the plaintext and ciphertext, but can choose the plaintext that gets encrypted to see the corresponding ciphertext. This gives her more power and possibly a deeper understanding of the way the encryption process works so she can gather more information about the key being used. Once the key is discovered, other messages encrypted with that key can be decrypted.

A chosen-ciphertext attack

In chosen-ciphertext attacks, the attacker can choose the ciphertext to be decrypted and has access to the resulting decrypted plaintext. Again, the goal is to figure out the key. This is a harder attack to carry out compared to the previously mentioned attacks, and the attacker may need to have control of the system that contains the cryptosystem.

A known-algorithm attack

Knowing the algorithm does not give you much advantage without knowing the key. This is a bogus detractor. The algorithm should be public, which is the Kerckhoff's Principle . The only secret should be the key.

Reference(s) used for this question:

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 866). McGraw-Hill. Kindle Edition.

and

Kerckhoff's Principle

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## QUESTION 875

Which of the following is NOT a property of a one-way hash function?

- A. It converts a message of a fixed length into a message digest of arbitrary length.
- B. It is computationally infeasible to construct two different messages with the same digest.
- C. It converts a message of arbitrary length into a message digest of a fixed length.
- D. Given a digest value, it is computationally infeasible to find the corresponding message.

Answer: A

Explanation: An algorithm that turns messages or text into a fixed string of digits, usually for security or data management purposes. The "one way" means that it's nearly impossible to derive the original text from the string.

A one-way hash function is used to create digital signatures, which in turn identify and authenticate the sender and message of a digitally distributed message.

A cryptographic hash function is a deterministic procedure that takes an arbitrary block of data and returns a fixed-size bit string, the (cryptographic) hash value, such that an accidental or intentional change to the data will change the hash value. The data to be encoded is often called the "message," and the hash value is sometimes called the message digest or simply digest.

The ideal cryptographic hash function has four main or significant properties:

it is easy (but not necessarily quick) to compute the hash value for any given message

it is infeasible to generate a message that has a given hash

it is infeasible to modify a message without changing the hash

it is infeasible to find two different messages with the same hash

Cryptographic hash functions have many information security applications, notably in digital signatures, message authentication codes (MACs), and other forms of authentication. They can also be used as ordinary hash functions, to index data in hash tables, for fingerprinting, to detect duplicate data or uniquely identify files, and as checksums to detect accidental data corruption. Indeed, in information security contexts, cryptographic hash values are sometimes called (digital) fingerprints, checksums, or just hash values, even though all these terms stand for functions with rather different properties and purposes.

Source:

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

and

[http://en.wikipedia.org/wiki/Cryptographic\\_hash\\_function](http://en.wikipedia.org/wiki/Cryptographic_hash_function)

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### QUESTION 876

The Data Encryption Algorithm performs how many rounds of substitution and permutation?

- A. 4
- B. 16
- C. 54
- D. 64

Answer: B

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 877

Which of the following statements is most accurate regarding a digital signature?

- A. It is a method used to encrypt confidential data.
- B. It is the art of transferring handwritten signature to electronic media.
- C. It allows the recipient of data to prove the source and integrity of data.
- D. It can be used as a signature system and a cryptosystem.

Answer: C

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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**QUESTION 878**

The computations involved in selecting keys and in enciphering data are complex, and are not practical for manual use. However, using mathematical properties of modular arithmetic and a method known as "\_\_\_\_\_," RSA is quite feasible for computer use.

- A. computing in Galois fields
- B. computing in Gladden fields
- C. computing in Gallipoli fields
- D. computing in Galbraith fields

Answer: A

Explanation: The computations involved in selecting keys and in enciphering data are complex, and are not practical for manual use. However, using mathematical properties of modular arithmetic and a method known as computing in Galois fields, RSA is quite feasible for computer use.

Source: FITES, Philip E., KRATZ, Martin P., Information Systems Security: A Practitioner's Reference, 1993, Van Nostrand Reinhold, page 44.

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**QUESTION 879**

Which of the following concerning the Rijndael block cipher algorithm is false?

- A. The design of Rijndael was strongly influenced by the design of the block cipher Square.
- B. A total of 25 combinations of key length and block length are possible
- C. Both block size and key length can be extended to multiples of 64 bits.
- D. The cipher has a variable block length and key length.

Answer: C

Explanation: The answer above is the correct answer because it is FALSE. Rijndael does not support multiples of 64 bits but multiples of 32 bits in the range of 128 bits to 256 bits. Key length could be 128, 160, 192, 224, and 256.

Both block length and key length can be extended very easily to multiples of 32 bits. For a total combination of 25 different block and key size that are possible.

The Rijndael Cipher

Rijndael is a block cipher, designed by Joan Daemen and Vincent Rijmen as a candidate algorithm for the Advanced Encryption Standard (AES) in the United States of America. The cipher has a variable block length and key length.

Rijndael can be implemented very efficiently on a wide range of processors and in hardware.

The design of Rijndael was strongly influenced by the design of the block cipher Square.

The Advanced Encryption Standard (AES)

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The Advanced Encryption Standard (AES) keys are defined to be either 128, 192, or 256 bits in accordance with the requirements of the AES.

The number of rounds, or iterations of the main algorithm, can vary from 10 to 14 within the Advanced Encryption Standard (AES) and is dependent on the block size and key length. 128 bits keys uses 10 rounds or encryptions, 192 bits keys uses 12 rounds of encryption, and 256 bits keys uses 14 rounds of encryption.

The low number of rounds has been one of the main criticisms of Rijndael, but if this ever becomes a problem the number of rounds can easily be increased at little extra cost performance wise by increasing the block size and key length.

#### Range of key and block lengths in Rijndael and AES

Rijndael and AES differ only in the range of supported values for the block length and cipher key length.

For Rijndael, the block length and the key length can be independently specified to any multiple of 32 bits, with a minimum of 128 bits, and a maximum of 256 bits. The support for block and key lengths 160 and 224 bits was introduced in Joan Daemen and Vincent Rijmen, AES submission document on Rijndael, Version 2, September 1999 available at

<http://csrc.nist.gov/archive/aes/rijndael/Rijndael-ammended.pdf>

AES fixes the block length to 128 bits, and supports key lengths of 128, 192 or 256 bits only.

Reference used for this question:

The Rijndael Page

and

<http://csrc.nist.gov/archive/aes/rijndael/Rijndael-ammended.pdf>

and

FIPS PUB 197, Advanced Encryption Standard (AES), National Institute of Standards and Technology, U.S. Department of Commerce, November 2001.

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### QUESTION 880

This type of attack is generally most applicable to public-key cryptosystems, what type of attack am I?

- A. Chosen-Ciphertext attack
- B. Ciphertext-only attack
- C. Plaintext Only Attack
- D. Adaptive-Chosen-Plaintext attack

Answer: A

Explanation: A chosen-ciphertext attack is one in which cryptanalyst may choose a piece of ciphertext and attempt to obtain the corresponding decrypted plaintext. This type of attack is generally most applicable to public-key cryptosystems.

A chosen-ciphertext attack (CCA) is an attack model for cryptanalysis in which the cryptanalyst gathers information, at least in part, by choosing a ciphertext and obtaining its decryption under an unknown key. In the attack, an adversary has a chance to enter one or more known ciphertexts into the system and obtain the resulting plaintexts. From these pieces of information the adversary can attempt to recover the hidden secret key used for decryption.

A number of otherwise secure schemes can be defeated under chosen-ciphertext attack. For

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example, the El Gamal cryptosystem is semantically secure under chosen-plaintext attack, but this semantic security can be trivially defeated under a chosen-ciphertext attack. Early versions of RSA padding used in the SSL protocol were vulnerable to a sophisticated adaptive chosen-ciphertext attack which revealed SSL session keys. Chosen-ciphertext attacks have implications for some self-synchronizing stream ciphers as well. Designers of tamper-resistant cryptographic smart cards must be particularly cognizant of these attacks, as these devices may be completely under the control of an adversary, who can issue a large number of chosen-ciphertexts in an attempt to recover the hidden secret key.

According to RSA:

Cryptanalytic attacks are generally classified into six categories that distinguish the kind of information the cryptanalyst has available to mount an attack. The categories of attack are listed here roughly in increasing order of the quality of information available to the cryptanalyst, or, equivalently, in decreasing order of the level of difficulty to the cryptanalyst. The objective of the cryptanalyst in all cases is to be able to decrypt new pieces of ciphertext without additional information. The ideal for a cryptanalyst is to extract the secret key.

A ciphertext-only attack is one in which the cryptanalyst obtains a sample of ciphertext, without the plaintext associated with it. This data is relatively easy to obtain in many scenarios, but a successful ciphertext-only attack is generally difficult, and requires a very large ciphertext sample. Such attack was possible on cipher using Code Book Mode where frequency analysis was being used and even thou only the ciphertext was available, it was still possible to eventually collect enough data and decipher it without having the key.

A known-plaintext attack is one in which the cryptanalyst obtains a sample of ciphertext and the corresponding plaintext as well. The known-plaintext attack (KPA) or crib is an attack model for cryptanalysis where the attacker has samples of both the plaintext and its encrypted version (ciphertext), and is at liberty to make use of them to reveal further secret information such as secret keys and code books.

A chosen-plaintext attack is one in which the cryptanalyst is able to choose a quantity of plaintext and then obtain the corresponding encrypted ciphertext. A chosen-plaintext attack (CPA) is an attack model for cryptanalysis which presumes that the attacker has the capability to choose arbitrary plaintexts to be encrypted and obtain the corresponding ciphertexts. The goal of the attack is to gain some further information which reduces the security of the encryption scheme. In the worst case, a chosen-plaintext attack could reveal the scheme's secret key.

This appears, at first glance, to be an unrealistic model; it would certainly be unlikely that an attacker could persuade a human cryptographer to encrypt large amounts of plaintexts of the attacker's choosing. Modern cryptography, on the other hand, is implemented in software or hardware and is used for a diverse range of applications; for many cases, a chosen-plaintext attack is often very feasible. Chosen-plaintext attacks become extremely important in the context of public key cryptography, where the encryption key is public and attackers can encrypt any plaintext they choose.

Any cipher that can prevent chosen-plaintext attacks is then also guaranteed to be secure against known-plaintext and ciphertext-only attacks; this is a conservative approach to security.

Two forms of chosen-plaintext attack can be distinguished:

Batch chosen-plaintext attack, where the cryptanalyst chooses all plaintexts before any of them are encrypted. This is often the meaning of an unqualified use of "chosen-plaintext attack".

Adaptive chosen-plaintext attack, is a special case of chosen-plaintext attack in which the cryptanalyst is able to choose plaintext samples dynamically, and alter his or her choices based on

the results of previous encryptions. The cryptanalyst makes a series of interactive queries, choosing subsequent plaintexts based on the information from the previous encryptions. Non-randomized (deterministic) public key encryption algorithms are vulnerable to simple "dictionary"-type attacks, where the attacker builds a table of likely messages and their corresponding ciphertexts. To find the decryption of some observed ciphertext, the attacker simply looks the ciphertext up in the table. As a result, public-key definitions of security under chosenplaintext attack require probabilistic encryption (i.e., randomized encryption). Conventional symmetric ciphers, in which the same key is used to encrypt and decrypt a text, may also be vulnerable to other forms of chosen-plaintext attack, for example, differential cryptanalysis of block ciphers.

An adaptive-chosen-ciphertext is the adaptive version of the above attack. A cryptanalyst can mount an attack of this type in a scenario in which he has free use of a piece of decryption hardware, but is unable to extract the decryption key from it.

An adaptive chosen-ciphertext attack (abbreviated as CCA2) is an interactive form of chosen-ciphertext attack in which an attacker sends a number of ciphertexts to be decrypted, then uses the results of these decryptions to select subsequent ciphertexts. It is to be distinguished from an indifferent chosen-ciphertext attack (CCA1).

The goal of this attack is to gradually reveal information about an encrypted message, or about the decryption key itself. For public-key systems, adaptive-chosen-ciphertexts are generally applicable only when they have the property of ciphertext malleability — that is, a ciphertext can be modified in specific ways that will have a predictable effect on the decryption of that message.

A Plaintext Only Attack is simply a bogus detractor. If you have the plaintext only then there is no need to perform any attack.

References:

RSA Laboratories FAQs about today's cryptography: What are some of the basic types of cryptanalytic attack?

also see:

<http://www.giac.org/resources/whitepaper/cryptography/57.php>

and

[http://en.wikipedia.org/wiki/Chosen-plaintext\\_attack](http://en.wikipedia.org/wiki/Chosen-plaintext_attack)

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## QUESTION 881

What is NOT true about a one-way hashing function?

- A. It provides authentication of the message
- B. A hash cannot be reversed to get the message used to create the hash
- C. The results of a one-way hash is a message digest
- D. It provides integrity of the message

Answer: A

Explanation: A one way hashing function can only be used for the integrity of a message and not for authentication or confidentiality. Because the hash creates just a fingerprint of the message which cannot be reversed and it is also very difficult to create a second message with the same hash.

A hash by itself does not provide Authentication. It only provides a weak form of integrity. It would

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be possible for an attacker to perform a Man-In-The-Middle attack where both the hash and the digest could be changed without the receiver knowing it.

A hash combined with your session key will produce a Message Authentication Code (MAC) which will provide you with both authentication of the source and integrity. It is sometimes referred to as a Keyed Hash.

A hash encrypted with the sender private key produce a Digital Signature which provide authentication, but not the hash by itself.

Hashing functions by themselves such as MD5, SHA1, SHA2, SHA-3 does not provide authentication.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, Page 548

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### QUESTION 882

You've decided to authenticate the source who initiated a particular transfer while ensuring integrity of the data being transferred. You can do this by:

- A. Having the sender encrypt the message with his private key.
- B. Having the sender encrypt the hash with his private key.
- C. Having the sender encrypt the message with his symmetric key.
- D. Having the sender encrypt the hash with his public key.

Answer: B

Explanation: Instead of using a shared-key to encrypt the hash of a given message, the sender's private key is used to encrypt the hash value of the message. This is the act of digitally signing the message.

Digital Signatures provide authentication of a sender and integrity of a sender's message. A message is input into a hash function. Then the hash value is encrypted using the private key of the sender. The result of these two steps yields a digital signature. The receiver can verify the digital signature by decrypting the hash value using the signer's public key, then perform the same hash computation over the message, and then compare the hash values for an exact match. If the hash values are the same then the signature is valid.

The following answers are incorrect:

Having the sender encrypt the hash with his public key. This does not provide any benefit because only the sender cold decrypt using his own private key and nobody else. Encrypting with a public key only provide Confidentiality and not other service.

Having the sender encrypt the message with his private key. This is close but not good enough. It would only provide authenticity of the source.

Having the sender encrypt the message with his symmetric key. This would provide only Confidentiality.

The following reference(s) were/was used to create this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 14885-14889). Auerbach Publications. Kindle Edition.

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### QUESTION 883

Which key agreement scheme uses implicit signatures ?

- A. MQV
- B. DH
- C. ECC
- D. RSA

Answer: A

Explanation: MQV (Menezes–Qu–Vanstone) is an authenticated protocol for key agreement based on the Diffie–Hellman scheme. Like other authenticated Diffie–Hellman schemes, MQV provides protection against an active attacker. The protocol can be modified to work in an arbitrary finite group, and, in particular, elliptic curve groups, where it is known as elliptic curve MQV (ECMQV).

Both parties in the exchange calculate an implicit signature using its own private key and the other's public key.

The following answers are incorrect:

DH is not the correct choice

Diffie–Hellman key exchange (D–H) is a specific method of exchanging keys. It is one of the earliest practical examples of Key exchange implemented within the field of cryptography. The Diffie–Hellman key exchange method allows two parties that have no prior knowledge of each other to jointly establish a shared secret key over an insecure communications channel. This key can then be used to encrypt subsequent communications using a symmetric key cipher. It is a type of key exchange.

Synonyms of Diffie–Hellman key exchange include:

Diffie–Hellman key agreement

Diffie–Hellman key establishment

Diffie–Hellman key negotiation

Exponential key exchange

Diffie–Hellman protocol

Diffie–Hellman handshake

The scheme was first published by Whitfield Diffie and Martin Hellman in 1976, although it later emerged that it had been separately invented a few years earlier within GCHQ, the British signals intelligence agency, by Malcolm J. Williamson but was kept classified. In 2002, Hellman suggested the algorithm be called Diffie–Hellman–Merkle key exchange in recognition of Ralph Merkle's contribution to the invention of public-key cryptography (Hellman, 2002).

ECC is not the correct choice

Public-key cryptography is based on the intractability of certain mathematical problems. Early public-key systems, such as the RSA algorithm, are secure assuming that it is difficult to factor a large integer composed of two or more large prime factors. For elliptic-curve-based protocols, it is assumed that finding the discrete logarithm of a random elliptic curve element with respect to a publicly-known base point is infeasible. The size of the elliptic curve determines the difficulty of the problem. It is believed that the same level of security afforded by an RSA-based system with a large modulus can be achieved with a much smaller elliptic curve group. Using a small group reduces storage and transmission requirements.

Elliptic curve cryptography (ECC) is an approach to public-key cryptography based on the algebraic structure of elliptic curves over finite fields. The use of elliptic curves in cryptography was

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suggested independently by Neal Koblitz and Victor S. Miller in 1985.

RSA is not the correct answer

In cryptography, RSA (which stands for Rivest, Shamir and Adleman who first publicly described it) is an algorithm for public-key cryptography. It is the first algorithm known to be suitable for signing as well as encryption, and was one of the first great advances in public key cryptography. RSA is widely used in electronic commerce protocols, and is believed to be secure given sufficiently long keys and the use of up-to-date implementations.

The following reference(s) were/was used to create this question:

ISC2 review book version 8 page 15

also see:

<http://en.wikipedia.org/wiki/MQV>

[http://en.wikipedia.org/wiki/Elliptic\\_curve\\_cryptography](http://en.wikipedia.org/wiki/Elliptic_curve_cryptography)

<http://en.wikipedia.org/wiki/RSA>

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### QUESTION 884

While using IPsec, the ESP and AH protocols both provides integrity services. However when using AH, some special attention needs to be paid if one of the peers uses NAT for address translation service. Which of the items below would affects the use of AH and its Integrity Check Value (ICV) the most?

- A. Key session exchange
- B. Packet Header Source or Destination address
- C. VPN cryptographic key size
- D. Cryptographic algorithm used

Answer: B

Explanation: It may seem odd to have two different protocols that provide overlapping functionality.

AH provides authentication and integrity, and ESP can provide those two functions and confidentiality.

Why even bother with AH then?

In most cases, the reason has to do with whether the environment is using network address translation (NAT). IPsec will generate an integrity check value (ICV), which is really the same thing as a MAC value, over a portion of the packet. Remember that the sender and receiver generate their own values. In IPsec, it is called an ICV value. The receiver compares her ICV value with the one sent by the sender. If the values match, the receiver can be assured the packet has not been modified during transmission. If the values are different, the packet has been altered and the receiver discards the packet.

The AH protocol calculates this ICV over the data payload, transport, and network headers. If the packet then goes through a NAT device, the NAT device changes the IP address of the packet. That is its job. This means a portion of the data (network header) that was included to calculate the ICV value has now changed, and the receiver will generate an ICV value that is different from the one sent with the packet, which means the packet will be discarded automatically.

The ESP protocol follows similar steps, except it does not include the network header portion when calculating its ICV value. When the NAT device changes the IP address, it will not affect the

receiver's ICV value because it does not include the network header when calculating the ICV. Here is a tutorial on IPSEC from the Shon Harris Blog:

The Internet Protocol Security (IPSec) protocol suite provides a method of setting up a secure channel for protected data exchange between two devices. The devices that share this secure channel can be two servers, two routers, a workstation and a server, or two gateways between different networks. IPSec is a widely accepted standard for providing network layer protection. It can be more flexible and less expensive than end-to end and link encryption methods.

IPSec has strong encryption and authentication methods, and although it can be used to enable tunneled communication between two computers, it is usually employed to establish virtual private networks (VPNs) among networks across the Internet.

IPSec is not a strict protocol that dictates the type of algorithm, keys, and authentication method to use. Rather, it is an open, modular framework that provides a lot of flexibility for companies when they choose to use this type of technology. IPSec uses two basic security protocols:

Authentication Header (AH) and Encapsulating Security Payload (ESP). AH is the authenticating protocol, and ESP is an authenticating and encrypting protocol that uses cryptographic mechanisms to provide source authentication, confidentiality, and message integrity.

IPSec can work in one of two modes: transport mode, in which the payload of the message is protected, and tunnel mode, in which the payload and the routing and header information are protected. ESP in transport mode encrypts the actual message information so it cannot be sniffed and uncovered by an unauthorized entity. Tunnel mode provides a higher level of protection by also protecting the header and trailer data an attacker may find useful. Figure 8-26 shows the high-level view of the steps of setting up an IPSec connection.

Each device will have at least one security association (SA) for each VPN it uses. The SA, which is critical to the IPSec architecture, is a record of the configurations the device needs to support an IPSec connection. When two devices complete their handshaking process, which means they have agreed upon a long list of parameters they will use to communicate, these data must be recorded and stored somewhere, which is in the SA.

The SA can contain the authentication and encryption keys, the agreed-upon algorithms, the key lifetime, and the source IP address. When a device receives a packet via the IPSec protocol, it is the SA that tells the device what to do with the packet. So if device B receives a packet from device C via IPSec, device B will look to the corresponding SA to tell it how to decrypt the packet, how to properly authenticate the source of the packet, which key to use, and how to reply to the message if necessary.

SAs are directional, so a device will have one SA for outbound traffic and a different SA for inbound traffic for each individual communication channel. If a device is connecting to three devices, it will have at least six SAs, one for each inbound and outbound connection per remote device. So how can a device keep all of these SAs organized and ensure that the right SA is invoked for the right connection? With the mighty security parameter index (SPI), that's how. Each device has an SPI that keeps track of the different SAs and tells the device which one is appropriate to invoke for the different packets it receives. The SPI value is in the header of an IPSec packet, and the device reads this value to tell it which SA to consult.

IPSec can authenticate the sending devices of the packet by using MAC (covered in the earlier section, "The One-Way Hash"). The ESP protocol can provide authentication, integrity, and confidentiality if the devices are configured for this type of functionality.

So if a company just needs to make sure it knows the source of the sender and must be assured of the integrity of the packets, it would choose to use AH. If the company would like to use these

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services and also have confidentiality, it would use the ESP protocol because it provides encryption functionality. In most cases, the reason ESP is employed is because the company must set up a secure VPN connection.

It may seem odd to have two different protocols that provide overlapping functionality. AH provides authentication and integrity, and ESP can provide those two functions and confidentiality. Why even bother with AH then? In most cases, the reason has to do with whether the environment is using network address translation (NAT). IPSec will generate an integrity check value (ICV), which is really the same thing as a MAC value, over a portion of the packet. Remember that the sender and receiver generate their own values. In IPSec, it is called an ICV value. The receiver compares her ICV value with the one sent by the sender. If the values match, the receiver can be assured the packet has not been modified during transmission. If the values are different, the packet has been altered and the receiver discards the packet.

The AH protocol calculates this ICV over the data payload, transport, and network headers. If the packet then goes through a NAT device, the NAT device changes the IP address of the packet. That is its job. This means a portion of the data (network header) that was included to calculate the ICV value has now changed, and the receiver will generate an ICV value that is different from the one sent with the packet, which means the packet will be discarded automatically.

The ESP protocol follows similar steps, except it does not include the network header portion when calculating its ICV value. When the NAT device changes the IP address, it will not affect the receiver's ICV value because it does not include the network header when calculating the ICV.

Because IPSec is a framework, it does not dictate which hashing and encryption algorithms are to be used or how keys are to be exchanged between devices. Key management can be handled manually or automated by a key management protocol. The de facto standard for IPSec is to use Internet Key Exchange (IKE), which is a combination of the ISAKMP and OAKLEY protocols. The Internet Security Association and Key Management Protocol (ISAKMP) is a key exchange architecture that is independent of the type of keying mechanisms used. Basically, ISAKMP provides the framework of what can be negotiated to set up an IPSec connection (algorithms, protocols, modes, keys). The OAKLEY protocol is the one that carries out the negotiation process. You can think of ISAKMP as providing the playing field (the infrastructure) and OAKLEY as the guy running up and down the playing field (carrying out the steps of the negotiation).

IPSec is very complex with all of its components and possible configurations. This complexity is what provides for a great degree of flexibility, because a company has many different configuration choices to achieve just the right level of protection. If this is all new to you and still confusing, please review one or more of the following references to help fill in the gray areas.

The following answers are incorrect:

The other options are distractors.

The following reference(s) were/was used to create this question:

Shon Harris, CISSP All-in-One Exam Guide- fifth edition, page 759

and

<https://neodean.wordpress.com/tag/security-protocol/>

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## QUESTION 885

Which of the following protocols offers native encryption?

- A. IPSEC, SSH, PPTP, SSL, MPLS, L2F, and L2TP
- B. IPSEC, SSH, SSL, TFTP

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- C. IPSEC, SSH, SSL, TLS
  - D. IPSEC, SSH, PPTP, SSL, MPLS, and L2TP

Answer: C

Explanation: The following answers are incorrect:

IPSEC, SSH, PPTP, SSL, MPLS, and L2TP is incorrect because L2TP and PPTP does NOT offer encryption.

IPSEC, SSH, SSL, TFTP is incorrect because TFTP does not offers encryption.

IPSEC, SSH, PPTP, SSL, MPLS, L2F, and L2TP is incorrect because MPLS, L2F, and L2TP do NOT offer encryption.

NOTE:

PPTP did not provide Encryption natively. It is MPPE from Microsoft that would provide encryption. MPPE is an encryption technology developed by Microsoft to encrypt point-to-point links. These PPP connections can be over a dialup line or over a VPN tunnel. MPPE works as a subfeature of Microsoft Point-to-Point Compression (MPPC).

MPPC is a scheme used to compress PPP packets between client devices. The MPPC algorithm is designed to optimize bandwidth utilization in order to support multiple simultaneous connections.

MPPE is negotiated using bits in the MPPC option within the Compression Control Protocol (CCP) MPPC configuration option (CCP configuration option number 18).

MPPE uses the RC4 algorithm with either 40- or 128-bit keys. All keys are derived from the cleartext authentication password of the user. RC4 is stream cipher; therefore, the sizes of the encrypted and decrypted frames are the same size as the original frame. The Cisco implementation of MPPE is fully interoperable with that of Microsoft and uses all available options, including historyless mode. Historyless mode can increase throughput in lossy environments such as VPNs, because neither side needs to send CCP Resets Requests to synchronize encryption contexts when packets are lost.

The following reference(s) were/was used to create this question:

Official (ISC)2 Guide to the CISSP CBK, Third Edition , pages 874 and 355 (IPSEC), 360 (SSH), 359 (PPTP), 362 (SSL), 361 (SOCKS), 360 (L2TP).

and

[http://www.cisco.com/en/US/products/ps6587/products\\_white\\_paper09186a008019bf38.shtml#15190](http://www.cisco.com/en/US/products/ps6587/products_white_paper09186a008019bf38.shtml#15190)

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## QUESTION 886

What is the difference between the OCSP (Online Certificate Status Protocol) and a Certificate Revocation List (CRL)?

- A. The OCSP (Online Certificate Status Protocol) provides real-time certificate checks and a Certificate Revocation List (CRL) has a delay in the updates.
- B. The OCSP (Online Certificate Status Protocol) is a proprietary certificate mechanism developed by Microsoft and a Certificate Revocation List (CRL) is an open standard.
- C. The OCSP (Online Certificate Status Protocol) is used only by Active Directory and a Certificate Revocation List (CRL) is used by Certificate Authorites
- D. The OCSP (Online Certificate Status Protocol) is a way to check the attributes of a certificate

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and a Certificate Revocation List (CRL) is used by Certificate Authorites.

Answer: A

Explanation: A Certificate Revocation List (CRL) is periodically update by a Certificate Authority (CA), where there may be a delay from the time a certificate has been revoked versus the time it propagates into the Certificate Revocation List (CRL).

The CA can revoke certificates and provide an update service to the other members of the PKI via a certificate revocation list (CRL), which is a list of non-valid certificates that should not be accepted by any member of the PKI. The use of public key (asymmetric) cryptography has enabled more effective use of symmetric cryptography as well as several other important features, such as greater access control, nonrepudiation, and digital signatures.

In transactions where there is a need for real-time checks, the Online Certificate Status Protocol can be used which can obtain the revocation status in a more timely fashion.

From RFC 2560

In lieu of or as a supplement to checking against a periodic CRL, it may be necessary to obtain timely information regarding the revocation status of a certificate (cf. [RFC2459], Section 3.3). Examples include high-value funds transfer or large stock trades.

The Online Certificate Status Protocol (OCSP) enables applications to determine the (revocation) state of an identified certificate. OCSP may be used to satisfy some of the operational requirements of providing more timely revocation information than is possible with CRLs and may also be used to obtain additional status information. An OCSP client issues a status request to an OCSP responder and suspends acceptance of the certificate in question until the responder provides a response.

This protocol specifies the data that needs to be exchanged between an application checking the status of a certificate and the server providing that status.

The following answers are incorrect:

- The OCSP (Online Certificate Status Protocol) is a proprietary certificate mechanism developed by Microsoft and a Certificate Revocation List (CRL) is an open standard.
- The OCSP (Online Certificate Status Protocol) is used only by Active Directory and a Certificate Revocation List (CRL) is used by Certificate Authorites.
- The OCSP (Online Certificate Status Protocol) is a way to check the attributes of a certificate and a Certificate Revocation List (CRL) is used by Certificate Authorites.

The following reference(s) were/was used to create this question:

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition :

Cryptography (Kindle Locations 2256-2259).. Kindle Edition.

<http://www.ietf.org/rfc/rfc2560.txt>

[http://technet.microsoft.com/en-us/library/cc731027\(v=ws.10\)](http://technet.microsoft.com/en-us/library/cc731027(v=ws.10))

<http://www.networkworld.com/reviews/2004/0809revsid.html>

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## QUESTION 887

Which of the following protocols would BEST mitigate threats of sniffing attacks on web application traffic?

- A. SSL or TLS
- B. 802.1X

- 
- C. ARP Cache Security
  - D. SSH - Secure Shell

Answer: A

Explanation: While it traverses the network, without some sort of encryption of web application data is vulnerable to sniffing and interception by attackers on the network. If we observe sniffer traffic on an unencrypted network we can clearly see the contents of user interaction with the web server and its applications.

SSL - Secure Sockets Layer or TLS - Transport Layer Security

There are similarities between these two protocols but TLS 3.1 supersedes SSL 2.0 but they are not interoperable. Today both protocols are commonly used on many web servers. In either case SSL/TLS encrypts network traffic as it traverses the wire and protects it from sniffing attacks.

The following answers are incorrect:

802.1X: This wouldn't secure data in transit but it would help prevent unauthorized devices from connecting to your network and sniffing data. Also Known As "Dot 1 X" or "The Extensible Authentication Protocol (EAP)" it provides infrastructure protection by requiring certificates to connect.

ARP Cache Security: This wouldn't mitigate the threat of network sniffing of web app data.

SSH - Secure Shell: Incorrect. SSH is a TELNET replacement for that encrypts traffic to mitigate the threat of network sniffers on SSH connections.

The following reference(s) were/was used to create this question:

2011. EC-COUNCIL Official Curriculum, Ethical Hacking and Countermeasures, v7.1, Module 13, Page 569.

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### QUESTION 888

What type of key would you find within a browser's list of trusted root CA?

- A. Private key
- B. Symmetric key
- C. Recovery key
- D. Public key

Answer: D

Explanation: The public key would be found. The public key is used to validate the Digital Signature contained within the Digital Certificate. As you well know the private key would never be distributed and only the owner of the certificate would have a copy of the private key.

In cryptography and computer security, a root certificate is either an unsigned public key certificate or a self-signed certificate that identifies the Root Certificate Authority (CA). A root certificate is part of a public key infrastructure scheme. The most common commercial variety is based on the ITU-T X.509 standard, which normally includes a digital signature from a certificate authority (CA). Digital certificates are verified using a chain of trust. The trust anchor for the digital certificate is the Root Certificate Authority (CA).

A certificate authority can issue multiple certificates in the form of a tree structure. A root certificate is the top-most certificate of the tree, the private key of which is used to "sign" other certificates. All

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certificates immediately below the root certificate inherit the trustworthiness of the root certificate - a signature by a root certificate is somewhat analogous to "notarizing" an identity in the physical world. Certificates further down the tree also depend on the trustworthiness of the intermediates (often known as "subordinate certification authorities").

Many software applications assume these root certificates are trustworthy on the user's behalf. For example, a web browser uses them to verify identities within SSL/TLS secure connections. However, this implies that the user trusts their browser's publisher, the certificate authorities it trusts, and any intermediates the certificate authority may have issued a certificate-issuing certificate, to faithfully verify the identity and intentions of all parties that own the certificates. This (transitive) trust in a root certificate is the usual case and is integral to the X.509 certificate chain model.

The root certificate is usually made trustworthy by some mechanism other than a certificate, such as by secure physical distribution. For example, some of the most well-known root certificates are distributed in the Internet browsers by their manufacturers

The following answers are incorrect:

The Private Key is never distributed, only the owner would have a copy of the private key.

Symmetric keys have no direct relation to Public Key cryptosystems.

A recovery key is usually used with full drive encryption tool when a user has lost or damage his key.

The following reference(s) were/was used to create this question:

[http://en.wikipedia.org/wiki/Root\\_certificate](http://en.wikipedia.org/wiki/Root_certificate)

and

Getting a root CA accepted within browsers

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### QUESTION 889

In a PKI infrastructure where are list of revoked certificates stored?

- A. CRL
- B. Registration Authority
- C. Recovery Agent
- D. Key escrow

Answer: A

Explanation: Certificate revocation is the process of revoking a certificate before it expires.

A certificate may need to be revoked because it was stolen, an employee moved to a new company, or someone has had their access revoked. A certificate revocation is handled either through a Certificate Revocation List (CRL) or by using the Online Certificate Status Protocol (OCSP).

A repository is simply a database or database server where the certificates are stored. The process of revoking a certificate begins when the CA is notified that a particular certificate needs to be revoked. This must be done whenever the private key becomes known/compromised.

The owner of a certificate can request it be revoked at any time, or the request can be made by the administrator. The CA marks the certificate as revoked. This information is published in the CRL. The revocation process is usually very quick; time is based on the publication interval for the CRL.

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Disseminating the revocation information to users may take longer. Once the certificate has been revoked, it can never be used—or trusted—again. The CA publishes the CRL on a regular basis, usually either hourly or daily. The CA sends or publishes this list to organizations that have chosen to receive it; the publishing process occurs automatically in the case of PKI. The time between when the CRL is issued and when it reaches users may be too long for some applications. This time gap is referred to as latency.

OCSP solves the latency problem: If the recipient or relaying party uses OCSP for verification, the answer is available immediately.

The following answers are incorrect:

**Registration Authority (RA)** A registration authority (RA) is an authority in a network that verifies user requests for a digital certificate and tells the certificate authority (CA) to issue it. RAs are part of a public key infrastructure (PKI), a networked system that enables companies and users to exchange information and money safely and securely. The digital certificate contains a public key that is used to encrypt and decrypt messages and digital signatures.

**Recovery agent** Sometimes it is necessary to recover a lost key. One of the problems that often arises regarding PKI is the fear that documents will become lost forever—irrecoverable because someone loses or forgets his private key. Let's say that employees use Smart Cards to hold their private keys. If a user was to leave his Smart Card in his or her wallet that was left in the pants that he or she accidentally threw into the washing machine, then that user might be without his private key and therefore incapable of accessing any documents or e-mails that used his existing private key.

Many corporate environments implement a key recovery server solely for the purpose of backing up and recovering keys. Within an organization, there typically is at least one key recovery agent. A key recovery agent has the authority and capability to restore a user's lost private key. Some key recovery servers require that two key recovery agents retrieve private user keys together for added security. This is similar to certain bank accounts, which require two signatures on a check for added security. Some key recovery servers also have the ability to function as a key escrow server, thereby adding the ability to split the keys onto two separate recovery servers, further increasing security.

Key escrow (also known as a “fair” cryptosystem) is an arrangement in which the keys needed to decrypt encrypted data are held in escrow so that, under certain circumstances, an authorized third party may gain access to those keys. These third parties may include businesses, who may want access to employees' private communications, or governments, who may wish to be able to view the contents of encrypted communications.

The following reference(s) were/was used to create this question:

Dulaney, Emmett (2011-06-03). CompTIA Security+ Study Guide: Exam SY0-301 (pp. 347-348). John Wiley and Sons. Kindle Edition.

and

[http://en.wikipedia.org/wiki/Key\\_escrow](http://en.wikipedia.org/wiki/Key_escrow)

and

<http://my.safaribooksonline.com/book/certification/securityplus/9781597494267/public-keyinfrastructure/ch12lev1sec5>

and

<http://searchsecurity.techtarget.com/definition/registration-authority>

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**QUESTION 890**

The equation used to calculate the total number of symmetric keys (K) needed for a group of users (N) to communicate securely with each other is given by which of the following?

- A.  $K(N - 1)/ 2$
- B.  $N(K - 1)/ 2$
- C.  $K(N + 1)/ 2$
- D.  $N(N - 1)/ 2$

Answer: D

Explanation: The formula is: Total number of users multiplied by total number of users minus 1, the results are then divided by 2)

When using symmetric algorithms, the sender and receiver use the same key for encryption and decryption functions. Each pair of users who want to exchange data using symmetric key encryption must have two instances of the same key. This means that if Dan and Iqqi want to communicate, both need to obtain a copy of the same key. If Dan also wants to communicate using symmetric encryption with Norm and Dave, he needs to have three separate keys, one for each friend. This might not sound like a big deal until Dan realizes that he may communicate with hundreds of people over a period of several months, and keeping track and using the correct key that corresponds to each specific receiver can become a daunting task.

If ten people needed to communicate securely with each other using symmetric keys, then 45 keys would need to be kept track of. If 100 people were going to communicate, then 4,950 keys would be involved.

The equation used to calculate the number of symmetric keys needed is  $N(N - 1)/ 2 = \text{number of keys}$

The following answers are incorrect:

- $K(N - 1)/ 2$
- $N(K - 1)/ 2$
- $K(N + 1)/ 2$

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 782). McGraw-Hill. Kindle Edition.

**QUESTION 891**

In which mode of DES, a block of plaintext and a key will always give the same ciphertext?

- A. Electronic Code Book (ECB)
- B. Output Feedback (OFB)
- C. Counter Mode (CTR)
- D. Cipher Feedback (CFB)

Answer: A

Explanation: ECB mode operates like a code book. A 64-bit data block is entered into the algorithm with a key, and a block of ciphertext is produced. For a given block of plaintext and a

given key, the same block of ciphertext is always produced.

The security issue that comes up with using ECB mode is that each block will be encrypted with the exact same key, and thus the exact same code book. So, two problems could happen, an attacker could uncover the key and thus have the key to decrypt all the blocks of data, or an attacker could gather the ciphertext and plaintext of each block and build the code book that was used, without needing the key.

The following are incorrect answers:

Output Feedback (OFB)

Counter Mode (CTR)

Cipher Feedback (CFB)

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 803). McGraw-Hill. Kindle Edition.

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### QUESTION 892

Which of the following modes of DES is MOST Likely used for Database Encryption

- A. Electronic Code Book(ECB)
- B. Cipher Block Chaining(CBC)
- C. Cipher Feedback(CFB)
- D. Output Feedback(OFB)

Answer: A

Explanation: Because ECB mode works with blocks of data independently, data within a file does not have to be encrypted in a certain order. This is very helpful when using encryption in databases. A database has different pieces of data accessed in a random fashion.

If it is encrypted in ECB mode, then any record or table can be added, encrypted, deleted, or decrypted independently of any other table or record.

Other DES modes are dependent upon the text encrypted before them. This dependency makes it harder to encrypt and decrypt smaller amounts of text, because the previous encrypted text would need to be decrypted first.

Because ECB mode does not use chaining, you should not use it to encrypt large amounts of data, because patterns would eventually show themselves.

Some important characteristics of ECB mode encryption are as follows:

- Operations can be run in parallel, which decreases processing time.
- Errors are contained. If an error takes place during the encryption process, it only affects one block of data.
- Only usable for the encryption of short messages.
- Cannot carry out preprocessing functions before receiving plaintext.

The following answers are incorrect:

Cipher Block Chaining(CBC)

Cipher Feedback(CFB)

Output Feedback(OFB)

The following reference(s) were/was used to create this question:

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Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 803). McGraw-Hill . Kindle Edition.

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**QUESTION 893**

which of the following is a Hashing Algorithm?

- A. SHA
- B. RSA
- C. Diffie Hellman(DH)
- D. Elliptic Curve Cryptography(ECC)

Answer: A

Explanation: SHA was designed by NSA and published by NIST to be used with the Digital Signature Standard (DSS).

SHA was designed to be used in digital signatures and was developed when a more secure hashing algorithm was required for U.S. government applications.

SHA produces a 160-bit hash value, or message digest.

This is then inputted into an asymmetric algorithm, which computes the signature for a message. SHA is similar to MD4. It has some extra mathematical functions and produces a 160-bit hash instead of a 128-bit hash like MD5, which makes it more resistant to brute force attacks, including birthday attacks.

SHA was improved upon and renamed SHA-1. Recently, newer versions of this algorithm have been developed and released such as SHA2 which has the following hash length: SHA-256, SHA-384, and SHA-512.

NOTE: Very recently SHA-3 has also been released but it is too new to be in the CBK.

The following answers are incorrect:

RSA

Diffie Hellman

Elliptic Curve Cryptography(ECC)

All of the choices above are examples of an Asymmetric algorithm

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 827). McGraw-Hill . Kindle Edition.

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**QUESTION 894**

Complete the following sentence. A digital signature is a \_\_\_\_

- A. hash value that has been encrypted with the senders private key
- B. hash value that has been encrypted with the senders public key
- C. hash value that has been encrypted with the senders Session key
- D. its senders signature signed and scanned in a digital format

Answer: A

Explanation: A digital signature is a hash value that has been encrypted with the senders private

key. The act of signing means encrypting the messages hash value with the sender private key. The following answers are incorrect:

hash value that has been encrypted with the senders public key Encrypting with a public key provide only one service, it is confidentiality. Only the receiver using the matching private key could get access to the clear text.

hash value that has been encrypted with the senders Session key Session keys are Symmetric keys that have a short lifespan, they are used to encrypt the data while a session is ongoing and then destroyed.

it is senders signature signed and scanned in a digital format This is only a distractor

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 829). McGraw-Hill . Kindle Edition.

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### QUESTION 895

which of the following example is NOT an asymmetric key algorithms?

- A. Elliptic curve cryptosystem(ECC)
- B. Diffie-Hellman
- C. Advanced Encryption Standard(AES)
- D. Merkle-Hellman Knapsack

Answer: C

Explanation: AES is an example of Symmetric Key algorithm. After DES was used as an encryption standard for over 20 years and it was cracked in a relatively short time once the necessary technology was available, NIST decided a new standard, the Advanced Encryption Standard (AES), needed to be put into place .

In January 1997 , NIST announced its request for AES candidates and outlined the requirements in FIPS PUB 197. AES was to be a symmetric block cipher supporting key sizes of 128, 192, and 256 bits.

The following five algorithms were the finalists:

- MARS Developed by the IBM team that created Lucifer
- RC6 Developed by RSA Laboratories
- Serpent Developed by Ross Anderson, Eli Biham, and Lars Knudsen
- Twofish Developed by Counterpane Systems
- Rijndael Developed by Joan Daemen and Vincent Rijmen

Out of these contestants, Rijndael was chosen.

The block sizes that Rijndael supports are 128, 192 , and 256 bits.

The number of rounds depends upon the size of the block and the key length:

- If both the key and block size are 128 bits, there are 10 rounds.
- If both the key and block size are 192 bits, there are 12 rounds.
- If both the key and block size are 256 bits, there are 14 rounds.

When preparing for my CISSP exam, i came across this post by Laurel Marotta at the URL below:

<http://cissp-study.3965.n7.nabble.com/CCCure-CISSP-Study-Plan-to-crack-CISSP-clarificationtd401.html>

This tips was originally contributed by Doug Landoll

Here is an easy way to remember the types of crypto cipher:

The sentence to remember is: DEER MRS H CARBIDS

Asymmetric: encrypt with 1 key, decrypt with other Key exchange. A key pair: Public and Private.

Services: Confidentiality, Nonrepudiation, Integrity, Digital Signature

D - Diffie-Hellman

E - El Gamal: DH +nonrepudiation

E - ECC

R - RSA

Hash- one-way algorithm, no key

M - MD5

R - RIPEMD (160)

S - SHA (3)

H - Haval (v)

Symmetric: Encryption, one key

C - CAST

A - AES: 128k, 10r; 192k, 12 r; 256k, 14r

R - RC4, RC5, RC6

B - BLOWFISH:23-448k, 64bit block

I - IDEA : 128k, 64bit block

D - DES-64-bit block, 16r

S - SERPENT

The following answers are all incorrect because they are all Asymmetric Crypto ciphers:

Elliptic curve cryptosystem(ECC)

Diffie-Hellman

Merkle-Hellman Knapsack

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 809). McGraw-Hill . Kindle Edition.

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## QUESTION 896

Complete the following sentence. A message can be encrypted, which provides \_\_\_\_\_

- A. Confidentiality
- B. Non-Repudiation
- C. Authentication
- D. Integrity

Answer: A

Explanation: Encrypting a message provides only one security service. It is Confidentiality.

You must clearly understand all the available choices within cryptography, because different steps and algorithms provide different types of security services:

- A message can be encrypted, which provides confidentiality.
- A message can be hashed, which provides integrity.
- A message can be digitally signed, which provides authentication, nonrepudiation, and integrity.
- A message can be encrypted and digitally signed , which provides confidentiality, authentication,

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nonrepudiation, and integrity.

Some algorithms can only perform encryption, whereas others support digital signatures and encryption.

When hashing is involved, a hashing algorithm is used, not an encryption algorithm. It is important to understand that not all algorithms can necessarily provide all security services. Most of these algorithms are used in some type of combination to provide all the necessary security services.

The following answers are incorrect:

Non-Repudiation Regarding digital security, the cryptological meaning and application of nonrepudiation shifts to mean:

A service that provides proof of the integrity and origin of data.

An authentication that can be asserted to be genuine with high assurance.

Proof of data integrity is typically the easiest of these requirements to accomplish. A data hash, such as SHA2, is usually sufficient to establish that the likelihood of data being undetectably changed is extremely low. Even with this safeguard, it is still possible to tamper with data in transit, either through a man-in-the-middle attack or phishing. Due to this flaw, data integrity is best asserted when the recipient already possesses the necessary verification information.

The most common method of asserting the digital origin of data is through digital certificates, a form of public key infrastructure, to which digital signatures belong. Note that the public key scheme is not used for encryption in this form, confidentiality is not achieved by signing a message with a private key (since anyone can obtain the public key to reverse the signature).

Verifying the digital origin means that the certified/signed data can be, with reasonable certainty, trusted to be from somebody who possesses the private key corresponding to the signing certificate. If the key is not properly safeguarded by the original owner, digital forgery can become a major concern.

Authentication (from Greek: ; real or genuine, from authentes; author) is the act of confirming the truth of an attribute of a single piece of data (datum) or entity. In contrast with Identification which refers to the act of stating or otherwise indicating a claim purportedly attesting to a person or thing's identity, Authentication is the process of actually confirming that identity. It might involve confirming the identity of a person by validating their identity documents, verifying the validity of a website with a digital certificate, or ensuring that a product is what its packaging and labeling claim to be. In other words, Authentication often involves verifying the validity of at least one form of identification.

## AUTHENTICATION FACTORS

The ways in which someone may be authenticated fall into three categories, based on what are known as the factors of authentication: something the user knows, something the user has, and something the user is.

Each authentication factor covers a range of elements used to authenticate or verify a person's identity prior to being granted access, approving a transaction request, signing a document or other work product, granting authority to others, and establishing a chain of authority.

Security research has determined that for a positive authentication, elements from at least two, and preferably all three, factors should be verified. Using two of the three factors is called strong authentication or two factors authentication.

The three factors (classes) and some of elements of each factor are:

the knowledge factors: Something the user knows (e.g., a password, pass phrase, or personal identification number (PIN), challenge response (the user must answer a question), pattern), software token, or phone serving as a software token

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the ownership factors: Something the user has (e.g., wrist band, ID card, security token, or cell phone with built-in hardware token)

the inherence factors: Something the user is or does (e.g., fingerprint, retinal pattern, DNA sequence (there are assorted definitions of what is sufficient), signature, face, voice, unique bioelectric signals, or other biometric identifier).

Integrity Data integrity refers to maintaining and assuring the accuracy and consistency of data over its entire life-cycle, and is a critical aspect to the design, implementation and usage of any system which stores, processes, or retrieves data.

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (pp. 829-830). McGraw-Hill . Kindle Edition.

<http://en.wikipedia.org/wiki/Non-repudiation>

<http://en.wikipedia.org/wiki/Authentication>

[http://en.wikipedia.org/wiki/Data\\_integrity](http://en.wikipedia.org/wiki/Data_integrity)

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### QUESTION 897

A message can be encrypted and digitally signed, which provides \_\_\_\_\_

- A. Confidentiality, Authentication, Non-repudiation, and Integrity.
- B. Confidentiality and Authentication
- C. Confidentiality and Non-repudiation
- D. Confidentiality and Integrity.

Answer: A

Explanation: For the purpose of the exam, one needs to be very clear on all the available choices within cryptography,

because different steps and algorithms provide different types of security services:

A message can be encrypted, which provides confidentiality.

A message can be digitally signed, which provides authentication, nonrepudiation, and integrity.

A message can be hashed, which provides integrity.

A message can be encrypted and digitally signed, which provides confidentiality, authentication, nonrepudiation, and integrity.

The following answers are incorrect:

Confidentiality and Authentication

Confidentiality and Non-repudiation

Confidentiality and Integrity

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (pp. 829-830). McGraw-Hill . Kindle Edition.

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### QUESTION 898

Public key infrastructure(PKI) consists of programs, data formats, procedures, communication protocols, security policies, and public key cryptographic mechanisms working in a comprehensive manner to enable a wide range of dispersed people to communicate in a secure and predictable fashion.

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This infrastructure is based upon which of the following Standard?

- A. X.509
- B. X.500
- C. X.400
- D. X.25

Answer: A

Explanation: X.509 was initially issued on July 3, 1988 and was begun in association with the X.500 standard.

It assumes a strict hierarchical system of certificate authorities (CAs) for issuing the certificates. This contrasts with web of trust models, like PGP, where anyone (not just special CAs) may sign and thus attest to the validity of others' key certificates.

PKI establishes a level of trust within an environment.

PKI is an ISO authentication framework that uses public key cryptography and the X.509 standard. The framework was set up to enable authentication to happen across different networks and the Internet.

Particular protocols and algorithms are not specified, which is why PKI is called a framework and not a specific technology.

In cryptography, X.509 is an ITU-T standard for a public key infrastructure (PKI) and Privilege Management Infrastructure (PMI). X.509 specifies, amongst other things, standard formats for public key certificates, certificate revocation lists, attribute certificates, and a certification path validation algorithm.

The standard for how the CA creates the certificate is X.509, which dictates the different fields used in the certificate and the valid values that can populate those fields.

The most commonly used version is v3 of this standard, which is often denoted as X.509v3.

Many cryptographic protocols use this type of certificate, including SSL.

The certificate includes the serial number, version number, identity information, algorithm information, lifetime dates, and the signature of the issuing authority

The following answers are incorrect:

X.500 is a Directory Access Protocol(LDAP)

X.400 is for Electronic Messaging (EMAILs)

X.25 is Frame Relay

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 833). McGraw-Hill . Kindle Edition.

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### QUESTION 899

What would you call a microchip installed on the motherboard of modern computers and is dedicated to carrying out security functions that involve the storage and processing of symmetric and asymmetric keys, hashes, and digital certificates.

- A. Trusted Platform Module (TPM)
- B. Trusted BIOS Module (TBM)
- C. Central Processing Unit (CPU)

## D. Arithmetic Logical Unit (ALU)

Answer: A

Explanation: The Trusted Platform Module(TPM) was devised by the Trusted Computing Group(TCG), an organization that promotes open standards to help strengthen computing platforms against security weaknesses and attacks.

The TPM is essentially a securely designed microcontroller with added modules to perform cryptographic functions.

These modules allow for accelerated and storage processing of cryptographic keys, hash values, and pseudonumber sequences.

The TPMs internal storage is based on nonvolatile random access memory, which retains its information

when power is turned off and is therefore termed as nonvolatile. The TPM is used to deter any attempts to tamper with a systems configurations.

The following answers are all incorrect:

Trusted BIOS Module (TBM) This is a bogus distractor.

Central Processing Unit (CPU) A central processing unit (CPU) (formerly also referred to as a central processor unit) is the hardware within a computer that carries out the instructions of a computer program by performing the basic arithmetical, logical, and input/output operations of the system. The term has been in use in the computer industry at least since the early 1960s. The form, design, and implementation of CPUs have changed over the course of their history, but their fundamental operation remains much the same.

Arithmetic Logical Unit (ALU) In digital electronics, an arithmetic logic unit (ALU) is a digital circuit that performs integer arithmetic and logical operations. The ALU is a fundamental building block of the central processing unit of a computer, and even the simplest microprocessors contain one for purposes such as maintaining timers. The processors found inside modern CPUs and graphics processing units (GPUs) accommodate very powerful and very complex ALUs; a single component may contain a number of ALUs.

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 843). McGraw-Hill . Kindle Edition.

[http://en.wikipedia.org/wiki/Central\\_processing\\_unit](http://en.wikipedia.org/wiki/Central_processing_unit)

[http://en.wikipedia.org/wiki/Arithmetic\\_logic\\_unit](http://en.wikipedia.org/wiki/Arithmetic_logic_unit)

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## QUESTION 900

Suppose that you are the COMSEC - Communications Security custodian for a large, multinational corporation. Susie, from Finance approaches you in the break room saying that she lost her smart ID Card that she uses to digitally sign and encrypt emails in the PKI.

What happens to the certificates contained on the smart card after the security officer takes appropriate action?

- A. They are added to the CRL
- B. They are reissued to the user
- C. New certificates are issued to the user
- D. The user may no longer have certificates

Answer: A

Explanation: Smart ID Cards can contain digital certifications user for establishing identity and for digitally encrypting and decrypting messages.

Commonly, there are three types of certificates on an ID Card: Identity certificate, private certificate and public certificate:

- Identity Certificate: This is the cert used to guarantee your identity, as when you swipe to enter a facility or when logging onto a computer

- Public Certificate: This is freely shared with the public. All who have it can use it to decrypt messages that you encrypt with your private key.

- Private Certificate: This is the key that you use to encrypt messages. It is a complimentary key to your public key. Only your public key can decrypt messages encrypted with the private key.

Otherwise known as PKI - Public Key Infrastructure, this is how the keys are used on your card. Ordinarily, there is software on the computer that can, given the appropriate PIN number, log on, digitally sign, encrypt and decrypt messages.

If you should lose your card the only certificate that is vital to be kept secret is your private key because that can decrypt messages encrypt with your public key.

If this happens, the private key is added to the CRL - Certificate Revocation List. It is published by the Certificate Authority or CA server and must periodically be downloaded so that the system knows which certificates to trust and which not to trust.

Notably, revocation lists can become quite large and slow to download, especially over slower or tactical military networks. Also, certificates can be in one of two states on the CRL: Revoked or Hold. A hold can be reversed but once in revoked status, it is gone forever

#### ABOUT OCSP

Another way of validating if a certificate is valid is using OCSP.

The Online Certificate Status Protocol (OCSP) is an Internet protocol used for obtaining the revocation status of an X.509 digital certificate. It is described in RFC 6960 and is on the Internet standards track. It was created as an alternative to certificate revocation lists (CRL), specifically addressing certain problems associated with using CRLs in a public key infrastructure (PKI).

Messages communicated via OCSP are encoded in ASN.1 and are usually communicated over HTTP. The "request/response" nature of these messages leads to OCSP servers being termed OCSP responders.

The following answers are incorrect:

- They are reissued to the user: This isn't correct because once a private certificate is lost, it may never again be trusted because it has been out of control of the user.

- New certificates are issued to the user: This is actually correct but not what happens first.

Ordinarily the previous certificates for the users are added to the CRL and THEN the new certificates are issued to the user. This way there is no chance a double set of certs are out there for a single user.

- The user may no longer have certificates: This isn't correct, unless the user is fired or quits.

Users must have certificates to operate in a PKI environment. (Public Key Infrastructure)

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

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**QUESTION 901**

You are an information systems security officer at a mid-sized business and are called upon to investigate a threat conveyed in an email from one employee to another.

You gather the evidence from both the email server transaction logs and from the computers of the two individuals involved in the incident and prepare an executive summary.

You find that a threat was sent from one user to the other in a digitally signed email. The sender of the threat says he didn't send the email in question.

What concept of PKI - Public Key Infrastructure will implicate the sender?

- A. Non-repudiation
- B. The digital signature of the recipient
- C. Authentication
- D. Integrity

Answer: A

Explanation: PKI - Public Key Infrastructure is an infrastructure of hardware, software, people, policies and procedures that makes use of the technology to provide some sort of confidentiality, integrity and authenticity as well as non-repudiation in our daily digital lives.

In the case of the email threat, the fact that the email was digitally signed by the sender proves that he is guilty of conveying the threat. Non-repudiation is the aspect of PKI that proves that nobody else could have digitally signed the email using his private key that exists only on his identity card.

In the Digital World:

Regarding digital security, the cryptological meaning and application of non-repudiation shifts to mean:

A service that provides proof of the integrity and origin of data.

An authentication that can be asserted to be genuine with high assurance .

Proof of data integrity is typically the easiest of these requirements to accomplish. A data hash, such as SHA2, is usually sufficient to establish that the likelihood of data being undetectably changed is extremely low. Even with this safeguard, it is still possible to tamper with data in transit, either through a man-in-the-middle attack or phishing. Due to this flaw, data integrity is best asserted when the recipient already possesses the necessary verification information.

The most common method of asserting the digital origin of data is through digital certificates, a form of public key infrastructure, to which digital signatures belong. They can also be used for encryption. The digital origin only means that the certified/signed data can be, with reasonable certainty, trusted to be from somebody who possesses the private key corresponding to the signing certificate. If the key is not properly safeguarded by the original owner, digital forgery can become a major concern.

The following answers are incorrect:

- The digital signature of the recipient: No, this isn't right. The recipient's signature won't indict the sender of the threat. The sender's digital signature will prove his involvement.
- Authentication: This is incorrect. Authentication is the process of proving one's identity.
- Integrity: Sorry, this isn't the right answer either. Integrity in PKI only verifies that messages and content aren't altered in transit.

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The following reference(s) was used to create this question:  
<http://en.wikipedia.org/wiki/Non-repudiation>

---

### QUESTION 902

When we encrypt or decrypt data there is a basic operation involving ones and zeros where they are compared in a process that looks something like this:

0101 0001 Plain text

0111 0011 Key stream

0010 0010 Output

What is this cryptographic operation called?

- A. Exclusive-OR
- B. Bit Swapping
- C. Logical-NOR
- D. Decryption

Answer: A

Explanation: When we encrypt data we are basically taking the plaintext information and applying some key material or keystream and conducting something called an XOR or Exclusive-OR operation.

The symbol used for XOR is the following: This is a type of cipher known as a stream cipher.

The operation looks like this:

0101 0001 Plain text

0111 0011 Key stream

0010 0010 Output (ciphertext)

As you can see, it's not simple addition and the XOR Operation uses something called a truth table that explains why  $0+1=1$  and  $1+1=0$ .

The rules are simple, if both bits are the same the result is zero, if both bits are not the same the result is one.

The following answers are incorrect:

- Bit Swapping: Incorrect. This isn't a known cryptographic operations.
- Logical NOR: Sorry, this isn't correct but is where only  $0+0=1$ . All other combinations of  $1+1$ ,  $1+0$  equals 0. More on NOR here.
- Decryption: Sorry, this is the opposite of the process of encryption or, the process of applying the keystream to the plaintext to get the resulting encrypted text.

The following reference(s) was used to create this question:

For more details on XOR and all other topics of cryptography. Subscribe to our holistic

<http://en.wikipedia.org/wiki/Exclusive-or>

and

[http://en.wikipedia.org/wiki/Stream\\_cipher](http://en.wikipedia.org/wiki/Stream_cipher)

---

### QUESTION 903

Which type of encryption is considered to be unbreakable if the stream is truly random and is as large as the plaintext and never reused in whole or part?

- A. One Time Pad (OTP)
- B. One time Cryptopad (OTC)
- C. Cryptanalysis
- D. Pretty Good Privacy (PGP)

Answer: A

Explanation: OTP or One Time Pad is considered unbreakable if the key is truly random and is as large as the plaintext and never reused in whole or part AND kept secret.

In cryptography, a one-time pad is a system in which a key generated randomly is used only once to encrypt a message that is then decrypted by the receiver using the matching one-time pad and key. Messages encrypted with keys based on randomness have the advantage that there is theoretically no way to "break the code" by analyzing a succession of messages. Each encryption is unique and bears no relation to the next encryption so that some pattern can be detected.

With a one-time pad, however, the decrypting party must have access to the same key used to encrypt the message and this raises the problem of how to get the key to the decrypting party safely or how to keep both keys secure. One-time pads have sometimes been used when the both parties started out at the same physical location and then separated, each with knowledge of the keys in the one-time pad. The key used in a one-time pad is called a secret key because if it is revealed, the messages encrypted with it can easily be deciphered.

One-time pads figured prominently in secret message transmission and espionage before and during World War II and in the Cold War era. On the Internet, the difficulty of securely controlling secret keys led to the invention of public key cryptography.

The biggest challenge with OTP was to get the pad security to the person or entity you wanted to communicate with. It had to be done in person or using a trusted courier or custodian. It certainly did not scale up very well and it would not be usable for large quantity of data that needs to be encrypted as we often time have today.

The following answers are incorrect:

- One time Cryptopad: Almost but this isn't correct. Cryptopad isn't a valid term in cryptography.
- Cryptanalysis: Sorry, incorrect. Cryptanalysis is the process of analyzing information in an effort to breach the cryptographic security systems.
- PGP - Pretty Good Privacy: PGP, written by Phil Zimmermann is a data encryption and decryption program that provides cryptographic privacy and authentication for data. Still isn't the right answer though. Read more here about PGP.

The following reference(s) was used to create this question:

To get more info on this topics or any topics of Security+,

<http://users.telenet.be/d.rijmenants/en/otp.htm>

and

[http://en.wikipedia.org/wiki/One-time\\_pad](http://en.wikipedia.org/wiki/One-time_pad)

and

<http://searchsecurity.techtarget.com/definition/one-time-pad>

## QUESTION 904

Which of the following terms can be described as the process to conceal data into another file or media in a practice known as security through obscurity?

- A. Steganography
- B. ADS - Alternate Data Streams
- C. Encryption
- D. NTFS ADS

Answer: A

Explanation: It is the art and science of encoding hidden messages in such a way that no one, apart from the sender and intended recipient, suspects the existence of the message or could claim there is a message.

It is a form of security through obscurity.

The word steganography is of Greek origin and means "concealed writing." It combines the Greek words steganos (), meaning "covered or protected," and graphei () meaning "writing."

The first recorded use of the term was in 1499 by Johannes Trithemius in his *Steganographia*, a treatise on cryptography and steganography, disguised as a book on magic. Generally, the hidden messages will appear to be (or be part of) something else: images, articles, shopping lists, or some other cover text. For example, the hidden message may be in invisible ink between the visible lines of a private letter.

The advantage of steganography over cryptography alone is that the intended secret message does not attract attention to itself as an object of scrutiny. Plainly visible encrypted messages, no matter how unbreakable, will arouse interest, and may in themselves be incriminating in countries where encryption is illegal. Thus, whereas cryptography is the practice of protecting the contents of a message alone, steganography is concerned with concealing the fact that a secret message is being sent, as well as concealing the contents of the message.

It is sometimes referred to as Hiding in Plain Sight. This image of trees blow contains in it another image of a cat using Steganography.



ADS Tree with Cat inside

This image below is hidden in the picture of the trees above:



### Hidden Kitty

As explained here the image is hidden by removing all but the two least significant bits of each color component and subsequent normalization.

#### ABOUT MSF and LSF

One of the common method to perform steganography is by hiding bits within the Least Significant Bits of a media (LSB) or what is sometimes referred to as Slack Space. By modifying only the least significant bit, it is not possible to tell if there is an hidden message or not looking at the picture or the media. If you would change the Most Significant Bits (MSB) then it would be possible to view or detect the changes just by looking at the picture. A person can perceive only up to 6 bits of depth, bit that are changed past the first sixth bit of the color code would be undetectable to a human eye.

If we make use of a high quality digital picture, we could hide six bits of data within each of the pixel of the image. You have a color code for each pixel composed of a Red, Green, and Blue value. The color code is 3 sets of 8 bits each for each of the color. You could change the last two bit to hide your data. See below a color code for one pixel in binary format. The bits below are not real they are just example for illustration purpose:

RED GREEN BLUE

0101 0101 1100 1011 1110 0011

MSB LSB MSB LSB MSB LSB

Let's say that I would like to hide the letter A uppercase within the pixels of the picture. If we convert the letter "A" uppercase to a decimal value it would be number 65 within the ASCII table , in binary format the value 65 would translet to 01000001

You can break the 8 bits of character A uppercase in group of two bits as follow: 01 00 00 01

Using the pixel above we will hide those bits within the last two bits of each of the color as follow:

RED GREEN BLUE

0101 0101 1100 1000 1110 0000

MSB LSB MSB LSB MSB LSB

As you can see above, the last two bits of RED was already set to the proper value of 01, then we move to the GREEN value and we changed the last two bit from 11 to 00, and finally we changed the last two bits of blue to 00. One pixel allowed us to hide 6 bits of data. We would have to use another pixel to hide the remaining two bits.

The following answers are incorrect:

- ADS - Alternate Data Streams: This is almost correct but ADS is different from steganography in that ADS hides data in streams of communications or files while Steganography hides data in a single file.

- Encryption: This is almost correct but Steganography isn't exactly encryption as much as using space in a file to store another file.
- NTFS ADS: This is also almost correct in that you're hiding data where you have space to do so. NTFS, or New Technology File System common on Windows computers has a feature where you can hide files where they're not viewable under normal conditions. Tools are required to uncover the ADS-hidden files.

The following reference(s) was used to create this question:

Steganography tool

and

<http://en.wikipedia.org/wiki/Steganography>

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### QUESTION 905

Which of the following type of cryptography is used when both parties use the same key to communicate securely with each other?

- A. Symmetric Key Cryptography
- B. PKI - Public Key Infrastructure
- C. Diffie-Hellman
- D. DSS - Digital Signature Standard

Answer: A

Explanation: Symmetric-key algorithms are a class of algorithms for cryptography that use the same cryptographic keys for both encryption of plaintext (sender) and decryption of ciphertext (receiver). The keys may be identical, in practice, they represent a shared secret between two or more parties that can be used to maintain a private information link.

This requirement that both parties have access to the secret key is one of the main drawbacks of symmetric key encryption, in comparison to public-key encryption. This is also known as secret key encryption. In symmetric key cryptography, each end of the conversation must have the same key or they cannot decrypt the message sent to them by the other party.

Symmetric key crypto is very fast but more difficult to manage due to the need to distribute the key in a secure means to all parts needing to decrypt the data. There is no key management built within Symmetric crypto.

PKI provides CIA - Confidentiality (Through encryption) Integrity (By guaranteeing that the message hasn't change in transit) and Authentication (Non-repudiation). Symmetric key crypto provides mostly Confidentiality.

The following answers are incorrect:

- PKI - Public Key Infrastructure: This is the opposite of symmetric key crypto. Each side in PKI has their own private key and public key. What one key encrypt the other one can decrypt. You make use of the receiver public key to communicate securely with a remote user. The receiver will use their matching private key to decrypt the data.
- Diffie-Hellman: Sorry, this is an asymmetric key technique. It is used for key agreement over an insecure network such as the Internet. It allows two parties who has never met to negotiate a secret key over an insecure network while preventing Man-In-The-Middle (MITM) attacks.
- DSS - Digital Signature Standard: Sorry, this is an asymmetric key technique.

The following reference(s) was used to create this question:

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To learn more about this topics and 100% of the Security+ CBK, subscribe to our Holistic Computer Based Tutorial (CBT) on our Learning Management System  
[http://en.wikipedia.org/wiki/Symmetric-key\\_algorithm](http://en.wikipedia.org/wiki/Symmetric-key_algorithm)

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**QUESTION 906**

Complete the blanks. When using PKI, I digitally sign a message using my \_\_\_\_\_ key. The recipient verifies my signature using my \_\_\_\_\_ key.

- A. Private / Public
- B. Public / Private
- C. Symmetric / Asymmetric
- D. Private / Symmetric

Answer: A

Explanation: When we encrypt messages using our private keys which are only available to us. The person who wants to read and decrypt the message need only have our public keys to do so. The whole point to PKI is to assure message integrity, authentication of the source, and to provide secrecy with the digital encryption.

See below a nice walktrough of Digital Signature creation and verification from the Comodo web site:

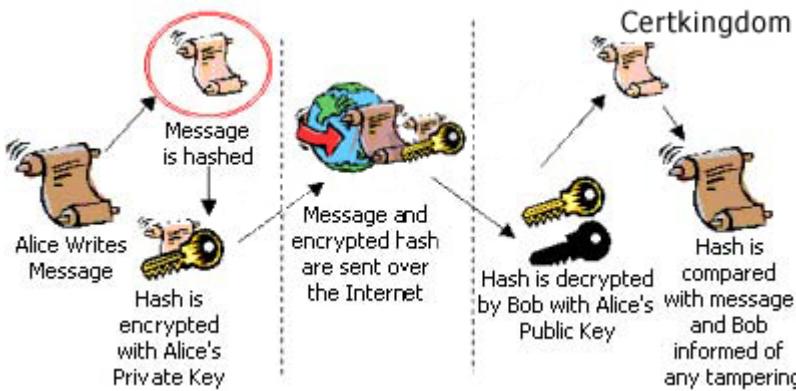
Digital Signatures apply the same functionality to an e-mail message or data file that a handwritten signature does for a paper-based document. The Digital Signature vouches for the origin and integrity of a message, document or other data file.

How do we create a Digital Signature?

The creation of a Digital Signature is a complex mathematical process. However as the complexities of the process are computed by the computer, applying a Digital Signature is no more difficult than creating a handwritten one!

The following text illustrates in general terms the processes behind the generation of a Digital Signature:

1. Alice clicks 'sign' in her email application or selects which file is to be signed.
2. Alice's computer calculates the 'hash' (the message is applied to a publicly known mathematical hashing function that converts the message into a long number referred to as the hash).
3. The hash is encrypted with Alice's Private Key (in this case it is known as the Signing Key) to create the Digital Signature.
4. The original message and its Digital Signature are transmitted to Bob.
5. Bob receives the signed message. It is identified as being signed, so his email application knows which actions need to be performed to verify it.
6. Bob's computer decrypts the Digital Signature using Alice's Public Key.
7. Bob's computer also calculates the hash of the original message (remember - the mathematical function used by Alice to do this is publicly known).
8. Bob's computer compares the hashes it has computed from the received message with the now decrypted hash received with Alice's message.



### digital signature creation and verification

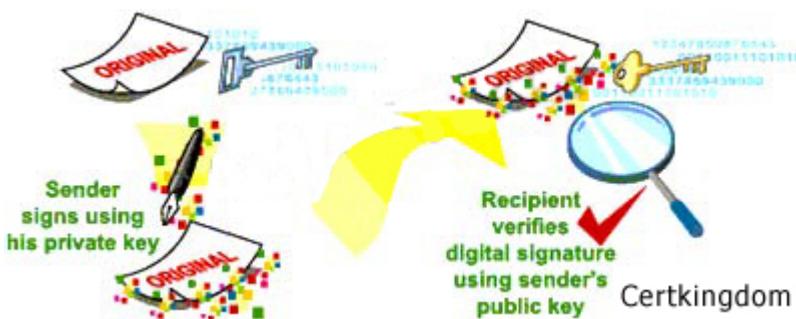
If the message has remained integral during its transit (i.e. it has not been tampered with), when compared the two hashes will be identical.

However, if the two hashes differ when compared then the integrity of the original message has been compromised. If the original message is tampered with it will result in Bob's computer calculating a different hash value. If a different hash value is created, then the original message will have been altered. As a result the verification of the Digital Signature will fail and Bob will be informed.

### Origin, Integrity, Non-Repudiation, and Preventing Men-In-The-Middle (MITM) attacks

Eve, who wants to impersonate Alice, cannot generate the same signature as Alice because she does not have Alice's Private Key (needed to sign the message digest). If instead, Eve decides to alter the content of the message while in transit, the tampered message will create a different message digest to the original message, and Bob's computer will be able to detect that.

Additionally, Alice cannot deny sending the message as it has been signed using her Private Key, thus ensuring non-repudiation.



### Creating and validating a digital signature

Due to the recent Global adoption of Digital Signature law, Alice may now sign a transaction, message or piece of digital data, and so long as it is verified successfully it is a legally permissible means of proof that Alice has made the transaction or written the message.

The following answers are incorrect:

- Public / Private: This is the opposite of the right answer.
- Symmetric / Asymmetric: Not quite. Sorry. This form of crypto is asymmetric so you were almost on target.
- Private / Symmetric: Well, you got half of it right but Symmetric is wrong.

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The following reference(s) was used to create this question:

<http://www.comodo.com/resources/small-business/digital-certificates3.php>

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### QUESTION 907

Which of the following BEST describes a function relying on a shared secret key that is used along with a hashing algorithm to verify the integrity of the communication content as well as the sender?

- A. Message Authentication Code - MAC
- B. PAM - Pluggable Authentication Module
- C. NAM - Negative Acknowledgement Message
- D. Digital Signature Certificate

Answer: A

Explanation: The purpose of a message authentication code - MAC is to verify both the source and message integrity without the need for additional processes.

A MAC algorithm, sometimes called a keyed (cryptographic) hash function (however, cryptographic hash function is only one of the possible ways to generate MACs), accepts as input a secret key and an arbitrary-length message to be authenticated, and outputs a MAC (sometimes known as a tag). The MAC value protects both a message's data integrity as well as its authenticity, by allowing verifiers (who also possess the secret key) to detect any changes to the message content.

MACs differ from digital signatures as MAC values are both generated and verified using the same secret key. This implies that the sender and receiver of a message must agree on the same key before initiating communications, as is the case with symmetric encryption. For the same reason, MACs do not provide the property of non-repudiation offered by signatures specifically in the case of a network-wide shared secret key: any user who can verify a MAC is also capable of generating MACs for other messages.

In contrast, a digital signature is generated using the private key of a key pair, which is asymmetric encryption. Since this private key is only accessible to its holder, a digital signature proves that a document was signed by none other than that holder. Thus, digital signatures do offer nonrepudiation.

The following answers are incorrect:

- PAM - Pluggable Authentication Module: This isn't the right answer. There is no known message authentication function called a PAM. However, a pluggable authentication module (PAM) is a mechanism to integrate multiple low-level authentication schemes and commonly used within the Linux Operating System.
- NAM - Negative Acknowledgement Message: This isn't the right answer. There is no known message authentication function called a NAM. The proper term for a negative acknowledgement is NAK, it is a signal used in digital communications to ensure that data is received with a minimum of errors.
- Digital Signature Certificate: This isn't right. As it is explained and contrasted in the explanations provided above.

The following reference(s) was used to create this question:

[http://en.wikipedia.org/wiki/Message\\_authentication\\_code](http://en.wikipedia.org/wiki/Message_authentication_code)

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**QUESTION 908**

Which answer BEST describes a secure cryptoprocessor that can be used to store cryptographic keys, passwords or certificates in a component located on the motherboard of a computer?

- A. TPM - Trusted Platform Module
- B. TPM - Trusted Procedure Module
- C. Smart Card
- D. Enigma Machine

Answer: A

Explanation: The Trusted Platform Module (TPM) is an international standard for a secure cryptoprocessor. The TPM technical specification was written by a computer industry consortium called the Trusted Computing Group (TCG). The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) standardized the specification as ISO/IEC 11889 in 2009.

A TPM is a specialized chip that can be installed on the motherboard of a computer and is used for hardware authentication. The TPM authenticates the computer in question rather than the user. TPM uses the boot sequence of the computer to determine the trusted status of a platform. The TPM places the cryptographic processes at the hardware level. If someone removes the drives and attempts to boot the hard drive from another computer, the hard drive will fail and deny all access. This provides a greater level of security than a software encryption option that may have only been used to encrypt a few folders on the hard drive. TPM was designed as an inexpensive way to securely report the environment that booted and to identify the system.

The following answers are incorrect:

- TPM - Trusted Procedure Module: Almost, TPM is right but it's Trusted Platform Module, not Procedure. Read the questions carefully to avoid mistakes like this.
- Smart Card: Sorry, smart cards do not have cryptoprocessors.
- Enigma Machine: This is a great answer but it is incorrect because the Enigma Machine is an invention by the German Engineer Arthur Scherbius at the end of WWI. The Enigma was used by the Germans to encrypt Military communications throughout WWII and remained classified well into the 1970s.

The following reference(s) was used to create this question:

[http://en.wikipedia.org/wiki/Trusted\\_Platform\\_Module](http://en.wikipedia.org/wiki/Trusted_Platform_Module)

and

Gregg, Michael; Haines, Billy (2012-02-16). CASP: CompTIA Advanced Security Practitioner Study Guide Authorized Courseware: Exam CAS-001 (p. 205). Wiley. Kindle Edition.

**QUESTION 909**

There are basic goals of Cryptography. Which of the following most benefits from the process of encryption?

- A. Confidentiality
- B. Authentication
- C. Integrity
- D. Non-Repudiation

Answer: A

Explanation: Encryption would be one of your last layer within Defense in Depth. When we encrypt files, for the most part they are useless to anyone (they can't get access to the plaintext) except the person possessing the encryption key to decrypt the files.

With strong encryption we can assume that they are safe so long as the encryption key is secured. This process provides confidentiality that the data has not been divulged, even if captured (Sniffed) or otherwise stolen while in transit or in storage.

Consider this mnemonic to help you remember the basic cryptographic goals:

P: Privacy (or confidentiality)

A: Authentication

I: Integrity

N: Non-repudiation

The following answers are incorrect:

Authentication: Authentication isn't insured by encryption alone. Incorrect.

Integrity: Encryption doesn't insure integrity. Hashing algorithms would be used instead. Sorry.

Incorrect answer.

Non-repudiation: Sorry, encryption alone doesn't insure non-repudiation. You would need to have a valid Public Key Infrastructure (PKI) in place along with the proper processes.

The following reference(s) was used to create this question:

Gregg, Michael; Haines, Billy (2012-02-16). CASP: CompTIA Advanced Security Practitioner Study Guide Authorized Courseware: Exam CAS-001 (p. 3). Wiley. Kindle Edition.

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## QUESTION 910

Readable is to unreadable just as plain text is to \_\_\_\_\_?

A. Cipher Text

B. Encryption

C. Unplain Text

D. Digitally Signed

Answer: A

Explanation: When we encrypt text it is unreadable and referred to as Cipher Text.

The following answers are incorrect:

Encryption: Changing plain text to cipher text is the process of encryption but it isn't the right answer here. Sorry.

Unplain text: Sorry, that's not even a real word. Lol.

Digitally Signed: This answer is related to cryptography but isn't the right answer. We sign items so that the recipient can assure that the document came from the stated individual and it was not modified. A Digital Signature provides Authenticity and Integrity.

The following reference(s) was used to create this question:

Gregg, Michael; Haines, Billy (2012-02-16). CASP: CompTIA Advanced Security Practitioner Study Guide Authorized Courseware: Exam CAS-001 (p. 4). Wiley. Kindle Edition.

(Security Architecture and Design)

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**QUESTION 911**

In Mandatory Access Control, sensitivity labels attached to object contain what information?

- A. The item's classification
- B. The item's classification and category set
- C. The item's category
- D. The item's need to know

Answer: B

Explanation: A Sensitivity label must contain at least one classification and one category set. Category set and Compartment set are synonyms, they mean the same thing. The sensitivity label must contain at least one Classification and at least one Category. It is common in some environments for a single item to belong to multiple categories. The list of all the categories to which an item belongs is called a compartment set or category set.

The following answers are incorrect:

the item's classification. Is incorrect because you need a category set as well.

the item's category. Is incorrect because category set and classification would be both be required.

The item's need to know. Is incorrect because there is no such thing. The need to know is indicated by the categories the object belongs to. This is NOT the best answer.

Reference(s) used for this question:

OIG CBK, Access Control (pages 186 - 188)

AIO, 3rd Edition, Access Control (pages 162 - 163)

AIO, 4th Edition, Access Control, pp 212-214.

Wikipedia - [http://en.wikipedia.org/wiki/Mandatory\\_Access\\_Control](http://en.wikipedia.org/wiki/Mandatory_Access_Control)

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**QUESTION 912**

The Orange Book describes four hierarchical levels to categorize security systems. Which of the following levels require mandatory protection?

- A. A and B.
- B. B and C.
- C. A, B, and C.
- D. B and D.

Answer: A

Explanation: Level B is the first to require Mandatory Protection. Because the higher levels also inherit the requirements of all lower levels, level A also requires Mandatory Protection.

The following answers are incorrect:

B and C. Is incorrect because Mandatory Protection is not required until level B, Level C is a lower level.

A, B, and C. Is incorrect because Mandatory Protection is not required until level B, Level C is a lower level.

---

B and D. Is incorrect because Mandatory Protection is not required until level B, Level D is a lower level.

One of the first accepted evaluation standards was the Trusted Computer Security Evaluation Criteria or TCSEC. The Orange Book was part of this standard that defines four security divisions consisting of seven different classes for security ratings. The lowest class offering the least protection is D - Minimal protection. The highest classification would be A1 offering the most secure environment. As you go to the next division and class you inherit the requirements of the lower levels. So, for example C2 would also incorporate the requirements for C1 and D.

The divisions and classes are:

D – Minimal protection  
C – Discretionary protection  
C1 – Discretionary Security Protection  
C2 – Controlled Access Protection  
B – Mandatory Protection  
B1 – Labeled Security  
B2 – Structured Protection  
B3 – Security Domains  
A – Verified Protection  
A1 – Verified Design

Wikipedia: "TCSEC was replaced with the development of the Common Criteria international standard originally published in 2005."

References:

OIG CBK, Security Architecture and Design (pages 329 - 330)  
AIO, 3rd Edition, Security Models and Architecture (pages 302 - 306)  
AIO, 4th Edition, Security Architecture and Design, pp357-361.  
Wikipedia - [http://en.wikipedia.org/wiki/TCSEC#Divisions\\_and\\_Classes](http://en.wikipedia.org/wiki/TCSEC#Divisions_and_Classes)  
DOD TCSEC - <http://www.cerberussystems.com/INFOSEC/stds/d520028.htm>  
NSI reference for Orange book: <http://nsi.org/Library/Compsec/orangebo.txt>

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## QUESTION 913

What mechanism does a system use to compare the security labels of a subject and an object?

- A. Validation Module.
- B. Reference Monitor.
- C. Clearance Check.
- D. Security Module.

Answer: B

Explanation: Because the Reference Monitor is responsible for access control to the objects by the subjects it compares the security labels of a subject and an object.

According to the OIG: The reference monitor is an access control concept referring to an abstract machine that mediates all accesses to objects by subjects based on information in an access control database. The reference monitor must mediate all access, be protected from modification, be verifiable as correct, and must always be invoked. The reference monitor, in accordance with the security policy, controls the checks that are made in the access control database.

---

The following are incorrect:

Validation Module. A Validation Module is typically found in application source code and is used to validate data being inputted.

Clearance Check. Is a distractor, there is no such thing other than what someone would do when checking if someone is authorized to access a secure facility.

Security Module. Is typically a general purpose module that performs a variety of security related functions.

References:

OIG CBK, Security Architecture and Design (page 324)  
AIO, 4th Edition, Security Architecture and Design, pp 328-328.  
Wikipedia - [http://en.wikipedia.org/wiki/Reference\\_monitor](http://en.wikipedia.org/wiki/Reference_monitor)

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### QUESTION 914

What are the components of an object's sensitivity label?

- A. A Classification Set and a single Compartment.
- B. A single classification and a single compartment.
- C. A Classification Set and user credentials.
- D. A single classification and a Compartment Set.

Answer: D

Explanation: Both are the components of a sensitivity label.

The following are incorrect:

A Classification Set and a single Compartment. Is incorrect because the nomenclature "Classification Set" is incorrect, there only one classification and it is not a "single compartment" but a Compartment Set.

A single classification and a single compartment. Is incorrect because while there only is one classification, it is not a "single compartment" but a Compartment Set.

A Classification Set and user credentials. Is incorrect because the nomenclature "Classification Set" is incorrect, there only one classification and it is not "user credential" but a Compartment Set. The user would have their own sensitivity label.

---

### QUESTION 915

What does it mean to say that sensitivity labels are "incomparable"?

- A. The number of classification in the two labels is different.
- B. Neither label contains all the classifications of the other.
- C. the number of categories in the two labels are different.
- D. Neither label contains all the categories of the other.

Answer: D

Explanation: If a category does not exist then you cannot compare it. Incomparable is when you have two disjointed sensitivity labels, that is a category in one of the labels is not in the other label. "Because neither label contains all the categories of the other, the labels can't be compared.

---

They're said to be incomparable"

#### COMPARABILITY:

The label:

TOP SECRET [VENUS ALPHA]

is "higher" than either of the labels:

SECRET [VENUS ALPHA] TOP SECRET [VENUS]

But you can't really say that the label:

TOP SECRET [VENUS]

is higher than the label:

SECRET [ALPHA]

Because neither label contains all the categories of the other, the labels can't be compared.

They're said to be incomparable. In a mandatory access control system, you won't be allowed access to a file whose label is incomparable to your clearance.

The Multilevel Security policy uses an ordering relationship between labels known as the dominance relationship. Intuitively, we think of a label that dominates another as being "higher" than the other. Similarly, we think of a label that is dominated by another as being "lower" than the other. The dominance relationship is used to determine permitted operations and information flows.

#### DOMINANCE

The dominance relationship is determined by the ordering of the Sensitivity/Clearance component of the label and the intersection of the set of Compartments.

Sample Sensitivity/Clearance ordering are:

Top Secret > Secret > Confidential > Unclassified

s3 > s2 > s1 > s0

Formally, for label one to dominate label 2 both of the following must be true:

The sensitivity/clearance of label one must be greater than or equal to the sensitivity/clearance of label two.

The intersection of the compartments of label one and label two must equal the compartments of label two.

Additionally:

Two labels are said to be equal if their sensitivity/clearance and set of compartments are exactly equal. Note that dominance includes equality.

One label is said to strictly dominate the other if it dominates the other but is not equal to the other.

Two labels are said to be incomparable if each label has at least one compartment that is not included in the other's set of compartments.

The dominance relationship will produce a partial ordering over all possible MLS labels, resulting in what is known as the MLS Security Lattice.

The following answers are incorrect:

The number of classification in the two labels is different. Is incorrect because the categories are what is being compared, not the classifications.

Neither label contains all the classifications of the other. Is incorrect because the categories are what is being compared, not the classifications.

the number of categories in the two labels is different. Is incorrect because it is possible a category exists more than once in one sensitivity label and does not exist in the other so they would be comparable.

Reference(s) used for this question:

O'Reilly - Computer Systems and Access Control (Chapter 3)  
<http://www.oreilly.com/catalog/csb/chapter/ch03.html>  
and  
[http://rubix.com/cms/mls\\_dom](http://rubix.com/cms/mls_dom)

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### QUESTION 916

As per the Orange Book, what are two types of system assurance?

- A. Operational Assurance and Architectural Assurance.
- B. Design Assurance and Implementation Assurance.
- C. Architectural Assurance and Implementation Assurance.
- D. Operational Assurance and Life-Cycle Assurance.

Answer: D

Explanation: Are the two types of assurance mentioned in the Orange book.

The following answers are incorrect:

Operational Assurance and Architectural Assurance. Is incorrect because Architectural Assurance is not a type of assurance mentioned in the Orange book.

Design Assurance and Implementation Assurance. Is incorrect because neither are types of assurance mentioned in the Orange book.

Architectural Assurance and Implementation Assurance. Is incorrect because neither are types of assurance mentioned in the Orange book.

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### QUESTION 917

The Orange Book requires auditing mechanisms for any systems evaluated at which of the following levels?

- A. C1 and above.
- B. C2 and above.
- C. B1 and above.
- D. B2 and above.

Answer: B

Explanation: All levels from C2 and above require Auditing mechanisms. C2: Controlled Access Protection: Identify individuals, auditing (especially of security related events which must be protected), object reuse concept, strict logon, decision making capability when subjects access objects.

The following answers are incorrect:

C1 and above. Is incorrect because auditing is not a requirement until level C2. C1 is a lower level.

B1 and above. Is incorrect because auditing is a requirement of level C2. B1 is a higher level so would not address level C2.

B2 and above. Is incorrect because auditing is a requirement of level C2. B2 is a higher level so would not address level C2.

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**QUESTION 918**

Which of the following are required for Life-Cycle Assurance?

- A. System Architecture and Design specification.
- B. Security Testing and Covert Channel Analysis.
- C. Security Testing and Trusted distribution.
- D. Configuration Management and Trusted Facility Management.

Answer: C

Explanation: Security testing and trusted distribution are required for Life-Cycle Assurance.

The following answers are incorrect:

System Architecture and Design specification. Is incorrect because System Architecture is not required for Life-Cycle Assurance.

Security Testing and Covert Channel Analysis. Is incorrect because Covert Channel Analysis is not required for Life-Cycle Assurance.

Configuration Management and Trusted Facility Management. Is incorrect because Trusted Facility Management. is not required for Life-Cycle Assurance.

**QUESTION 919**

Memory management in TCSEC levels B3 and A1 operating systems may utilize "data hiding".

What does this mean?

- A. System functions are layered, and none of the functions in a given layer can access data outside that layer.
- B. Auditing processes and their memory addresses cannot be accessed by user processes.
- C. Only security processes are allowed to write to ring zero memory.
- D. It is a form of strong encryption cipher.

Answer: A

Explanation: Data Hiding is protecting data so that it is only available to higher levels this is done and is also performed by layering, when the software in each layer maintains its own global data and does not directly reference data outside its layers.

The following answers are incorrect:

Auditing processes and their memory addresses cannot be accessed by user processes. Is incorrect because this does not offer data hiding.

Only security processes are allowed to write to ring zero memory. This is incorrect, the security kernel would be responsible for this.

It is a form of strong encryption cipher. Is incorrect because this does not conform to the definition of data hiding.

**QUESTION 920**

The Orange Book states that "Hardware and software features shall be provided that can be used to periodically validate the correct operation of the on-site hardware and firmware elements of the TCB [Trusted Computing Base]." This statement is the formal requirement for:

- A. Security Testing.
- B. Design Verification.
- C. System Integrity.
- D. System Architecture Specification.

Answer: C

Explanation: This is a requirement starting as low as C1 within the TCSEC rating. The Orange book requires the following for System Integrity Hardware and/or software features shall be provided that can be used to periodically validate the correct operation of the on-site hardware and firmware elements of the TCB.

**NOTE FROM CLEMENT:**

This is a question that confuses a lot of people because most people take for granted that the orange book with its associated Bell LaPadula model has nothing to do with integrity. However you have to be careful about the context in which the word integrity is being used. You can have Data Integrity and you can have System Integrity which are two completely different things.

Yes, the Orange Book does not specifically address the Integrity requirements, however it has to run on top of systems that must meet some integrity requirements.

This is part of what they call operational assurance which is defined as a level of confidence of a trusted system's architecture and implementation that enforces the system's security policy. It includes:

- System architecture
- Covert channel analysis
- System integrity
- Trusted recovery

**DATA INTEGRITY**

Data Integrity is very different from System Integrity. When you have integrity of the data, there are three goals:

1. Prevent authorized users from making unauthorized modifications
2. Prevent unauthorized users from making modifications
3. Maintaining internal and external consistency of the data

Bell LaPadula which is based on the Orange Book address does not address Integrity, it addresses only Confidentiality.

Biba address only the first goal of integrity.

Clark-Wilson addresses the three goals of integrity.

In the case of this question, there is a system integrity requirement within the TCB. As mentioned above here is an extract of the requirements: Hardware and/or software features shall be provided that can be used to periodically validate the correct operation of the on-site hardware and firmware elements of the TCB.

The following answers are incorrect:

Security Testing. Is incorrect because Security Testing has no set of requirements in the Orange book.

Design Verification. Is incorrect because the Orange book's requirements for Design Verification include: A formal model of the security policy must be clearly identified and documented, including a mathematical proof that the model is consistent with its axioms and is sufficient to support the

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security policy.

System Architecture Specification. Is incorrect because there are no requirements for System Architecture Specification in the Orange book.

The following reference(s) were used for this question:

Trusted Computer Security Evaluation Criteria (TCSEC), DoD 5200.28-STD, page 15, 18, 25, 31, 40, 50.

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition, Security Architecture and Design, Page 392-397, for users with the Kindle Version see Kindle Locations 28504-28505.

and

DOD TCSEC - <http://www.cerberussystems.com/INFOSEC/stds/d520028.htm>

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### QUESTION 921

Which of the following can be used as a covert channel?

- A. Storage and timing.
- B. Storage and low bits.
- C. Storage and permissions.
- D. Storage and classification.

Answer: A

Explanation: The Orange book requires protection against two types of covert channels, Timing and Storage.

The following answers are incorrect:

Storage and low bits. Is incorrect because, low bits would not be considered a covert channel.

Storage and permissions. Is incorrect because, permissions would not be considered a covert channel.

Storage and classification. Is incorrect because, classification would not be considered a covert channel.

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### QUESTION 922

Covert Channel Analysis is first introduced at what level of the TCSEC rating?

- A. C2 and above.
- B. B1 and above.
- C. B2 and above.
- D. B3 and above.

Answer: C

Explanation: The Orange Book first introduce a requirement for Covert Channel Analysis at level B2 and all levels above B2 would also require this.

The AIO defines a Covert Channel as a communications path that enables a process to transmit information in a way that violates the system's security policy. It is a communication channel that allows two cooperating processes to transfer information in such a way that it violates the system's security policy. Even though there are protection mechanisms in place, if unauthorized information

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can be transferred using a signaling mechanism via entities or objects not normally considered to be able to communicate, then a covert channel may exist.

The following answers are incorrect:

C2 and above. Is incorrect because, the Orange book requires Covert Channel Analysis only starting at level B2 and above, level C2 is lower than B2 and it would not require covert channel analysis.

B1 and above. Is incorrect because, the Orange book requires Covert Channel Analysis only at level B2 and above, level B1 is lower than B2 and it would not require covert channel analysis.

B3 and above. Is incorrect because, the Orange book first requires Covert Channel Analysis at level B2.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 13347-13350). Auerbach Publications. Kindle Edition.

and

NIST <http://csrc.nist.gov/publications/secpubs/rainbow/std001.txt>

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### QUESTION 923

At what Orange Book evaluation levels are design specification and verification first required?

- A. C1 and above.
- B. C2 and above.
- C. B1 and above.
- D. B2 and above.

Answer: C

Explanation: Level B1 is the first to require design specification and verification and this would also be a requirement for all higher levels.

The following answers are incorrect:

C1 and above. Is incorrect because design specification and verification is not a requirement until level B1. C1 is a lower level.

C2 and above. Is incorrect because design specification and verification is not a requirement until level B1. C2 is a lower level.

B2 and above. Is incorrect because design specification and verification is a requirement of level B1. B2 is a higher level so would not address level B1.

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### QUESTION 924

Configuration Management controls what?

- A. Auditing of changes to the Trusted Computing Base.
- B. Control of changes to the Trusted Computing Base.
- C. Changes in the configuration access to the Trusted Computing Base.
- D. Auditing and controlling any changes to the Trusted Computing Base.

Answer: D

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Explanation: All of these are components of Configuration Management.

The following answers are incorrect:

Auditing of changes to the Trusted Computing Base. Is incorrect because it refers only to auditing the changes, but nothing about controlling them.

Control of changes to the Trusted Computing Base. Is incorrect because it refers only to controlling the changes, but nothing about ensuring the changes will not lead to a weakness or fault in the system.

Changes in the configuration access to the Trusted Computing Base. Is incorrect because this does not refer to controlling the changes or ensuring the changes will not lead to a weakness or fault in the system.

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### QUESTION 925

At which of the Orange Book evaluation levels is configuration management required?

- A. C1 and above.
- B. C2 and above.
- C. B1 and above.
- D. B2 and above.

Answer: D

Explanation: Level B2 is the first level to require configuration management and this would also be a requirement for all higher levels.

The following answers are incorrect:

C1 and above. Is incorrect because configuration management is not a requirement until level B2.  
C1 is a lower level.

C2 and above. Is incorrect because configuration management is not a requirement until level B2.  
C2 is a lower level.

B1 and above. Is incorrect because configuration management is not a requirement until level B2.  
B1 is a lower level.

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### QUESTION 926

What is the purpose of Trusted Distribution?

- A. To ensure that messages sent from a central office to remote locations are free from tampering.
- B. To prevent the sniffing of data as it travels through an untrusted network enroute to a trusted network.
- C. To ensure that the Trusted Computing Base is not tampered with during shipment or installation.
- D. To ensure that messages received at the Trusted Computing Base are not old messages being resent as part of a replay attack.

Answer: C

Explanation: One of the first accepted evaluation standards was the Trusted Computer Security Evaluation Criteria or TCSEC. The Orange Book was part of this standard that defines four

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security divisions consisting of seven different classes for security ratings. The lowest class offering the least protection is D - Minimal protection. The highest classification would be A1 offering the most secure environment. As you go to the next division and class you inherit the requirements of the lower levels. So, for example C2 would also incorporate the requirements for C1 and D. Design specification and verification is a formal model of the security policy supported through the life-cycle of the system.

Trusted Distribution is ensuring nothing has been tampered with not even the documentation, this is part of the Life-Cycle Assurance Requirements (See below)

#### Life-cycle Assurance Requirements

- Security Testing
- Design Specification and verification
- Configuration Management
- Trusted system distribution

The following answers are incorrect:

To ensure that messages sent from a central office to remote locations are free from tampering.

This is incorrect because it does not deal with the Trusted Computing Base.

To prevent the sniffing of data as it travels through an untrusted network enroute to a trusted network. This is incorrect because it does not deal with the Trusted Computing Base.

To ensure that messages received at the Trusted Computing Base are not old messages being resent as part of a replay attack. This is incorrect because it does not deal with ensuring the Trusted Computing Base has not been tampered with.

References:

NIST <http://csrc.nist.gov/publications/secpubs/rainbow/std001.txt>

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#### QUESTION 927

Which Orange Book evaluation level is described as "Verified Design"?

- A. A1.
- B. B3.
- C. B2.
- D. B1.

Answer: A

Explanation: Level A1 is described as Verified Design.

The following answers are incorrect:

B3. This is incorrect because level B3 is described as Security Domains.

B2. This is incorrect because level B2 is described as Structured Protection.

B1. This is incorrect because level B1 is described as Labeled Security.

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#### QUESTION 928

Which Orange Book evaluation level is described as "Structured Protection"?

- A. A1
- B. B3
- C. B2

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D. B1

Answer: C

Explanation: Level B2 is described as Structured Protection.

The following answers are incorrect:

- A1. This is incorrect because level A1 is described as Verified Design.
  - B3. This is incorrect because level B3 is described as Security Domains.
  - B1. This is incorrect because level B1 is described as Labeled Security.
- 

### QUESTION 929

Who developed one of the first mathematical models of a multilevel-security computer system?

- A. Diffie and Hellman.
- B. Clark and Wilson.
- C. Bell and LaPadula.
- D. Gasser and Lipner.

Answer: C

Explanation: In 1973 Bell and LaPadula created the first mathematical model of a multi-level security system.

The following answers are incorrect:

- Diffie and Hellman. This is incorrect because Diffie and Hellman was involved with cryptography.
  - Clark and Wilson. This is incorrect because Bell and LaPadula was the first model. The Clark-Wilson model came later, 1987.
  - Gasser and Lipner. This is incorrect, it is a distractor. Bell and LaPadula was the first model.
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### QUESTION 930

If an operating system permits shared resources such as memory to be used sequentially by multiple users/application or subjects without a refresh of the objects/memory area, what security problem is MOST likely to exist?

- A. Disclosure of residual data.
- B. Unauthorized obtaining of a privileged execution state.
- C. Data leakage through covert channels.
- D. Denial of service through a deadly embrace.

Answer: A

Explanation: Allowing objects to be used sequentially by multiple users without a refresh of the objects can lead to disclosure of residual data. It is important that steps be taken to eliminate the chance for the disclosure of residual data.

Object reuse refers to the allocation or reallocation of system resources to a user or, more appropriately, to an application or process. Applications and services on a computer system may create or use objects in memory and in storage to perform programmatic functions. In some

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cases, it is necessary to share these resources between various system applications. However, some objects may be employed by an application to perform privileged tasks on behalf of an authorized user or upstream application. If object usage is not controlled or the data in those objects is not erased after use, they may become available to unauthorized users or processes. Disclosure of residual data and Unauthorized obtaining of a privileged execution state are both a problem with shared memory and resources. Not clearing the heap/stack can result in residual data and may also allow the user to step on somebody's session if the security token/identify was maintained in that space. This is generally more malicious and intentional than accidental though. The MOST common issue would be Disclosure of residual data.

The following answers are incorrect:

Unauthorized obtaining of a privileged execution state. Is incorrect because this is not a problem with Object Reuse.

Data leakage through covert channels. Is incorrect because it is not the best answer. A covert channel is a communication path. Data leakage would not be a problem created by Object Reuse. In computer security, a covert channel is a type of computer security attack that creates a capability to transfer information objects between processes that are not supposed to be allowed to communicate by the computer security policy. The term, originated in 1973 by Lampson is defined as "(channels) not intended for information transfer at all, such as the service program's effect on system load." to distinguish it from Legitimate channels that are subjected to access controls by COMPUSEC.

Denial of service through a deadly embrace. Is incorrect because it is only a detractor.

References:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 4174-4179). Auerbach Publications. Kindle Edition.

and

<https://www.fas.org/irp/nsa/rainbow/tg018.htm>

and

[http://en.wikipedia.org/wiki/Covert\\_channel](http://en.wikipedia.org/wiki/Covert_channel)

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## QUESTION 931

The Information Technology Security Evaluation Criteria (ITSEC) was written to address which of the following that the Orange Book did not address?

- A. integrity and confidentiality.
- B. confidentiality and availability.
- C. integrity and availability.
- D. none of the above.

Answer: C

Explanation: TCSEC focused on confidentiality while ITSEC added integrity and availability as security goals.

The following answers are incorrect:

integrity and confidentiality. Is incorrect because TCSEC addressed confidentiality.

confidentiality and availability. Is incorrect because TCSEC addressed confidentiality.

none of the above. Is incorrect because ITSEC added integrity and availability as security goals.

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**QUESTION 932**

An Architecture where there are more than two execution domains or privilege levels is called:

- A. Ring Architecture.
- B. Ring Layering
- C. Network Environment.
- D. Security Models

Answer: A

Explanation: In computer science, hierarchical protection domains, often called protection rings, are a mechanism to protect data and functionality from faults (fault tolerance) and malicious behavior (computer security). This approach is diametrically opposite to that of capability-based security.

Computer operating systems provide different levels of access to resources. A protection ring is one of two or more hierarchical levels or layers of privilege within the architecture of a computer system. This is generally hardware-enforced by some CPU architectures that provide different CPU modes at the hardware or microcode level. Rings are arranged in a hierarchy from most privileged (most trusted, usually numbered zero) to least privileged (least trusted, usually with the highest ring number). On most operating systems, Ring 0 is the level with the most privileges and interacts most directly with the physical hardware such as the CPU and memory.

Special gates between rings are provided to allow an outer ring to access an inner ring's resources in a predefined manner, as opposed to allowing arbitrary usage. Correctly gating access between rings can improve security by preventing programs from one ring or privilege level from misusing resources intended for programs in another. For example, spyware running as a user program in Ring 3 should be prevented from turning on a web camera without informing the user, since hardware access should be a Ring 1 function reserved for device drivers. Programs such as web browsers running in higher numbered rings must request access to the network, a resource restricted to a lower numbered ring.

Ring Architecture

All of the other answers are incorrect because they are detractors.

References:

OIG CBK Security Architecture and Models (page 311)  
and  
[https://en.wikipedia.org/wiki/Ring\\_%28computer\\_security%29](https://en.wikipedia.org/wiki/Ring_%28computer_security%29)

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**QUESTION 933**

Which of the following components are considered part of the Trusted Computing Base?

- A. trusted hardware and firmware
- B. trusted hardware and software
- C. trusted hardware, software and firmware
- D. trusted computer operators and system managers

Answer: C

Explanation: The trusted computing base (TCB) is a collection of all the hardware, software, and firmware components within a system that provide some type of security and enforce the system's security policy. The TCB does not address only operating system components, because a computer system is not made up of only an operating system. Hardware, software components, and firmware components can affect the system in a negative or positive manner, and each has a responsibility to support and enforce the security policy of that particular system. Some components and mechanisms have direct responsibilities in supporting the security policy, such as firmware that will not let a user boot a computer from a USB drive, or the memory manager that will not let processes overwrite other processes' data. Then there are components that do not enforce the security policy but must behave properly and not violate the trust of a system. Examples of the ways in which a component could violate the system's security policy include an application that is allowed to make a direct call to a piece of hardware instead of using the proper system calls through the operating system, a process that is allowed to read data outside of its approved memory space, or a piece of software that does not properly release resources after use.

To assist with the evaluation of secure products, TCSEC introduced the idea of the Trusted Computing Base (TCB) into product evaluation. In essence, TCSEC starts with the principle that there are some functions that simply must be working correctly for security to be possible and consistently enforced in a computing system. For example, the ability to define subjects and objects and the ability to distinguish between them is so fundamental that no system could be secure without it. The TCB then are these fundamental controls implemented in a given system, whether that is in hardware, software, or firmware. Each of the TCSEC levels describes a different set of fundamental functions that must be in place to be certified to that level.

The link below will take you to a one page document that describes the high-level requirements that any TCB would need to meet to achieve each division or class (essentially a subdivision) of the TCSEC rating. See details at:

<https://www.freepRACTICETESTS.org/documents/TCB.pdf>

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (pp. 359-360). McGraw-Hill. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 17936-17943). Auerbach Publications. Kindle Edition.

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### QUESTION 934

Which of the following places the Orange Book classifications in order from most secure to least secure?

- A. A, B, C, D
- B. D, C, B, A
- C. D, B, A, C
- D. C, D, B, A

Answer: A

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Explanation: Source: RUSSEL, Deborah & GANGEMI, G.T. Sr., Computer Security Basics, O'Reilly, 1991, pg. 289.  
Also: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 5: Security Models and Architecture (pages 251-255).  
And: U.S. Department of Defense, Trusted Computer System Evaluation Criteria (Orange Book), DOD 5200.28-STD. December 1985 (also available here).

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### QUESTION 935

The Orange Book is founded upon which security policy model?

- A. The Biba Model
- B. The Bell LaPadula Model
- C. Clark-Wilson Model
- D. TEMPEST

Answer: B

Explanation: From the glossary of Computer Security Basics:

The Bell-LaPadula model is the security policy model on which the Orange Book requirements are based. From the Orange Book definition, "A formal state transition model of computer security policy that describes a set of access control rules. In this formal model, the entities in a computer system are divided into abstract sets of subjects and objects. The notion of secure state is defined and it is proven that each state transition preserves security by moving from secure state to secure state; thus, inductively proving the system is secure. A system state is defined to be 'secure' if the only permitted access modes of subjects to objects are in accordance with a specific security policy. In order to determine whether or not a specific access mode is allowed, the clearance of a subject is compared to the classification of the object and a determination is made as to whether the subject is authorized for the specific access mode."

The Biba Model is an integrity model of computer security policy that describes a set of rules. In this model, a subject may not depend on any object or other subject that is less trusted than itself. The Clark Wilson Model is an integrity model for computer security policy designed for a commercial environment. It addresses such concepts as nondiscretionary access control, privilege separation, and least privilege. TEMPEST is a government program that prevents the compromising electrical and electromagnetic signals that emanate from computers and related equipment from being intercepted and deciphered.

Source: RUSSEL, Deborah & GANGEMI, G.T. Sr., Computer Security Basics, O'Reilly, 1991.  
Also: U.S. Department of Defense, Trusted Computer System Evaluation Criteria (Orange Book), DOD 5200.28-STD. December 1985 (also available here).

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### QUESTION 936

Which of the following is NOT a basic component of security architecture?

- A. Motherboard
- B. Central Processing Unit (CPU)
- C. Storage Devices
- D. Peripherals (input/output devices)

Answer: A

Explanation: The CPU, storage devices and peripherals each have specialized roles in the security architecture. The CPU, or microprocessor, is the brains behind a computer system and performs calculations as it solves problems and performs system tasks. Storage devices provide both long- and short-term storage of information that the CPU has either processed or may process. Peripherals (scanners, printers, modems, etc) are devices that either input data or receive the data output by the CPU.

The motherboard is the main circuit board of a microcomputer and contains the connectors for attaching additional boards. Typically, the motherboard contains the CPU, BIOS, memory, mass storage interfaces, serial and parallel ports, expansion slots, and all the controllers required to control standard peripheral devices.

Reference(s) used for this question:

TIPTON, Harold F., The Official (ISC)2 Guide to the CISSP CBK (2007), page 308.

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### QUESTION 937

Which of the following is the lowest TCSEC class wherein the systems must support separate operator and system administrator roles?

- A. B2
- B. B1
- C. A1
- D. A2

Answer: A

Explanation: For the purpose of the exam you must know what is being introduced at each of the TCSEC rating. There is a fantastic one page guide that shows clearly what is being introduced at each of the layers. You can download a copy of the guide at:

<https://www.freepracticetests.org/documents/tcsec.pdf>

You can also download a nice document that covers the modes of operations at:

<https://www.freepracticetests.org/documents/modesofoperation.pdf>

References:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 220.

and

<http://csrc.nist.gov/publications/secpubs/rainbow/std001.txt> (paragraph 3.2)

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### QUESTION 938

In which of the following model are Subjects and Objects identified and the permissions applied to each subject/object combination are specified. Such a model can be used to quickly summarize what permissions a subject has for various system objects.

- A. Access Control Matrix model
- B. Take-Grant model

- 
- C. Bell-LaPadula model
  - D. Biba model

Answer: A

Explanation: An access control matrix is a table of subjects and objects indicating what actions individual subjects can take upon individual objects. Matrices are data structures that programmers implement as table lookups that will be used and enforced by the operating system. This type of access control is usually an attribute of DAC models. The access rights can be assigned directly to the subjects (capabilities) or to the objects (ACLs).

#### Capability Table

A capability table specifies the access rights a certain subject possesses pertaining to specific objects. A capability table is different from an ACL because the subject is bound to the capability table, whereas the object is bound to the ACL.

#### Access control lists (ACLs)

ACLs are used in several operating systems, applications, and router configurations. They are lists of subjects that are authorized to access a specific object, and they define what level of authorization is granted. Authorization can be specific to an individual, group, or role. ACLs map values from the access control matrix to the object.

Whereas a capability corresponds to a row in the access control matrix, the ACL corresponds to a column of the matrix.

NOTE: Ensure you are familiar with the terms Capability and ACLs for the purpose of the exam.  
Resource(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 5264-5267). McGraw-Hill. Kindle Edition.

or

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition, Page 229

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 1923-1925). Auerbach Publications. Kindle Edition.

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#### QUESTION 939

In which of the following security models is the subject's clearance compared to the object's classification such that specific rules can be applied to control how the subject-to-object interactions take place?

- A. Bell-LaPadula model
- B. Biba model
- C. Access Matrix model
- D. Take-Grant model

Answer: A

Explanation: The Bell-LAPadula model is also called a multilevel security system because users with different clearances use the system and the system processes data with different classifications. Developed by the US Military in the 1970s.

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A security model maps the abstract goals of the policy to information system terms by specifying explicit data structures and techniques necessary to enforce the security policy. A security model is usually represented in mathematics and analytical ideas, which are mapped to system specifications and then developed by programmers through programming code. So we have a policy that encompasses security goals, such as “each subject must be authenticated and authorized before accessing an object.” The security model takes this requirement and provides the necessary mathematical formulas, relationships, and logic structure to be followed to accomplish this goal.

A system that employs the Bell-LaPadula model is called a multilevel security system because users with different clearances use the system, and the system processes data at different classification levels. The level at which information is classified determines the handling procedures that should be used. The Bell-LaPadula model is a state machine model that enforces the confidentiality aspects of access control. A matrix and security levels are used to determine if subjects can access different objects. The subject’s clearance is compared to the object’s classification and then specific rules are applied to control how subject-to-object subject-to-object interactions can take place.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 369). McGraw-Hill. Kindle Edition.

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### QUESTION 940

Which of the following classes is the first level (lower) defined in the TCSEC (Orange Book) as mandatory protection?

- A. B
- B. A
- C. C
- D. D

Answer: A

Explanation: B level is the first Mandatory Access Control Level.

First published in 1983 and updated in 1985, the TCSEC, frequently referred to as the Orange Book, was a United States Government Department of Defense (DoD) standard that sets basic standards for the implementation of security protections in computing systems. Primarily intended to help the DoD find products that met those basic standards, TCSEC was used to evaluate, classify, and select computer systems being considered for the processing, storage, and retrieval of sensitive or classified information on military and government systems. As such, it was strongly focused on enforcing confidentiality with no focus on other aspects of security such as integrity or availability. Although it has since been superseded by the common criteria, it influenced the development of other product evaluation criteria, and some of its basic approach and terminology continues to be used.

Reference used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 17920-17926). Auerbach Publications. Kindle Edition. and

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THE source for all TCSEC "level" questions:

<http://csrc.nist.gov/publications/secpubs/rainbow/std001.txt> (paragraph 3 for this one)

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### QUESTION 941

Which of the following classes is defined in the TCSEC (Orange Book) as discretionary protection?

- A. C
- B. B
- C. A
- D. D

Answer: A

Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 197.

Also: THE source for all TCSEC "level" questions:

<http://csrc.nist.gov/publications/secpubs/rainbow/std001.txt>

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### QUESTION 942

Which of the following division is defined in the TCSEC (Orange Book) as minimal protection?

- A. Division D
- B. Division C
- C. Division B
- D. Division A

Answer: A

Explanation: The criteria are divided into four divisions: D, C, B, and A ordered in a hierarchical manner with the highest division (A) being reserved for systems providing the most comprehensive security.

Each division represents a major improvement in the overall confidence one can place in the system for the protection of sensitive information.

Within divisions C and B there are a number of subdivisions known as classes. The classes are also ordered in a hierarchical manner with systems representative of division C and lower classes of division B being characterized by the set of computer security mechanisms that they possess. Assurance of correct and complete design and implementation for these systems is gained mostly through testing of the security-relevant portions of the system. The security-relevant portions of a system are referred to throughout this document as the Trusted Computing Base (TCB).

Systems representative of higher classes in division B and division A derive their security attributes more from their design and implementation structure. Increased assurance that the required features are operative, correct, and tamperproof under all circumstances is gained through progressively more rigorous analysis during the design process.

TCSEC provides a classification system that is divided into hierarchical divisions of assurance levels:

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Division D - minimal security

Division C - discretionary protection

Division B - mandatory protection

Division A - verified protection

Reference: page 358 AIO V.5 Shon Harris

also

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 197.

Also:

THE source for all TCSEC "level" questions:

<http://csrc.nist.gov/publications/secpubs/rainbow/std001.txt>

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### QUESTION 943

Which of the following establishes the minimal national standards for certifying and accrediting national security systems?

- A. NIACAP
- B. DIACAP
- C. HIPAA
- D. TCSEC

Answer: A

Explanation: DIACAP

DITSCAP has been replaced by DIACAP (DoD Information Assurance Certification and Accreditation Process) effective Nov 2007 for C&A within the Department of Defense.

The DoD Information Assurance Certification and Accreditation Process (DIACAP) is the United States Department of Defense (DoD) process to ensure that risk management is applied on information systems (IS). DIACAP defines a DoD-wide formal and standard set of activities, general tasks and a management structure process for the certification and accreditation (C&A) of a DoD IS that will maintain the information assurance (IA) posture throughout the system's life cycle.

An interim version of the DIACAP was signed July 6, 2006 and superseded DITSCAP. The final version is titled Department of Defense Instruction 8510.01 and was signed on November 28, 2007. It supersedes the Interim DIACAP Guidance.

NIACAP

National Information Assurance Certification and Accreditation Process (NIACAP), establishes the minimum national standards for certifying and accrediting national security systems. This process provides a standard set of activities, general tasks, and a management structure to certify and accredit systems that will maintain the Information Assurance (IA) and security posture of a system or site.

HIPAA

The HIPAA legislation had four primary objectives:

- (1) Assure health insurance portability by eliminating job-lock due to pre-existing medical conditions,
- (2) Reduce healthcare fraud and abuse,

- 
- (3) Enforce standards for health information and
  - (4) Guarantee security and privacy of health information.

#### TCSEC

The TCSEC defines a hierarchy of various levels of security functionality and assurance criteria. Progression up the hierarchy involves the addition of security functionality and more stringent assurance criteria to enable users to place progressively more trust in the higher rated systems.

#### REFERENCES:

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 199.

Additional references: National Security Telecommunications and Information Systems Security Committee, National Information Assurance Certification and Accreditation Process (NIACAP). And: U.S. Department of Defense, Defense Information Technology Security Certification and Accreditation Process (DITSCAP).

And: FAGIN, Daniel (SANS Institute), HIPAA Security Standards v1.2d.

And: IBM's Security Solutions Glossary.

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#### QUESTION 944

Which of the following was developed by the National Computer Security Center (NCSC) for the US Department of Defense?

- A. TCSEC
- B. ITSEC
- C. DIACAP
- D. NIACAP

Answer: A

Explanation: Initially issued by the National Computer Security Center (NCSC) an arm of the National Security Agency in 1983 and then updated in 1985, TCSEC was replaced with the development of the Common Criteria international standard originally published in 2005.

#### References:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, pages 197-199.

Wikipedia

<http://en.wikipedia.org/wiki/TCSEC>

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#### QUESTION 945

Which of the following is a set of data processing elements that increases the performance in a computer by overlapping the steps of different instructions?

- A. pipelining
- B. complex-instruction-set-computer (CISC)
- C. reduced-instruction-set-computer (RISC)
- D. multitasking

Answer: A

Explanation: Pipelining is a natural concept in everyday life, e.g. on an assembly line. Consider the assembly of a car: assume that certain steps in the assembly line are to install the engine, install the hood, and install the wheels (in that order, with arbitrary interstitial steps). A car on the assembly line can have only one of the three steps done at once. After the car has its engine installed, it moves on to having its hood installed, leaving the engine installation facilities available for the next car. The first car then moves on to wheel installation, the second car to hood installation, and a third car begins to have its engine installed. If engine installation takes 20 minutes, hood installation takes 5 minutes, and wheel installation takes 10 minutes, then finishing all three cars when only one car can be assembled at once would take 105 minutes. On the other hand, using the assembly line, the total time to complete all three is 75 minutes. At this point, additional cars will come off the assembly line at 20 minute increments.

In computing, a pipeline is a set of data processing elements connected in series, so that the output of one element is the input of the next one. The elements of a pipeline are often executed in parallel or in time-sliced fashion; in that case, some amount of buffer storage is often inserted between elements. Pipelining is used in processors to allow overlapping execution of multiple instructions within the same circuitry. The circuitry is usually divided into stages, including instruction decoding, arithmetic, and register fetching stages, wherein each stage processes one instruction at a time.

The following were not correct answers:

CISC: is a CPU design where single instructions execute several low-level operations (such as a load from memory, an arithmetic operation, and a memory store) within a single instruction.

RISC: is a CPU design based on simplified instructions that can provide higher performance as the simplicity enables much faster execution of each instruction.

Multitasking: is a method where multiple tasks share common processing resources, such as a CPU, through a method of fast scheduling that gives the appearance of parallelism, but in reality only one task is being performed at any one time.

Reference:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, pages 188-189.

Also see

[http://en.wikipedia.org/wiki/Pipeline\\_\(computing\)](http://en.wikipedia.org/wiki/Pipeline_(computing))

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## QUESTION 946

Which of the following describes a computer processing architecture in which a language compiler or pre-processor breaks program instructions down into basic operations that can be performed by the processor at the same time?

- A. Very-Long Instruction-Word Processor (VLIW)
- B. Complex-Instruction-Set-Computer (CISC)
- C. Reduced-Instruction-Set-Computer (RISC)
- D. Super Scalar Processor Architecture (SCPA)

Answer: A

Explanation: Very long instruction word (VLIW) describes a computer processing architecture in

which a language compiler or pre-processor breaks program instruction down into basic operations that can be performed by the processor in parallel (that is, at the same time). These operations are put into a very long instruction word which the processor can then take apart without further analysis, handing each operation to an appropriate functional unit.

The following answer are incorrect:

The term "CISC" (complex instruction set computer or computing) refers to computers designed with a full set of computer instructions that were intended to provide needed capabilities in the most efficient way. Later, it was discovered that, by reducing the full set to only the most frequently used instructions, the computer would get more work done in a shorter amount of time for most applications. Intel's Pentium microprocessors are CISC microprocessors.

The PowerPC microprocessor, used in IBM's RISC System/6000 workstation and Macintosh computers, is a RISC microprocessor. RISC takes each of the longer, more complex instructions from a CISC design and reduces it to multiple instructions that are shorter and faster to process. RISC technology has been a staple of mobile devices for decades, but it is now finally poised to take on a serious role in data center servers and server virtualization. The latest RISC processors support virtualization and will change the way computing resources scale to meet workload demands.

A superscalar CPU architecture implements a form of parallelism called instruction level parallelism within a single processor. It therefore allows faster CPU throughput than would otherwise be possible at a given clock rate. A superscalar processor executes more than one instruction during a clock cycle by simultaneously dispatching multiple instructions to redundant functional units on the processor. Each functional unit is not a separate CPU core but an execution resource within a single CPU such as an arithmetic logic unit, a bit shifter, or a multiplier.

Reference(s) Used for this question:

[http://whatis.techtarget.com/definition/0,,sid9\\_gci214395,00.html](http://whatis.techtarget.com/definition/0,,sid9_gci214395,00.html)

and

<http://searchcio-midmarket.techtarget.com/definition/CISC>

and

<http://en.wikipedia.org/wiki/Superscalar>

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### QUESTION 947

Which of the following addresses a portion of the primary memory by specifying the actual address of the memory location?

- A. direct addressing
- B. Indirect addressing
- C. implied addressing
- D. indexed addressing

Answer: A

Explanation: +-----+  
| load | reg | address |  
+-----+-----+

(Effective address = address as given in instruction)

This requires space in an instruction for quite a large address. It is often available on CISC

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machines which have variable-length instructions, such as x86.

Some RISC machines have a special Load Upper Literal instruction which places a 16-bit constant in the top half of a register. An OR literal instruction can be used to insert a 16-bit constant in the lower half of that register, so that a full 32-bit address can then be used via the register-indirect addressing mode, which itself is provided as "base-plus-offset" with an offset of 0.

[http://en.wikipedia.org/wiki/Addressing\\_mode](http://en.wikipedia.org/wiki/Addressing_mode) (Very good coverage of the subject)

also see:

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 186.

also see:

<http://www.comsci.us/ic/notes/am.html>

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### QUESTION 948

The steps of an access control model should follow which logical flow:

- A. Authorization, Identification, authentication
- B. Identification, accountability, authorization
- C. Identification, authentication, authorization
- D. Authentication, Authorization, Identification

Answer: C

Reference: HARRIS, Shon, CISSP All In One Exam Guide. Chapter 4, pages 126-127. A very excellent discussion on this topic stating the steps and explaining the processes of those steps is paraphrased (hopefully coherently) here:

A user can identify themselves with a userid or account number.

To be authenticated, a user usually provides a second piece of the credential set, like a password, passphrase, cryptographic key, anatomical attribute, a token or a Personal Identification Number, or PIN.

Once the user provides credentials and is properly identified, the system needs to determine if the user has the necessary rights and privileges to do so.

If the user DOES have those rights and privileges, he is authorized access.

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### QUESTION 949

Common Criteria has assurance level from EAL 1 to EAL 7 regarding the depth of design and testing. Which of following assure the Target of Evaluation (or TOE) is methodically designed, tested and reviewed?

- A. EAL 3
- B. EAL 4
- C. EAL 5
- D. EAL 6

Answer: B

Explanation: EAL 1 : functionally tested

EAL 2 : structurally tested

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EAL 3 : methodically tested and checked

EAL 4 : methodically designed, tested and reviewed

EAL 5 : semifomally designed and tested

EAL 6 : semifomally verified design and tested

EAL 7 : fomally verified design and tested.

Source: Common Criteria Version 2.1, Part 2 page 53 through 67.

Additional source:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 3rd Edition, McGraw-Hill/Osborne, 2005, page 312.

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### QUESTION 950

Attributable data should be:

- A. always traced to individuals responsible for observing and recording the data
- B. sometimes traced to individuals responsible for observing and recording the data
- C. never traced to individuals responsible for observing and recording the data
- D. often traced to individuals responsible for observing and recording the data

Answer: A

Explanation: As per FDA data should be attributable, original, accurate, contemporaneous and legible. In an automated system attributability could be achieved by a computer system designed to identify individuals responsible for any input.

Source: U.S. Department of Health and Human Services, Food and Drug Administration, Guidance for Industry - Computerized Systems Used in Clinical Trials, April 1999, page 1.

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### QUESTION 951

If an internal database holds a number of printers in every department and this equals the total number of printers for the whole organization recorded elsewhere in the database, it is an example of:

- A. External consistency of the information system.
- B. Differential consistency of the information system.
- C. Internal consistency of the information system.
- D. Referential consistency of the information system.

Answer: C

Explanation: Internal consistency ensures that internal data is consistent, the subtotals match the total number of units in the data base. Internal Consistency, External Consistency, Well formed transactions are all terms related to the Clark-Wilson Model.

The Clark-Wilson model was developed after Biba and takes some different approaches to protecting the integrity of information. This model uses the following elements:

- Users Active agents
- Transformation procedures (TPs) Programmed abstract operations, such as read, write, and modify

- Constrained data items (CDIs) Can be manipulated only by TPs
  - Unconstrained data items (UDIs) Can be manipulated by users via primitive read and write operations
  - Integrity verification procedures (IVPs) Check the consistency of CDIs with external reality
- Although this list may look overwhelming, it is really quite straightforward.
- When an application uses the Clark-Wilson model, it separates data into one subset that needs to be highly protected, which is referred to as a constrained data item (CDI), and another subset that does not require a high level of protection, which is called an unconstrained data item (UDI). Users cannot modify critical data (CDI) directly. Instead, the subject (user) must be authenticated to a piece of software, and the software procedures (TPs) will carry out the operations on behalf of the user. For example, when Kathy needs to update information held within her company's database, she will not be allowed to do so without a piece of software controlling these activities. First, Kathy must authenticate to a program, which is acting as a front end for the database, and then the program will control what Kathy can and cannot do to the information in the database. This is referred to as access triple: subject (user), program (TP), and object (CDI). A user cannot modify CDI without using a TP.

#### Well Formed Transactions

A well-formed transaction is a series of operations that are carried out to transfer the data from one consistent state to the other. If Kathy transfers money from her checking account to her savings account, this transaction is made up of two operations: subtract money from one account and add it to a different account. By making sure the new values in her checking and savings accounts are accurate and their integrity is intact, the IVP maintains internal and external consistency.

The Clark-Wilson model also outlines how to incorporate separation of duties into the architecture of an application. If we follow our same example of banking software, if a customer needs to withdraw over \$ 10,000, the application may require a supervisor to log in and authenticate this transaction. This is a countermeasure against potential fraudulent activities.

The model provides the rules that the developers must follow to properly implement and enforce separation of duties through software procedures.

The following answers are incorrect:

External consistency of the information system. External consistency is where the data matches the real world. If you have an automated inventory system the numbers in the data must be consistent with what your stock actually is.

The other answers are distractors.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 8146-8159). McGraw-Hill. Kindle Edition.

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 8188-8195). McGraw-Hill. Kindle Edition.

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition, Security Architecture and Design Ch 4, Pg, 374-376 AIO 6th Edition. McGraw-Hill.

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#### QUESTION 952

What is called the type of access control where there are pairs of elements that have the least

upper bound of values and greatest lower bound of values?

- A. Mandatory model
- B. Discretionary model
- C. Lattice model
- D. Rule model

Answer: C

Explanation: In a lattice model, there are pairs of elements that have the least upper bound of values and greatest lower bound of values.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 34.

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### QUESTION 953

Which of the following statements relating to the Bell-LaPadula security model is FALSE (assuming the Strong Star property is not being used)?

- A. A subject is not allowed to read up.
- B. The \*- property restriction can be escaped by temporarily downgrading a high level subject.
- C. A subject is not allowed to read down.
- D. It is restricted to confidentiality.

Answer: C

Explanation: It is not a property of Bell LaPadula model.

The other answers are incorrect because:

A subject is not allowed to read up is a property of the 'simple security rule' of Bell LaPadula model.

The \*- property restriction can be escaped by temporarily downgrading a high level subject can be escaped by temporarily downgrading a high level subject or by identifying a set of trusted objects which are permitted to violate the \*-property as long as it is not in the middle of an operation.

It is restricted to confidentiality as it is a state machine model that enforces the confidentiality aspects of access control.

Reference: Shon Harris AIO v3 , Chapter-5 : Security Models and Architecture , Page:279-282

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### QUESTION 954

What would BEST define a covert channel?

- A. An undocumented backdoor that has been left by a programmer in an operating system
- B. An open system port that should be closed.
- C. A communication channel that allows transfer of information in a manner that violates the system's security policy.
- D. A trojan horse.

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Answer: C

Explanation: A covert channel is a way for an entity to receive information in an unauthorized manner. It is an information flow that is not controlled by a security mechanism. This type of information path was not developed for communication; thus, the system does not properly protect this path, because the developers never envisioned information being passed in this way.

Receiving information in this manner clearly violates the system's security policy. The channel to transfer this unauthorized data is the result of one of the following conditions:

- Oversight in the development of the product

- Improper implementation of access controls
- Existence of a shared resource between the two entities
- Installation of a Trojan horse

The following answers are incorrect:

An undocumented backdoor that has been left by a programmer in an operating system is incorrect because it is not a means by which unauthorized transfer of information takes place.

Such backdoor is usually referred to as a Maintenance Hook.

An open system port that should be closed is incorrect as it does not define a covert channel.

A trojan horse is incorrect because it is a program that looks like a useful program but when you install it it would include a bonus such as a Worm, Backdoor, or some other malware without the installer knowing about it.

Reference(s) used for this question:

Shon Harris AIO v3 , Chapter-5 : Security Models & Architecture

AIOv4 Security Architecture and Design (pages 343 - 344)

AIOv5 Security Architecture and Design (pages 345 - 346)

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## QUESTION 955

Which of the following statements relating to the Biba security model is FALSE?

- A. It is a state machine model.
- B. A subject is not allowed to write up.
- C. Integrity levels are assigned to subjects and objects.
- D. Programs serve as an intermediate layer between subjects and objects.

Answer: D

Explanation: The Biba model was developed after the Bell-LaPadula model. It is a state machine model and is very similar to the Bell-LaPadula model but the rules are 100% the opposite of Bell-LaPadula.

Biba addresses the integrity of data within applications. The Bell-LaPadula model uses a lattice of security levels (top secret, secret, sensitive, and so on). These security levels were developed mainly to ensure that sensitive data was only available to authorized individuals. The Biba model is not concerned with security levels and confidentiality, so it does not base access decisions upon this type of lattice. The Biba model uses a lattice of integrity levels instead of a lattice of confidentiality levels like Bel-LaPadula.

If implemented and enforced properly, the Biba model prevents data from any integrity level from flowing to a higher integrity level. Biba has two main rules to provide this type of protection:

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\*-integrity axiom A subject cannot write data to an object at a higher integrity level (referred to as "no write up").

Simple integrity axiom A subject cannot read data from a lower integrity level (referred to as "no read down").

Extra Information on clark-wilson model to understand the concepts:

The Clark-Wilson model was developed after Biba and takes some different approaches to protecting the integrity of information. This model uses the following elements:

Users Active agents

Transformation procedures (TPs) Programmed abstract operations, such as read, write, and modify

Constrained data items (CDIs) Can be manipulated only by TPs

Unconstrained data items (UDIs) Can be manipulated by users via primitive read and write operations

Integrity verification procedures (IVPs) Run periodically to check the consistency of CDIs with external reality

The other answers are incorrect:

It is a state machine model: Biba model is a state machine model and addresses the integrity of data within applications.

A subject is not allowed to write up is a part of integrity axiom in the Biba model.

Integrity levels are assigned to subjects and objects is also a characteristic of Biba model as it addresses integrity.

Reference(s) used for this question:

Shon Harris , AIO v3 , Chapter-5 : Security Models and Architecture , Page : 282 - 284

Reference: AIOv4 Security Architecture and Design (pages 338 - 342)

AIOv5 Security Architecture and Design (pages 341 - 344)

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## QUESTION 956

Which of the following organizations PRODUCES and PUBLISHES the Federal Information Processing Standards (FIPS)?

- A. The National Computer Security Center (NCSC)
- B. The National Institute of Standards and Technology (NIST)
- C. The National Security Agency (NSA)
- D. The American National Standards Institute (ANSI)

Answer: B

Explanation: FIPS publications are issued by NIST after approval by the Secretary of Commerce pursuant to Section 5131 of the Information Technology Reform Act of 1996, Public Law 104-106, and the FISMA Act of 2002.

The following answers are incorrect because :

The National Computer Security Center (NCSC) was established in 1981 within NSA to help support and drive NSA's DoD computer security responsibilities.

The National Security Agency (NSA) is incorrect because NSA does not publish FIPS and is the agency officially responsible for security within the US government.

The American National Standards Institute (ANSI) is also incorrect as ANSI does not publish FIPS

and is an organization that defines coding standards and signaling schemes in the United States and represents the United States in ISO and the International Telecommunication Union (ITU).  
Reference : Shon Harris AIO v3 , Appendix B : Who's Who

### QUESTION 957

Why do buffer overflows happen? What is the main cause?

- A. Because buffers can only hold so much data
- B. Because of improper parameter checking within the application
- C. Because they are an easy weakness to exploit
- D. Because of insufficient system memory

Answer: B

Explanation: Buffer Overflow attack takes advantage of improper parameter checking within the application. This is the classic form of buffer overflow and occurs because the programmer accepts whatever input the user supplies without checking to make sure that the length of the input is less than the size of the buffer in the program.

The buffer overflow problem is one of the oldest and most common problems in software development and programming, dating back to the introduction of interactive computing. It can result when a program fills up the assigned buffer of memory with more data than its buffer can hold. When the program begins to write beyond the end of the buffer, the program's execution path can be changed, or data can be written into areas used by the operating system itself. This can lead to the insertion of malicious code that can be used to gain administrative privileges on the program or system.

As explained by Gaurab, it can become very complex. At the time of input even if you are checking the length of the input, it has to be checked against the buffer size. Consider a case where entry point of data is stored in Buffer1 of Application1 and then you copy it to Buffer2 within Application2 later on, if you are just checking the length of data against Buffer1, it will not ensure that it will not cause a buffer overflow in Buffer2 of Application2.

A bit of reassurance from the ISC2 book about level of Coding Knowledge needed for the exam: It should be noted that the CISSP is not required to be an expert programmer or know the inner workings of developing application software code, like the FORTRAN programming language, or how to develop Web applet code using Java. It is not even necessary that the CISSP know detailed security-specific coding practices such as the major divisions of buffer overflow exploits or the reason for preferring str(n)cpy to strcpy in the C language (although all such knowledge is, of course, helpful). Because the CISSP may be the person responsible for ensuring that security is included in such developments, the CISSP should know the basic procedures and concepts involved during the design and development of software programming. That is, in order for the CISSP to monitor the software development process and verify that security is included, the CISSP must understand the fundamental concepts of programming developments and the security strengths and weaknesses of various application development processes.

The following are incorrect answers:

"Because buffers can only hold so much data" is incorrect. This is certainly true but is not the best answer because the finite size of the buffer is not the problem -- the problem is that the programmer did not check the size of the input before moving it into the buffer.

"Because they are an easy weakness to exploit" is incorrect. This answer is sometimes true but is not the best answer because the root cause of the buffer overflow is that the programmer did not check the size of the user input.

"Because of insufficient system memory" is incorrect. This is irrelevant to the occurrence of a buffer overflow.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 13319-13323). Auerbach Publications. Kindle Edition.

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### QUESTION 958

Which of the following choices describe a condition when RAM and Secondary storage are used together?

- A. Primary storage
- B. Secondary storage
- C. Virtual storage
- D. Real storage

Answer: C

Explanation: Virtual storage a service provided by the operating system where it uses a combination of RAM and disk storage to simulate a much larger address space than is actually present. Infrequently used portions of memory are paged out by being written to secondary storage and paged back in when required by a running program.

Most OS's have the ability to simulate having more main memory than is physically available in the system. This is done by storing part of the data on secondary storage, such as a disk. This can be considered a virtual page. If the data requested by the system is not currently in main memory, a page fault is taken. This condition triggers the OS handler. If the virtual address is a valid one, the OS will locate the physical page, put the right information in that page, update the translation table, and then try the request again. Some other page might be swapped out to make room. Each process may have its own separate virtual address space along with its own mappings and protections.

The following are incorrect answers:

Primary storage is incorrect. Primary storage refers to the combination of RAM, cache and the processor registers. Primary Storage The data waits for processing by the processors, it sits in a staging area called primary storage. Whether implemented as memory, cache, or registers (part of the CPU), and regardless of its location, primary storage stores data that has a high probability of being requested by the CPU, so it is usually faster than long-term, secondary storage. The location where data is stored is denoted by its physical memory address. This memory register identifier remains constant and is independent of the value stored there. Some examples of primary storage devices include random-access memory (RAM), synchronous dynamic randomaccess memory (SDRAM), and read-only memory (ROM). RAM is volatile, that is, when the system shuts down, it flushes the data in RAM although recent research has shown that data may still be retrievable. Contrast this

Secondary storage is incorrect. Secondary storage holds data not currently being used by the CPU and is used when data must be stored for an extended period of time using high-capacity,

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nonvolatile storage. Secondary storage includes disk, floppies, CD's, tape, etc. While secondary storage includes basically anything different from primary storage, virtual memory's use of secondary storage is usually confined to high-speed disk storage.

Real storage is incorrect. Real storage is another word for primary storage and distinguishes physical memory from virtual memory.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 17164-17171). Auerbach Publications. Kindle Edition.

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 17196-17201). Auerbach Publications. Kindle Edition.

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 17186-17187). Auerbach Publications. Kindle Edition.

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## QUESTION 959

Which of the following statements pertaining to protection rings is false?

- A. They provide strict boundaries and definitions on what the processes that work within each ring can access.
- B. Programs operating in inner rings are usually referred to as existing in a privileged mode.
- C. They support the CIA triad requirements of multitasking operating systems.
- D. They provide users with a direct access to peripherals

Answer: D

Explanation: In computer science, hierarchical protection domains, often called protection rings, are mechanisms to protect data and functionality from faults (fault tolerance) and malicious behaviour (computer security). This approach is diametrically opposite to that of capability-based security.

Computer operating systems provide different levels of access to resources. A protection ring is one of two or more hierarchical levels or layers of privilege within the architecture of a computer system. This is generally hardware-enforced by some CPU architectures that provide different CPU modes at the hardware or microcode level.

Rings are arranged in a hierarchy from most privileged (most trusted, usually numbered zero) to least privileged (least trusted, usually with the highest ring number). On most operating systems, Ring 0 is the level with the most privileges and interacts most directly with the physical hardware such as the CPU and memory.

Special gates between rings are provided to allow an outer ring to access an inner ring's resources in a predefined manner, as opposed to allowing arbitrary usage. Correctly gating access between rings can improve security by preventing programs from one ring or privilege level from misusing resources intended for programs in another. For example, spyware running as a user program in Ring 3 should be prevented from turning on a web camera without informing the user, since hardware access should be a Ring 1 function reserved for device drivers. Programs such as web browsers running in higher numbered rings must request access to the network, a resource restricted to a lower numbered ring.

"They provide strict boundaries and definitions on what the processes that work within each ring can access" is incorrect. This is in fact one of the characteristics of a ring protection system.

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"Programs operating in inner rings are usually referred to as existing in a privileged mode" is incorrect. This is in fact one of the characteristics of a ring protection system.

"They support the CIA triad requirements of multitasking operating systems" is incorrect. This is in fact one of the characteristics of a ring protection system.

Reference(s) used for this question:

CBK, pp. 310-311

AIO3, pp. 253-256

AIOv4 Security Architecture and Design (pages 308 - 310)

AIOv5 Security Architecture and Design (pages 309 - 312)

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### QUESTION 960

What is it called when a computer uses more than one CPU in parallel to execute instructions?

- A. Multiprocessing
- B. Multitasking
- C. Multithreading
- D. Parallel running

Answer: A

Explanation: A system with multiple processors is called a multiprocessing system.

Multitasking is incorrect. Multitasking involves sharing the processor among all ready processes.

Though it appears to the user that multiple processes are executing at the same time, only one process is running at any point in time.

Multithreading is incorrect. The developer can structure a program as a collection of independent threads to achieve better concurrency. For example, one thread of a program might be performing a calculation while another is waiting for additional input from the user.

"Parallel running" is incorrect. This is not a real term and is just a distraction.

References

CBK, pp. 315-316

AIO3, pp. 234 – 239

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### QUESTION 961

Which of the following statements pertaining to the trusted computing base (TCB) is false?

- A. Its enforcement of security policy is independent of parameters supplied by system administrators.
- B. It is defined in the Orange Book.
- C. It includes hardware, firmware and software.
- D. A higher TCB rating will require that details of their testing procedures and documentation be reviewed with more granularity.

Answer: A

Explanation: The ability of a TCB to correctly enforce a security policy depends solely on the mechanisms within it and the correct input by system administrative personnel of parameters

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related to security policy. For example, if Jane only has a "CONFIDENTIAL" clearance, a system administrator could foil the correct operation of a TCB by providing input to the system that gave her a "SECRET" clearance.

"It is defined in the Orange Book" is an incorrect choice. The TCB is defined in the Orange Book (TCSEC or Trusted Computer System Evaluation Criteria).

"It includes hardware, firmware and software" is incorrect. The TCB does include the combination of all hardware, firmware and software responsible for enforcing the security policy.

"A higher TCB rating will require that details of their testing procedures and documentation be reviewed with more granularity" is incorrect. As the level of trust increases (D through A), the level of scrutiny required during evaluation increases as well.

References:

CBK, pp. 323 - 324, 329 - 330  
AIO3, pp. 269 - 272,

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### QUESTION 962

What can be defined as an abstract machine that mediates all access to objects by subjects to ensure that subjects have the necessary access rights and to protect objects from unauthorized access?

- A. The Reference Monitor
- B. The Security Kernel
- C. The Trusted Computing Base
- D. The Security Domain

Answer: A

Explanation: The reference monitor refers to abstract machine that mediates all access to objects by subjects.

This question is asking for the concept that governs access by subjects to objects, thus the reference monitor is the best answer. While the security kernel is similar in nature, it is what actually enforces the concepts outlined in the reference monitor.

In operating systems architecture a reference monitor concept defines a set of design requirements on a reference validation mechanism, which enforces an access control policy over subjects' (e.g., processes and users) ability to perform operations (e.g., read and write) on objects (e.g., files and sockets) on a system. The properties of a reference monitor are:

The reference validation mechanism must always be invoked (complete mediation). Without this property, it is possible for an attacker to bypass the mechanism and violate the security policy.

The reference validation mechanism must be tamperproof (tamperproof). Without this property, an attacker can undermine the mechanism itself so that the security policy is not correctly enforced.

The reference validation mechanism must be small enough to be subject to analysis and tests, the completeness of which can be assured (verifiable). Without this property, the mechanism might be flawed in such a way that the policy is not enforced.

For example, Windows 3.x and 9x operating systems were not built with a reference monitor, whereas the Windows NT line, which also includes Windows 2000 and Windows XP, was designed to contain a reference monitor, although it is not clear that its properties (tamperproof, etc.) have ever been independently verified, or what level of computer security it was intended to

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provide.

The claim is that a reference validation mechanism that satisfies the reference monitor concept will correctly enforce a system's access control policy, as it must be invoked to mediate all security-sensitive operations, must not be tampered, and has undergone complete analysis and testing to verify correctness. The abstract model of a reference monitor has been widely applied to any type of system that needs to enforce access control, and is considered to express the necessary and sufficient properties for any system making this security claim.

According to Ross Anderson, the reference monitor concept was introduced by James Anderson in an influential 1972 paper.

Systems evaluated at B3 and above by the Trusted Computer System Evaluation Criteria (TCSEC) must enforce the reference monitor concept.

The reference monitor, as defined in AIO V5 (Harris) is: "an access control concept that refers to an abstract machine that mediates all access to objects by subjects."

The security kernel, as defined in AIO V5 (Harris) is: "the hardware, firmware, and software elements of a trusted computing based (TCB) that implement the reference monitor concept. The kernel must mediate all access between subjects and objects, be protected from modification, and be verifiable as correct."

The trusted computing based (TCB), as defined in AIO V5 (Harris) is: "all of the protection mechanisms within a computer system (software, hardware, and firmware) that are responsible for enforcing a security policy."

The security domain, "builds upon the definition of domain (a set of resources available to a subject) by adding the fact that resources within this logical structure (domain) are working under the same security policy and managed by the same group."

The following answers are incorrect:

"The security kernel" is incorrect. One of the places a reference monitor could be implemented is in the security kernel but this is not the best answer.

"The trusted computing base" is incorrect. The reference monitor is an important concept in the TCB but this is not the best answer.

"The security domain is incorrect." The reference monitor is an important concept in the security domain but this is not the best answer.

Reference(s) used for this question:

Official ISC2 Guide to the CBK, page 324

AIO Version 3, pp. 272 - 274

AIOv4 Security Architecture and Design (pages 327 - 328)

AIOv5 Security Architecture and Design (pages 330 - 331)

Wikipedia article at [https://en.wikipedia.org/wiki/Reference\\_monitor](https://en.wikipedia.org/wiki/Reference_monitor)

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## QUESTION 963

Which of the following is not a method to protect objects and the data within the objects?

- A. Layering
- B. Data mining
- C. Abstraction
- D. Data hiding

Answer: B

Explanation: Data mining is used to reveal hidden relationships, patterns and trends by running queries on large data stores.

Data mining is the act of collecting and analyzing large quantities of information to determine patterns of use or behavior and use those patterns to form conclusions about past, current, or future behavior. Data mining is typically used by large organizations with large databases of customer or consumer behavior. Retail and credit companies will use data mining to identify buying patterns or trends in geographies, age groups, products, or services. Data mining is essentially the statistical analysis of general information in the absence of specific data.

The following are incorrect answers:

They are incorrect as they all apply to Protecting Objects and the data within them. Layering, abstraction and data hiding are related concepts that can work together to produce modular software that implements an organization's security policies and is more reliable in operation. Layering is incorrect. Layering assigns specific functions to each layer and communication between layers is only possible through well-defined interfaces. This helps preclude tampering in violation of security policy. In computer programming, layering is the organization of programming into separate functional components that interact in some sequential and hierarchical way, with each layer usually having an interface only to the layer above it and the layer below it.

Abstraction is incorrect. Abstraction "hides" the particulars of how an object functions or stores information and requires the object to be manipulated through well-defined interfaces that can be designed to enforce security policy. Abstraction involves the removal of characteristics from an entity in order to easily represent its essential properties.

Data hiding is incorrect. Data hiding conceals the details of information storage and manipulation within an object by only exposing well defined interfaces to the information rather than the information itself. For example, the details of how passwords are stored could be hidden inside a password object with exposed interfaces such as check\_password, set\_password, etc. When a password needs to be verified, the test password is passed to the check\_password method and a boolean (true/false) result is returned to indicate if the password is correct without revealing any details of how/where the real passwords are stored. Data hiding maintains activities at different security levels to separate these levels from each other.

The following reference(s) were used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 27535-27540). Auerbach Publications. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 4269-4273). Auerbach Publications. Kindle Edition.

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## QUESTION 964

What is the main focus of the Bell-LaPadula security model?

- A. Accountability
- B. Integrity
- C. Confidentiality
- D. Availability

Answer: C

Explanation: The Bell-LaPadula model is a formal model dealing with confidentiality.

The Bell–LaPadula Model (abbreviated BLP) is a state machine model used for enforcing access control in government and military applications. It was developed by David Elliott Bell and Leonard J. LaPadula, subsequent to strong guidance from Roger R. Schell to formalize the U.S.

Department of Defense (DoD) multilevel security (MLS) policy. The model is a formal state transition model of computer security policy that describes a set of access control rules which use security labels on objects and clearances for subjects. Security labels range from the most sensitive (e.g. "Top Secret"), down to the least sensitive (e.g., "Unclassified" or "Public").

The Bell–LaPadula model focuses on data confidentiality and controlled access to classified information, in contrast to the Biba Integrity Model which describes rules for the protection of data integrity. In this formal model, the entities in an information system are divided into subjects and objects.

The notion of a "secure state" is defined, and it is proven that each state transition preserves security by moving from secure state to secure state, thereby inductively proving that the system satisfies the security objectives of the model. The Bell–LaPadula model is built on the concept of a state machine with a set of allowable states in a computer network system. The transition from one state to another state is defined by transition functions.

A system state is defined to be "secure" if the only permitted access modes of subjects to objects are in accordance with a security policy. To determine whether a specific access mode is allowed, the clearance of a subject is compared to the classification of the object (more precisely, to the combination of classification and set of compartments, making up the security level) to determine if the subject is authorized for the specific access mode.

The clearance/classification scheme is expressed in terms of a lattice. The model defines two mandatory access control (MAC) rules and one discretionary access control (DAC) rule with three security properties:

The Simple Security Property - a subject at a given security level may not read an object at a higher security level (no read-up).

The  $\text{-property}$  (read "star"-property) - a subject at a given security level must not write to any object at a lower security level (no write-down). The  $\text{-property}$  is also known as the Confinement property.

The Discretionary Security Property - use of an access matrix to specify the discretionary access control.

The following are incorrect answers:

Accountability is incorrect. Accountability requires that actions be traceable to the user that performed them and is not addressed by the Bell-LaPadula model.

Integrity is incorrect. Integrity is addressed in the Biba model rather than Bell-Lapadula.

Availability is incorrect. Availability is concerned with assuring that data/services are available to authorized users as specified in service level objectives and is not addressed by the Bell-Lapadula model.

References:

CBK, pp. 325-326

AIO3, pp. 279 - 284

AIOv4 Security Architecture and Design (pages 333 - 336)

AIOv5 Security Architecture and Design (pages 336 - 338)

Wikipedia at [https://en.wikipedia.org/wiki/Bell-La\\_Padula\\_model](https://en.wikipedia.org/wiki/Bell-La_Padula_model)

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**QUESTION 965**

Which of the following statements pertaining to the Bell-LaPadula is TRUE if you are NOT making use of the strong star property?

- A. It allows "read up."
- B. It addresses covert channels.
- C. It addresses management of access controls.
- D. It allows "write up."

Answer: D

Explanation: Bell-LaPadula Confidentiality Model10 The Bell-LaPadula model is perhaps the most well-known and significant security model, in addition to being one of the oldest models used in the creation of modern secure computing systems. Like the Trusted Computer System Evaluation Criteria (or TCSEC), it was inspired by early U.S. Department of Defense security policies and the need to prove that confidentiality could be maintained. In other words, its primary goal is to prevent disclosure as the model system moves from one state (one point in time) to another.

When the strong star property is not being used it means that both the \* property and the Simple Security Property rules would be applied.

The Star (\*) property rule of the Bell-LaPadula model says that subjects cannot write down, this would compromise the confidentiality of the information if someone at the secret layer would write the object down to a confidential container for example.

The Simple Security Property rule states that the subject cannot read up which means that a subject at the secret layer would not be able to access objects at Top Secret for example.

You must remember: The model tells you about are NOT allowed to do. Anything else would be allowed. For example within the Bell LaPadula model you would be allowed to write up as it does not compromise the security of the information. In fact it would upgrade it to the point that you could lock yourself out of your own information if you have only a secret security clearance.

The following are incorrect answers because they are all FALSE:

"It allows read up" is incorrect. The "simple security" property forbids read up.

"It addresses covert channels" is incorrect. Covert channels are not addressed by the Bell-LaPadula model.

"It addresses management of access controls" is incorrect. Management of access controls are beyond the scope of the Bell-LaPadula model.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 17595-17600). Auerbach Publications. Kindle Edition.

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**QUESTION 966**

Which security model introduces access to objects only through programs?

- A. The Biba model
- B. The Bell-LaPadula model
- C. The Clark-Wilson model

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D. The information flow model

Answer: C

Explanation: In the Clark-Wilson model, the subject no longer has direct access to objects but instead must access them through programs (well-formed transactions).

The Clark-Wilson integrity model provides a foundation for specifying and analyzing an integrity policy for a computing system.

The model is primarily concerned with formalizing the notion of information integrity. Information integrity is maintained by preventing corruption of data items in a system due to either error or malicious intent. An integrity policy describes how the data items in the system should be kept valid from one state of the system to the next and specifies the capabilities of various principals in the system. The model defines enforcement rules and certification rules.

Clark-Wilson is more clearly applicable to business and industry processes in which the integrity of the information content is paramount at any level of classification.

Integrity goals of Clark-Wilson model:

Prevent unauthorized users from making modification (Only this one is addressed by the Biba model).

Separation of duties prevents authorized users from making improper modifications.

Well formed transactions: maintain internal and external consistency i.e. it is a series of operations that are carried out to transfer the data from one consistent state to the other.

The following are incorrect answers:

The Biba model is incorrect. The Biba model is concerned with integrity and controls access to objects based on a comparison of the security level of the subject to that of the object.

The Bell-LaPadula model is incorrect. The Bell-LaPadula model is concerned with confidentiality and controls access to objects based on a comparison of the clearance level of the subject to the classification level of the object.

The information flow model is incorrect. The information flow model uses a lattice where objects are labelled with security classes and information can flow either upward or at the same level. It is similar in framework to the Bell-LaPadula model.

References:

ISC2 Official Study Guide, Pages 325 - 327

AIO3, pp. 284 - 287

AIOv4 Security Architecture and Design (pages 338 - 342)

AIOv5 Security Architecture and Design (pages 341 - 344)

Wikipedia at: [https://en.wikipedia.org/wiki/Clark-Wilson\\_model](https://en.wikipedia.org/wiki/Clark-Wilson_model)

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### QUESTION 967

Which security model ensures that actions that take place at a higher security level do not affect actions that take place at a lower level?

- A. The Bell-LaPadula model
- B. The information flow model
- C. The noninterference model
- D. The Clark-Wilson model

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Answer: C

Explanation: The goal of a noninterference model is to strictly separate differing security levels to assure that higher-level actions do not determine what lower-level users can see. This is in contrast to other security models that control information flows between differing levels of users. By maintaining strict separation of security levels, a noninterference model minimizes leakages that might happen through a covert channel.

The model ensures that any actions that take place at a higher security level do not affect, or interfere with, actions that take place at a lower level.

It is not concerned with the flow of data, but rather with what a subject knows about the state of the system. So if an entity at a higher security level performs an action, it can not change the state for the entity at the lower level.

The model also addresses the inference attack that occurs when some one has access to some type of information and can infer(guess) something that he does not have the clearance level or authority to know.

The following are incorrect answers:

The Bell-LaPadula model is incorrect. The Bell-LaPadula model is concerned only with confidentiality and bases access control decisions on the classification of objects and the clearances of subjects.

The information flow model is incorrect. The information flow models have a similar framework to the Bell-LaPadula model and control how information may flow between objects based on security classes. Information will be allowed to flow only in accordance with the security policy.

The Clark-Wilson model is incorrect. The Clark-Wilson model is concerned with change control and assuring that all modifications to objects preserve integrity by means of well-formed transactions and usage of an access triple (subject - interface - object).

References:

CBK, pp 325 - 326

AIO3, pp. 290 - 291

AIOv4 Security Architecture and Design (page 345)

AIOv5 Security Architecture and Design (pages 347 - 348)

[https://en.wikibooks.org/wiki/Security\\_Architecture\\_and\\_Design/Security\\_Models#Noninterference\\_Models](https://en.wikibooks.org/wiki/Security_Architecture_and_Design/Security_Models#Noninterference_Models)

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## QUESTION 968

Which of the following security models does NOT concern itself with the flow of data?

- A. The information flow model
- B. The Biba model
- C. The Bell-LaPadula model
- D. The noninterference model

Answer: D

Explanation: The goal of a noninterference model is to strictly separate differing security levels to assure that higher-level actions do not determine what lower-level users can see. This is in contrast to other security models that control information flows between differing levels of users,

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By maintaining strict separation of security levels, a noninterference model minimizes leakages that might happen through a covert channel.

The Bell-LaPadula model is incorrect. The Bell-LaPadula model is concerned with confidentiality and bases access control decisions on the classification of objects and the clearances of subjects.

The information flow model is incorrect. The information flow models have a similar framework to the Bell-LaPadula model and control how information may flow between objects based on security classes.

The Biba model is incorrect. The Biba model is concerned with integrity and is a complement to the Bell-LaPadula model in that higher levels of integrity are more trusted than lower levels.

Access control is based on these integrity levels to assure that read/write operations do not decrease an object's integrity.

References:

CBK, pp 325 - 326

AIO3, pp. 290 - 291

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### QUESTION 969

Which of the following Orange Book ratings represents the highest level of trust?

- A. B1
- B. B2
- C. F6
- D. C2

Answer: B

Explanation: Trusted Computer System Evaluation Criteria First published in 1983 and updated in 1985, the TCSEC, frequently referred to as the Orange Book, was a United States Government Department of Defense (DoD) standard that sets basic standards for the implementation of security protections in computing systems. Primarily intended to help the DoD find products that met those basic standards, TCSEC was used to evaluate, classify, and select computer systems being considered for the processing, storage, and retrieval of sensitive or classified information on military and government systems. As such, it was strongly focused on enforcing confidentiality with no focus on other aspects of security such as integrity or availability. Although it has since been superseded by the common criteria, it influenced the development of other product evaluation criteria, and some of its basic approach and terminology continues to be used.

The trust levels run from D (lowest) to A (highest). Within each level, a number can indicate differing requirements with higher numbers indicating a higher level of trust. The order from the least secure to the most secure is: D, C1, C2, B1, B2, B3, A1. See the one page resume at the link provided below.

B1 is incorrect. The trust levels run from D (lowest) to A (highest). Within each level, a number can indicate differing requirements with higher numbers indicating a higher level of trust.

F6 is incorrect. The Orange Book only defines levels A - D and there is no level F.

C2 is incorrect. The trust levels run from D (lowest) to A (highest). Within each level, a number can indicate differing requirements with higher numbers indicating a higher level of trust.

See our one page diagram on the TCSEC at:

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 17919-17925). Auerbach Publications. Kindle Edition.

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**QUESTION 970**

What Orange Book security rating is reserved for systems that have been evaluated but fail to meet the criteria and requirements of the higher divisions?

- A. A
- B. D
- C. E
- D. F

Answer: B

Explanation: D or "minimal protection" is reserved for systems that were evaluated under the TCSEC but did not meet the requirements for a higher trust level.

A is incorrect. A or "Verified Protection" is the highest trust level under the TCSEC.

E is incorrect. The trust levels are A - D so "E" is not a valid trust level.

F is incorrect. The trust levels are A - D so "F" is not a valid trust level.

CBK, pp. 329 - 330

AIO3, pp. 302 - 306

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**QUESTION 971**

Which Orange book security rating introduces the object reuse protection?

- A. C1
- B. C2
- C. B1
- D. B2

Answer: D

Explanation:

**QUESTION 972**

Which Orange book security rating introduces security labels?

- A. C2
- B. B1
- C. B2
- D. B3

Answer: B

Explanation: B1 is also called "Labeled Security" and each data object must have a classification label and each subject a clearance label. On each access attempt, the classification and clearance

are checked to verify that the access is permissible.

C2 is incorrect. C2 is also called "Controlled Access Protection" and only requires that subjects be individually identified and that security-related events are auditable.

B2 is incorrect. B2 is also called "Structured Protection" and imposes additional controls on security policy and a more thorough review of system design and implementation.

B3 is incorrect. B3 is also called "Security Domains" and imposes more granularity in each protection mechanism.

References:

CBK, pp. 329 - 330

AIO3 pp.302 - 307

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### QUESTION 973

Which Orange book security rating is the FIRST to be concerned with covert channels?

- A. A1
- B. B3
- C. B2
- D. B1

Answer: C

Explanation: This class ("Structured Protection") requires more stringent authentication mechanisms and well-defined interfaces between layers. Subjects and devices require labels and the system must not allow covert channels.

A1 is incorrect. A1 is also called "Verified Design" and requires formal verification of the design and specifications.

B3 is incorrect. B3 is also called "Security Domains" and imposes more granularity in each protection mechanism.

B1 is incorrect. B1 is also called "Labeled Security" and each data object must have a classification label and each subject a clearance label. On each access attempt, the classification and clearance are checked to verify that the access is permissible.

EXAM TIP:

The CBK only discusses the TCSEC in a very minimal fashion and the details are presented in a much more completely in the Shon Harris, All In One book. Folk wisdom has it that this reflects the CBK/security industry migration away from the TCSEC to the CC but the wise candidate will develop at least some familiarity with the TCSEC. There are still questions on TCSEC showing up randomly on the exam.

NOTE FROM CLEMENT:

As of today (April 2014) subjects such as the TCSEC are still proclaimed to be on the exam. Do make sure that you take some time to review the TCSEC ratings.

You can download a nice one page resume of the TCSEC rating at the following link:

<https://www.freepracticetests.org/documents/tcsec.pdf>

Do study this one page document and get familiar with what is being introduced at each of the TCSEC levels. Good questions might be for example:

1. At what level are labels introduced?
2. At what level is the Security Administrator role defined?

3. At what level are covert channel first introduced?

4. At what level do you use formal methods?

References:

The Official ISC2 CBK study guide, pages 329 - 330.

AIO3, pp. 302 - 306

AIOv4 Security Architecture and Design (pages 357 - 361)

AIOv5 Security Architecture and Design (pages 358 - 362)

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### QUESTION 974

What is called the formal acceptance of the adequacy of a system's overall security by the management?

A. Certification

B. Acceptance

C. Accreditation

D. Evaluation

Answer: C

Explanation: Accreditation is the authorization by management to implement software or systems in a production environment. This authorization may be either provisional or full.

The following are incorrect answers:

Certification is incorrect. Certification is the process of evaluating the security stance of the software or system against a selected set of standards or policies. Certification is the technical evaluation of a product. This may precede accreditation but is not a required precursor.

Acceptance is incorrect. This term is sometimes used as the recognition that a piece of software or system has met a set of functional or service level criteria (the new payroll system has passed its acceptance test). Certification is the better term in this context.

Evaluation is incorrect. Evaluation is certainly a part of the certification process but it is not the best answer to the question.

Reference(s) used for this question:

The Official Study Guide to the CBK from ISC2, pages 559-560

AIO3, pp. 314 - 317

AIOv4 Security Architecture and Design (pages 369 - 372)

AIOv5 Security Architecture and Design (pages 370 - 372)

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### QUESTION 975

Which division of the Orange Book deals with discretionary protection (need-to-know)?

A. D

B. C

C. B

D. A

Answer: B

Explanation: C deals with discretionary protection. See metric below:

	A1	B3	B2	B1	C2	C1	Certkingdom
<b>DISCRETIONARY ACCESS</b>							
Discretionary Access Control							
Identification and Authentication							
System Integrity							
System Architecture							
Security Testing							
Security Features User's Guide							
Manual Design Documentation							
Test Documentation							
<b>CONTROLLED ACCESS</b>							
Protect Audit Trails							
Object Reuse							
<b>MANDATORY ACCESS CONTROL</b>							
Labels							
Mandatory Access Control							
Process isolation in system architecture							
Design Specification & Verification							
Device labels							
Subject Sensitivity Labels							
Trusted Path							
Separation of Administrator and User functions							
Covert Channel Analysis (Only Covert Storage Channel at B2)							
Trusted Facility Management							
Configuration Management							
Trusted Recovery							
Covert Channel Analysis (Both Timing and Covert Channel analysis at B3)							
Security Administrator Role Defined							
Monitor events and notify security personnel							
Trusted Distribution							
Formal Methods							
	A1	B3	B2	B1	C2	C1	

### TCSEC Metric

The following are incorrect answers:

- D is incorrect. D deals with minimal security.
- B is incorrect. B deals with mandatory protection.
- A is incorrect. A deals with verified protection.

Reference(s) used for this question:

CBK, p. 329 - 330

and

Shon Harris, CISSP All In One (AIO), 6th Edition , page 392-393

### QUESTION 976

What does the Clark-Wilson security model focus on?

- A. Confidentiality
- B. Integrity
- C. Accountability
- D. Availability

Answer: B

Explanation: The Clark-Wilson model addresses integrity. It incorporates mechanisms to enforce internal and external consistency, a separation of duty, and a mandatory integrity policy.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architectures and Models (page 205).

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### QUESTION 977

What does the simple security (ss) property mean in the Bell-LaPadula model?

- A. No read up
- B. No write down
- C. No read down
- D. No write up

Answer: A

Explanation: The ss (simple security) property of the Bell-LaPadula access control model states that reading of information by a subject at a lower sensitivity level from an object at a higher sensitivity level is not permitted (no read up).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architectures and Models (page 202).

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### QUESTION 978

What does the \* (star) property mean in the Bell-LaPadula model?

- A. No write up
- B. No read up
- C. No write down
- D. No read down

Answer: C

Explanation: The \*- (star) property of the Bell-LaPadula access control model states that writing of information by a subject at a higher level of sensitivity to an object at a lower level of sensitivity is not permitted (no write down).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architectures and Models (page 202).

Also check out: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 5: Security Models and Architecture (page 242, 243).

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**QUESTION 979**

What does the \* (star) integrity axiom mean in the Biba model?

- A. No read up
- B. No write down
- C. No read down
- D. No write up

Answer: D

Explanation: The \*- (star) integrity axiom of the Biba access control model states that an object at one level of integrity is not permitted to modify an object of a higher level of integrity (no write up).  
Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architectures and Models (page 205).

**QUESTION 980**

What does the simple integrity axiom mean in the Biba model?

- A. No write down
- B. No read down
- C. No read up
- D. No write up

Answer: B

Explanation: The simple integrity axiom of the Biba access control model states that a subject at one level of integrity is not permitted to observe an object of a lower integrity (no read down).  
Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architectures and Models (page 205).

**QUESTION 981**

What is the Biba security model concerned with?

- A. Confidentiality
- B. Reliability
- C. Availability
- D. Integrity

Answer: D

Explanation: The Biba security model addresses the integrity of data being threatened when subjects at lower security levels are able to write to objects at higher security levels and when subjects can read data at lower levels.

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Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 5: Security Models and Architecture (Page 244).

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### QUESTION 982

Which security model uses division of operations into different parts and requires different users to perform each part?

- A. Bell-LaPadula model
- B. Biba model
- C. Clark-Wilson model
- D. Non-interference model

Answer: C

Explanation: The Clark-Wilson model uses separation of duties, which divides an operation into different parts and requires different users to perform each part. This prevents authorized users from making unauthorized modifications to data, thereby protecting its integrity.

The Clark-Wilson integrity model provides a foundation for specifying and analyzing an integrity policy for a computing system.

The model is primarily concerned with formalizing the notion of information integrity. Information integrity is maintained by preventing corruption of data items in a system due to either error or malicious intent. An integrity policy describes how the data items in the system should be kept valid from one state of the system to the next and specifies the capabilities of various principals in the system. The model defines enforcement rules and certification rules.

The model's enforcement and certification rules define data items and processes that provide the basis for an integrity policy. The core of the model is based on the notion of a transaction.

A well-formed transaction is a series of operations that transition a system from one consistent state to another consistent state.

In this model the integrity policy addresses the integrity of the transactions.

The principle of separation of duty requires that the certifier of a transaction and the implementer be different entities.

The model contains a number of basic constructs that represent both data items and processes that operate on those data items. The key data type in the Clark-Wilson model is a Constrained Data Item (CDI). An Integrity Verification Procedure (IVP) ensures that all CDIs in the system are valid at a certain state. Transactions that enforce the integrity policy are represented by Transformation Procedures (TPs). A TP takes as input a CDI or Unconstrained Data Item (UDI) and produces a CDI. A TP must transition the system from one valid state to another valid state. UDIs represent system input (such as that provided by a user or adversary). A TP must guarantee (via certification) that it transforms all possible values of a UDI to a "safe" CDI.

In general, preservation of data integrity has three goals:

Prevent data modification by unauthorized parties

Prevent unauthorized data modification by authorized parties

Maintain internal and external consistency (i.e. data reflects the real world)

Clark-Wilson addresses all three rules but BIBA addresses only the first rule of intergrity.

References:

HARRIS, Shon, All-In-One CISSP Certification Fifth Edition, McGraw-Hill/Osborne, Chapter 5:

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Security Architecture and Design (Page 341-344).  
and  
[http://en.wikipedia.org/wiki/Clark-Wilson\\_model](http://en.wikipedia.org/wiki/Clark-Wilson_model)

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**QUESTION 983**

A channel within a computer system or network that is designed for the authorized transfer of information is identified as a(n)?

- A. Covert channel
- B. Overt channel
- C. Opened channel
- D. Closed channel

Answer: B

Explanation: An overt channel is a path within a computer system or network that is designed for the authorized transfer of data. The opposite would be a covert channel which is an unauthorized path.

A covert channel is a way for an entity to receive information in an unauthorized manner. It is an information flow that is not controlled by a security mechanism. This type of information path was not developed for communication; thus, the system does not properly protect this path, because the developers never envisioned information being passed in this way. Receiving information in this manner clearly violates the system's security policy.

All of the other choices are bogus detractors.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 219.

and

Shon Harris, CISSP All In One (AIO), 6th Edition , page 380

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 378). McGraw-Hill. Kindle Edition.

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**QUESTION 984**

What can best be described as a domain of trust that shares a single security policy and single management?

- A. The reference monitor
- B. A security domain
- C. The security kernel
- D. The security perimeter

Answer: B

Explanation: A security domain is a domain of trust that shares a single security policy and single management.

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The term security domain just builds upon the definition of domain by adding the fact that resources within this logical structure (domain) are working under the same security policy and managed by the same group.

So, a network administrator may put all of the accounting personnel, computers, and network resources in Domain 1 and all of the management personnel, computers, and network resources in Domain 2. These items fall into these individual containers because they not only carry out similar types of business functions, but also, and more importantly, have the same type of trust level. It is this common trust level that allows entities to be managed by one single security policy. The different domains are separated by logical boundaries, such as firewalls with ACLs, directory services making access decisions, and objects that have their own ACLs indicating which individuals and groups can carry out operations on them.

All of these security mechanisms are examples of components that enforce the security policy for each domain. Domains can be architected in a hierarchical manner that dictates the relationship between the different domains and the ways in which subjects within the different domains can communicate. Subjects can access resources in domains of equal or lower trust levels.

The following are incorrect answers:

The reference monitor is an abstract machine which must mediate all access to subjects to objects, be protected from modification, be verifiable as correct, and is always invoked. Concept that defines a set of design requirements of a reference validation mechanism (security kernel), which enforces an access control policy over subjects' (processes, users) ability to perform operations (read, write, execute) on objects (files, resources) on a system. The reference monitor components must be small enough to test properly and be tamperproof.

The security kernel is the hardware, firmware and software elements of a trusted computing base that implement the reference monitor concept.

The security perimeter includes the security kernel as well as other security-related system functions that are within the boundary of the trusted computing base. System elements that are outside of the security perimeter need not be trusted. Not every process and resource falls within the TCB, so some of these components fall outside of an imaginary boundary referred to as the security perimeter. A security perimeter is a boundary that divides the trusted from the untrusted. For the system to stay in a secure and trusted state, precise communication standards must be developed to ensure that when a component within the TCB needs to communicate with a component outside the TCB, the communication cannot expose the system to unexpected security compromises. This type of communication is handled and controlled through interfaces.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 28548-28550). McGraw-Hill. Kindle Edition.

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 7873-7877). McGraw-Hill. Kindle Edition.

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition , Access Control, Page 214-217

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Security Architecture and Design (Kindle Locations 1280-1283). . Kindle Edition.

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

AIO 6th edition chapter 3 access control page 214-217 defines Security domains. Reference monitor, Security Kernel, and Security Parameter are defined in Chapter 4, Security Architecture and Design.

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**QUESTION 985**

Which of the following describes a technique in which a number of processor units are employed in a single computer system to increase the performance of the system in its application environment above the performance of a single processor of the same kind?

- A. Multitasking
- B. Multiprogramming
- C. Pipelining
- D. Multiprocessing

Answer: D

Explanation: Multiprocessing is an organizational technique in which a number of processor units are employed in a single computer system to increase the performance of the system in its application environment above the performance of a single processor of the same kind. In order to cooperate on a single application or class of applications, the processors share a common resource. Usually this resource is primary memory, and the multiprocessor is called a primary memory multiprocessor. A system in which each processor has a private (local) main memory and shares secondary (global) memory with the others is a secondary memory multiprocessor, sometimes called a multicomputer system because of the looser coupling between processors. The more common multiprocessor systems incorporate only processors of the same type and performance and thus are called homogeneous multiprocessors; however, heterogeneous multiprocessors are also employed. A special case is the attached processor, in which a second processor module is attached to a first processor in a closely coupled fashion so that the first can perform input/output and operating system functions, enabling the attached processor to concentrate on the application workload.

The following were incorrect answers:

Multiprogramming: The interleaved execution of two or more programs by a computer, in which the central processing unit executes a few instructions from each program in succession.

Multitasking: The concurrent operation by one central processing unit of two or more processes.

Pipelining: A procedure for processing instructions in a computer program more rapidly, in which each instruction is divided into numerous small stages, and a population of instructions are in various stages at any given time. One instruction does not have to wait for the previous one to complete all of the stages before it gets into the pipeline. It would be similar to an assembly chain in the real world.

References:

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

<http://www.answers.com/topic/multiprocessing?cat=technology>

<http://www.answers.com/multitasking?cat=biz-fin>

<http://www.answers.com/pipelining?cat=technology>

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**QUESTION 986**

Who first described the DoD multilevel military security policy in abstract, formal terms?

- A. David Bell and Leonard LaPadula

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- B. Rivest, Shamir and Adleman
  - C. Whitfield Diffie and Martin Hellman
  - D. David Clark and David Wilson

Answer: A

Explanation: It was David Bell and Leonard LaPadula who, in 1973, first described the DoD multilevel military security policy in abstract, formal terms. The Bell-LaPadula is a Mandatory Access Control (MAC) model concerned with confidentiality. Rivest, Shamir and Adleman (RSA) developed the RSA encryption algorithm. Whitfield Diffie and Martin Hellman published the Diffie-Hellman key agreement algorithm in 1976. David Clark and David Wilson developed the Clark-Wilson integrity model, more appropriate for security in commercial activities.

Source: RUSSEL, Deborah & GANGEMI, G.T. Sr., Computer Security Basics, O'Reilly, July 1992 (pages 78,109).

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### QUESTION 987

Which of the following computer design approaches is based on the fact that in earlier technologies, the instruction fetch was the longest part of the cycle?

- A. Pipelining
- B. Reduced Instruction Set Computers (RISC)
- C. Complex Instruction Set Computers (CISC)
- D. Scalar processors

Answer: C

Explanation: Complex Instruction Set Computer (CISC) uses instructions that perform many operations per instruction. It was based on the fact that in earlier technologies, the instruction fetch was the longest part of the cycle. Therefore, by packing more operations into an instruction, the number of fetches could be reduced. Pipelining involves overlapping the steps of different instructions to increase the performance in a computer. Reduced Instruction Set Computers (RISC) involve simpler instructions that require fewer clock cycles to execute. Scalar processors are processors that execute one instruction at a time.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architectures and Models (page 188).

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### QUESTION 988

What is used to protect programs from all unauthorized modification or executional interference?

- A. A protection domain
- B. A security perimeter
- C. Security labels
- D. Abstraction

Answer: A

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Explanation: A protection domain consists of the execution and memory space assigned to each process. The purpose of establishing a protection domain is to protect programs from all unauthorized modification or executional interference. The security perimeter is the boundary that separates the Trusted Computing Base (TCB) from the remainder of the system. Security labels are assigned to resources to denote a type of classification. Abstraction is a way to protect resources in the fact that it involves viewing system components at a high level and ignoring its specific details, thus performing information hiding.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architecture and Models (page 193).

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### QUESTION 989

What is called a system that is capable of detecting that a fault has occurred and has the ability to correct the fault or operate around it?

- A. A fail safe system
- B. A fail soft system
- C. A fault-tolerant system
- D. A failover system

Answer: C

Explanation: A fault-tolerant system is capable of detecting that a fault has occurred and has the ability to correct the fault or operate around it. In a fail-safe system, program execution is terminated, and the system is protected from being compromised when a hardware or software failure occurs and is detected. In a fail-soft system, when a hardware or software failure occurs and is detected, selected, non-critical processing is terminated. The term failover refers to switching to a duplicate "hot" backup component in real-time when a hardware or software failure occurs, enabling processing to continue.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architecture and Models (page 196).

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### QUESTION 990

Which integrity model defines a constrained data item, an integrity verification procedure and a transformation procedure?

- A. The Take-Grant model
- B. The Biba integrity model
- C. The Clark Wilson integrity model
- D. The Bell-LaPadula integrity model

Answer: C

Explanation: The Clark Wilson integrity model addresses the three following integrity goals: 1)

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data is protected from modification by unauthorized users; 2) data is protected from unauthorized modification by authorized users; and 3) data is internally and externally consistent. It also defines a Constrained Data Item (CDI), an Integrity Verification Procedure (IVP), a Transformation Procedure (TP) and an Unconstrained Data item. The Bell-LaPadula and Take-Grant models are not integrity models.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architecture and Models (page 205).

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### QUESTION 991

What is defined as the hardware, firmware and software elements of a trusted computing base that implement the reference monitor concept?

- A. The reference monitor
- B. Protection rings
- C. A security kernel
- D. A protection domain

Answer: C

Explanation: A security kernel is defined as the hardware, firmware and software elements of a trusted computing base that implement the reference monitor concept. A reference monitor is a system component that enforces access controls on an object. A protection domain consists of the execution and memory space assigned to each process. The use of protection rings is a scheme that supports multiple protection domains.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 5: Security Architecture and Models (page 194).

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### QUESTION 992

According to the Orange Book, which security level is the first to require a system to protect against covert timing channels?

- A. A1
- B. B3
- C. B2
- D. B1

Answer: B

Explanation: B1 does not address covert channels. B2 requires a system to protect against covert storage channels but does not address covert timing channels. B3 and A1 both address covert storage channels and covert timing channels and must perform a covert channel analysis for both types.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 6: Operations Security (page

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220).

Also: U.S. Department of Defense, Trusted Computer System Evaluation Criteria (Orange Book), DOD 5200.28-STD. December 1985 (also available [here](#)).

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**QUESTION 993**

According to the Orange Book, which security level is the first to require a system to support separate operator and system administrator roles?

- A. A1
- B. B1
- C. B2
- D. B3

Answer: C

Explanation: B2 security level requires that systems must support separate operator and system administrator roles.

At B3 and A1, systems must clearly identify the functions of the security administrator to perform the security-related functions.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 6: Operations Security (page 220).

Also:

U.S. Department of Defense, Trusted Computer System Evaluation Criteria (Orange Book), DOD 5200.28-STD. December 1985 (also available [here](#)).

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**QUESTION 994**

In the Bell-LaPadula model, the Star-property is also called:

- A. The simple security property
- B. The confidentiality property
- C. The confinement property
- D. The tranquility property

Answer: C

Explanation: The Bell-LaPadula model focuses on data confidentiality and access to classified information, in contrast to the Biba Integrity Model which describes rules for the protection of data integrity.

In this formal model, the entities in an information system are divided into subjects and objects. The notion of a "secure state" is defined, and it is proven that each state transition preserves security by moving from secure state to secure state, thereby proving that the system satisfies the security objectives of the model.

The Bell-LaPadula model is built on the concept of a state machine with a set of allowable states in a system. The transition from one state to another state is defined by transition functions.

A system state is defined to be "secure" if the only permitted access modes of subjects to objects

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are in accordance with a security policy.

To determine whether a specific access mode is allowed, the clearance of a subject is compared to the classification of the object (more precisely, to the combination of classification and set of compartments, making up the security level) to determine if the subject is authorized for the specific access mode.

The clearance/classification scheme is expressed in terms of a lattice. The model defines two mandatory access control (MAC) rules and one discretionary access control (DAC) rule with three security properties:

The Simple Security Property - a subject at a given security level may not read an object at a higher security level (no read-up).

The \*-property (read "star"-property) - a subject at a given security level must not write to any object at a lower security level (no write-down). The \*-property is also known as the Confinement property.

The Discretionary Security Property - use an access control matrix to specify the discretionary access control.

The transfer of information from a high-sensitivity document to a lower-sensitivity document may happen in the Bell-LaPadula model via the concept of trusted subjects. Trusted Subjects are not restricted by the \*-property. Untrusted subjects are.

Trusted Subjects must be shown to be trustworthy with regard to the security policy. This security model is directed toward access control and is characterized by the phrase: "no read up, no write down." Compare the Biba model, the Clark-Wilson model and the Chinese Wall.

With Bell-LaPadula, users can create content only at or above their own security level (i.e. secret researchers can create secret or top-secret files but may not create public files; no write-down).

Conversely, users can view content only at or below their own security level (i.e. secret researchers can view public or secret files, but may not view top-secret files; no read-up).

#### Strong \* Property

The Strong \* Property is an alternative to the \*-Property in which subjects may write to objects with only a matching security level. Thus, the write-up operation permitted in the usual \*-Property is not present, only a write-to-same level operation. The Strong \* Property is usually discussed in the context of multilevel database management systems and is motivated by integrity concerns.

#### Tranquility principle

The tranquility principle of the Bell-LaPadula model states that the classification of a subject or object does not change while it is being referenced. There are two forms to the tranquility principle: the "principle of strong tranquility" states that security levels do not change during the normal operation of the system and the "principle of weak tranquility" states that security levels do not change in a way that violates the rules of a given security policy.

Another interpretation of the tranquility principles is that they both apply only to the period of time during which an operation involving an object or subject is occurring. That is, the strong tranquility principle means that an object's security level/label will not change during an operation (such as read or write); the weak tranquility principle means that an object's security level/label may change in a way that does not violate the security policy during an operation.

Reference(s) used for this question:

[http://en.wikipedia.org/wiki/Biba\\_Model](http://en.wikipedia.org/wiki/Biba_Model)

[http://en.wikipedia.org/wiki/Mandatory\\_access\\_control](http://en.wikipedia.org/wiki/Mandatory_access_control)

[http://en.wikipedia.org/wiki/Discretionary\\_access\\_control](http://en.wikipedia.org/wiki/Discretionary_access_control)

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[http://en.wikipedia.org/wiki/Clark-Wilson\\_model](http://en.wikipedia.org/wiki/Clark-Wilson_model)  
[http://en.wikipedia.org/wiki/Brewer\\_and\\_Nash\\_model](http://en.wikipedia.org/wiki/Brewer_and_Nash_model)

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**QUESTION 995**

Which of the following is best defined as an administrative declaration by a designated authority that an information system is approved to operate in a particular security configuration with a prescribed set of safeguards?

- A. Certification
- B. Declaration
- C. Audit
- D. Accreditation

Answer: D

Explanation: Accreditation: is an administrative declaration by a designated authority that an information system is approved to operate in a particular security configuration with a prescribed set of safeguards. It is usually based on a technical certification of the system's security mechanisms.

Certification: Technical evaluation (usually made in support of an accreditation action) of an information system's security features and other safeguards to establish the extent to which the system's design and implementation meet specified security requirements.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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**QUESTION 996**

Which of the following is best defined as a mode of system termination that automatically leaves system processes and components in a secure state when a failure occurs or is detected in a system?

- A. Fail proof
- B. Fail soft
- C. Fail safe
- D. Fail Over

Answer: C

Explanation: NOTE: This question is referring to a system which is Logical/Technical, so it is in the context of a system that you must choose the right answer. This is very important to read the question carefully and to identify the context whether it is in the Physical world or in the Technical/Logical world.

RFC 2828 (Internet Security Glossary) defines fail safe as a mode of system termination that automatically leaves system processes and components in a secure state when a failure occurs or is detected in the system.

A secure state means in the Logical/Technical world that no access would be granted or no packets would be allowed to flow through the system inspecting the packets such as a firewall for example.

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If the question would have made reference to a building or something specific to the Physical world then the answer would have been different. In the Physical World everything becomes open and full access would be granted. See the valid choices below for the Physical context.

Fail-safe in the physical security world is when doors are unlocked automatically in case of emergency. Used in environment where humans work around. As human safety is prime concern during Fire or other hazards.

The following were all wrong choices:

Fail-secure in the physical security world is when doors are locked automatically in case of emergency. Can be in an area like Cash Locker Room provided there should be alternative manually operated exit door in case of emergency.

Fail soft is selective termination of affected non-essential system functions and processes when a failure occurs or is detected in the system.

Fail Over is a redundancy mechanism and does not apply to this question.

According to the Official ISC2 Study Guide (OIG):

Fault Tolerance is defined as built-in capability of a system to provide continued correct execution in the presence of a limited number of hardware or software faults. It means a system can operate in the presence of hardware component failures. A single component failure in a fault-tolerant system will not cause a system interruption because the alternate component will take over the task transparently. As the cost of components continues to drop, and the demand for system availability increases, many non-fault-tolerant systems have redundancy built-in at the subsystem level. As a result, many non-fault-tolerant systems can tolerate hardware faults - consequently, the line between a fault-tolerant system and a non-fault-tolerant system becomes increasingly blurred.

According to Common Criteria:

Fail Secure - Failure with preservation of secure state, which requires that the TSF (TOE security functions) preserve a secure state in the face of the identified failures.

Acc. to The CISSP Prep Guide, Gold Ed.:

Fail over - When one system/application fails, operations will automatically switch to the backup system.

Fail safe - Pertaining to the automatic protection of programs and/or processing systems to maintain safety when a hardware or software failure is detected in a system.

Fail secure - The system preserves a secure state during and after identified failures occur.

Fail soft - Pertaining to the selective termination of affected non-essential processing when a hardware or software failure is detected in a system.

Acc. to CISSP for Dummies:

Fail closed - A control failure that results all accesses blocked.

Fail open - A control failure that results in all accesses permitted.

Failover - A failure mode where, if a hardware or software failure is detected, the system automatically transfers processing to a hot backup component, such as a clustered server.

Fail-safe - A failure mode where, if a hardware or software failure is detected, program execution is terminated, and the system is protected from compromise.

Fail-soft (or resilient) - A failure mode where, if a hardware or software failure is detected, certain, noncritical processing is terminated, and the computer or network continues to function in a degraded mode.

Fault-tolerant - A system that continues to operate following failure of a computer or network component.

It's good to differentiate this concept in Physical Security as well:

Fail-safe

- Door defaults to being unlocked
- Dictated by fire codes

Fail-secure

- Door defaults to being locked

Reference(s) used for this question:

SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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### QUESTION 997

The Reference Validation Mechanism that ensures the authorized access relationships between subjects and objects is implementing which of the following concept:

- A. The reference monitor.
- B. Discretionary Access Control.
- C. The Security Kernel.
- D. Mandatory Access Control.

Answer: A

Explanation: The reference monitor concept is an abstract machine that ensures that all subjects have the necessary access rights before accessing objects. Therefore, the kernel will mediate all accesses to objects by subjects and will do so by validating through the reference monitor concept.

The kernel does not decide whether or not the access will be granted, it will be the Reference Monitor which is a subset of the kernel that will say YES or NO.

All access requests will be intercepted by the Kernel, validated through the reference monitor, and then access will either be denied or granted according to the request and the subject privileges within the system.

1. The reference monitor must be small enough to be fully tested and validated
2. The Kernel must MEDIATE all access requests from subjects to objects
3. The processes implementing the reference monitor must be protected
4. The reference monitor must be tamperproof

The following answers are incorrect:

The security kernel is the mechanism that actually enforces the rules of the reference monitor concept.

The other answers are distractors.

Shon Harris, All In One, 5th Edition, Security Architecture and Design, Page 330

also see

[http://en.wikipedia.org/wiki/Reference\\_monitor](http://en.wikipedia.org/wiki/Reference_monitor)

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### QUESTION 998

What is the name of the first mathematical model of a multi-level security policy used to define the concept of a secure state, the modes of access, and rules for granting access?

- A. Clark and Wilson Model
- B. Harrison-Ruzzo-Ullman Model

- 
- C. Rivest and Shamir Model
  - D. Bell-LaPadula Model

Answer: D

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 999

Which of the following models does NOT include data integrity or conflict of interest?

- A. Biba
- B. Clark-Wilson
- C. Bell-LaPadula
- D. Brewer-Nash

Answer: C

Explanation: Bell LaPadula model (Bell 1975): The granularity of objects and subjects is not predefined, but the model prescribes simple access rights. Based on simple access restrictions the Bell LaPadula model enforces a discretionary access control policy enhanced with mandatory rules. Applications with rigid confidentiality requirements and without strong integrity requirements may properly be modeled.

These simple rights combined with the mandatory rules of the policy considerably restrict the spectrum of applications which can be appropriately modeled.

Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

Also check:

Proceedings of the IFIP TC11 12th International Conference on Information Security, Samos (Greece), May 1996, On Security Models.

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### QUESTION 1000

Which of the following describes a logical form of separation used by secure computing systems?

- A. Processes use different levels of security for input and output devices.
- B. Processes are constrained so that each cannot access objects outside its permitted domain.
- C. Processes conceal data and computations to inhibit access by outside processes.
- D. Processes are granted access based on granularity of controlled objects.

Answer: B

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 1001

What security problem is most likely to exist if an operating system permits objects to be used sequentially by multiple users without forcing a refresh of the objects?

- A. Disclosure of residual data.

- B. Unauthorized obtaining of a privileged execution state.
- C. Denial of service through a deadly embrace.
- D. Data leakage through covert channels.

Answer: A

Explanation: This question is asking you to consider the effects of object reuse. Object reuse is "reassigning to subject media that previously contained information. Object reuse is a security concern because if insufficient measures were taken to erase the information on the media, the information may be disclosed to unauthorized personnel."

This concept relates to Security Architecture and Design, because it is in level C2: Controlled Access Protection, of the Orange Book, where "The object reuse concept must be invoked, meaning that any medium holding data must not contain any remnants of information after it is release for another subject to use."

REFERENCE:

AIO Version 5 (Shon Harris), page 360

and

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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**QUESTION 1002**

In access control terms, the word "dominate" refers to which of the following?

- A. Higher or equal to access class
- B. Rights are superceded
- C. Valid need-to-know with read privileges
- D. A higher clearance level than other users

Answer: A

Explanation: Higher or equal to access class. The reason is the term dominates refers to a subject being authorized to perform an operation if the access class of the subject is higher or dominates the access class of the object requested. This is the best answer for the term "dominates" in access control.

If a subject wishes to access an object, his security clearance must be equal or higher than the object he's accessing.

The following answers are incorrect:

Rights are superceded is incorrect as it is not actually a valid condition.

Valid need-to-know with read privileges is too specific to be dominates, and is usually what a user's label indicates.

A higher clearance level than others. Although having a higher clearance level might be important to obtain access to the higher levels of data, it is not what the definition of "dominates" refers to in access control.

The following reference(s) were/was used to create this question:

Shon Harris latest "All in One CISSP Exam Prep" page 280.

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**QUESTION 1003**

The biggest difference between System High Security Mode and Dedicated Security Mode is:

- A. The clearance required
- B. Object classification
- C. Subjects cannot access all objects
- D. Need-to-know

Answer: D

Explanation: "Need to know" is correct. In Dedicated Security Mode the subject must have "need to know" for ALL the information contained within the system. With System High Security Mode the subject must have "need to know" for only the information they are trying to access.

The following answers are incorrect:

"The clearance required"

It is incorrect because all the data on the system require the same clearance, but this is the same for both systems.

"Object classification"

It is incorrect because all the data on the system require the same classification level. Although the need-to-know is part of the object's label this is not the best answer.

"Subjects cannot access all objects"

It is incorrect because the more correct answer is need to know. Although because of need to know, certain subjects cannot access all objects, the best answer is need to know.

The following reference(s) were/was used to create this question:

ISC2 OIG p.841 and p.995

Shon Harris AIO, 4th Edition, p. 297

<http://www.fas.org/irp/nsa/rainbow/tg004.htm>

**QUESTION 1004**

For competitive reasons, the customers of a large shipping company called the "Integrated International Secure Shipping Containers Corporation" (IISSCC) like to keep private the various cargos that they ship. IISSCC uses a secure database system based on the Bell-LaPadula access control model to keep this information private. Different information in this database is classified at different levels. For example, the time and date a ship departs is labeled Unclassified, so customers can estimate when their cargos will arrive, but the contents of all shipping containers on the ship are labeled Top Secret to keep different shippers from viewing each other's cargos.

An unscrupulous fruit shipper, the "Association of Private Fuit Exporters, Limited" (APFEL) wants to learn whether or not a competitor, the "Fruit Is Good Corporation" (FIGCO), is shipping pineapples on the ship "S.S. Cruise Pacific" (S.S. CP). APFEL can't simply read the top secret contents in the IISSCC database because of the access model. A smart APFEL worker, however, attempts to insert a false, unclassified record in the database that says that FIGCO is shipping pineapples on the S.S. CP, reasoning that if there is already a FIGCO-pineapple-SSCP record then the insertion attempt will fail. But the attempt does not fail, so APFEL can't be sure whether or not FIGCO is shipping pineapples on the S.S. CP.

What is the name of the access control model property that prevented APFEL from reading FIGCO's cargo information? What is a secure database technique that could explain why, when

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the insertion attempt succeeded, APFEL was still unsure whether or not FIGCO was shipping pineapples?

- A. \*-Property and Polymorphism
- B. Strong \*-Property and Polyinstantiation
- C. Simple Security Property and Polymorphism
- D. Simple Security Property and Polyinstantiation

Answer: D

Explanation: The Simple Security Property states that a subject at a given clearance may not read an object at a higher classification, so unclassified APFEL could not read FIGCO's top secret cargo information.

Polyinstantiation permits a database to have two records that are identical except for their classifications (i.e., the primary key includes the classification). Thus, APFEL's new unclassified record did not collide with the real, top secret record, so APFEL was not able to learn about FIGs pineapples.

The following answers are incorrect:

\*-Property and Polymorphism

The \*-property states that a subject at a given clearance must not write to any object at a lower classification, which is irrelevant here because APFEL was trying to read data with a higher classification.

Polymorphism is a term that can refer to, among other things, viruses that can change their code to better hide from anti-virus programs or to objects of different types in an object-oriented program that are related by a common superclass and can, therefore, respond to a common set of methods in different ways. That's also irrelevant to this question.

Strong \*-Property and Polyinstantiation

Half-right. The strong \*-property limits a subject of a given clearance to writing only to objects with a matching classification. APFEL's attempt to insert an unclassified record was consistent with this property, but that has nothing to do with preventing APFEL from reading top secret information.

Simple Security Property and Polymorphism

Also half-right. See above for why Polymorphism is wrong.

The following reference(s) were/was used to create this question:

HARRIS, Shon, CISSP All-in-one Exam Guide, Third Edition, McGraw-Hill/Osborne, 2005

Chapter 5: Security Models and Architecture (page 280)

Chapter 11: Application and System Development (page 828)

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## QUESTION 1005

What is a trusted shell?

- A. It means that someone who is working in that shell cannot "bust out of it", and other processes cannot "bust into it".
- B. It means that it is a communications channel between the user, or program, and the kernel.
- C. It means that someone working in that shell can communicate with someone else in another trusted shell.
- D. It means that it won't let processes overwrite other processes' data.

Answer: A

Explanation: A trusted shell means that someone who is working in that shell cannot "bust out of it", and other processes cannot "bust into it".

The following reference(s) were/was used to create this question:

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2008, chapter 5: Security Architecture and Design (page 323).

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### QUESTION 1006

Which security model uses an access control triple and also require separation of duty?

- A. DAC
- B. Lattice
- C. Clark-Wilson
- D. Bell-LaPadula

Answer: C

Explanation: The following answers are incorrect:

DAC  
Bell-LaPadula  
Lattice

The following reference(s) were/was used to create this question:

Separation of duty is necessarily determined by conditions external to the computer system.

The Clark-Wilson scheme includes as a requirement maintenance of separation of duty as expressed in the access control triples.

Enforcement is on a per-user basis, using the user ID from the access control triple.

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### QUESTION 1007

You have been approached by one of your clients . They are interested in doing some security reengineering . The client is looking at various information security models. It is a highly secure environment where data at high classifications cannot be leaked to subjects at lower classifications . Of primary concern to them, is the identification of potential covert channel. As an Information Security Professional , which model would you recommend to the client?

- A. Information Flow Model combined with Bell Lapadula
- B. Bell Lapadula
- C. Biba
- D. Information Flow Model

Answer: A

Explanation: Securing the data manipulated by computing systems has been a challenge in the past years. Several methods to limit the information disclosure exist today, such as access control lists, firewalls, and cryptography. However, although these methods do impose limits on the

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information that is released by a system, they provide no guarantees about information propagation. For example, access control lists of file systems prevent unauthorized file access, but they do not control how the data is used afterwards. Similarly, cryptography provides a means to exchange information privately across a non-secure channel, but no guarantees about the confidentiality of the data are given once it is decrypted.

In low level information flow analysis, each variable is usually assigned a security level. The basic model comprises two distinct levels: low and high, meaning, respectively, publicly observable information, and secret information. To ensure confidentiality, flowing information from high to low variables should not be allowed. On the other hand, to ensure integrity, flows to high variables should be restricted.

More generally, the security levels can be viewed as a lattice with information flowing only upwards in the lattice.

#### Noninterference Models

This could have been another good answer as it would help in minimizing the damage from covert channels.

The goal of a noninterference model is to help ensure that high-level actions (inputs) do not determine what low-level user s can see (outputs ) . Most of the security models presented are secured by permitting restricted ows between high- and low-level users. The noninterference model maintains activities at different security levels to separate these levels from each other. In this way, it minimizes leakages that may happen through covert channels, because there is complete separation (noninterference) between security levels. Because a user at a higher security level has no way to interfere with the activities at a lower level, the lower-level user cannot get any information from the higher leve.

The following answers are incorrect:

#### Bell Lapadula

The Bell-LaPadula Model (abbreviated BLP) is a state machine model used for enforcing access control in government and military applications. It was developed by David Elliott Bell and Leonard J. LaPadula, subsequent to strong guidance from Roger R. Schell to formalize the U.S.

Department of Defense (DoD) multilevel security (MLS) policy. The model is a formal state transition model of computer security policy that describes a set of access control rules which use security labels on objects and clearances for subjects. Security labels range from the most sensitive (e.g. "Top Secret"), down to the least sensitive (e.g., "Unclassified" or "Public").

The Bell–LaPadula model focuses on data confidentiality and controlled access to classified information, in contrast to the Biba Integrity Model which describes rules for the protection of data integrity. In this formal model, the entities in an information system are divided into subjects and objects. The notion of a "secure state" is defined, and it is proven that each state transition preserves security by moving from secure state to secure state, thereby inductively proving that the system satisfies the security objectives of the model. The Bell–LaPadula model is built on the concept of a state machine with a set of allowable states in a computer network system. The transition from one state to another state is defined by transition functions.

A system state is defined to be "secure" if the only permitted access modes of subjects to objects are in accordance with a security policy. To determine whether a specific access mode is allowed, the clearance of a subject is compared to the classification of the object (more precisely, to the combination of classification and set of compartments, making up the security level) to determine if the subject is authorized for the specific access mode. The clearance/classification scheme is expressed in terms of a lattice. The model defines two mandatory access control (MAC) rules and

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one discretionary access control (DAC) rule with three security properties:

The Simple Security Property - a subject at a given security level may not read an object at a higher security level (no read-up).

The *-property* (read "star"-property) - a subject at a given security level must not write to any object at a lower security level (no write-down). The *-property* is also known as the Confinement property.

The Discretionary Security Property - use of an access matrix to specify the discretionary access control.

The transfer of information from a high-sensitivity document to a lower-sensitivity document may happen in the Bell–LaPadula model via the concept of trusted subjects. Trusted Subjects are not restricted by the *-property*. Untrusted subjects are. Trusted Subjects must be shown to be trustworthy with regard to the security policy. This security model is directed toward access control and is characterized by the phrase: "no read up, no write down."

With Bell-LaPadula, users can create content only at or above their own security level (i.e. secret researchers can create secret or top-secret files but may not create public files; no write-down).

Conversely, users can view content only at or below their own security level (i.e. secret researchers can view public or secret files, but may not view top-secret files; no read-up).

The Bell–LaPadula model explicitly defined its scope. It did not treat the following extensively: Covert channels. Passing information via pre-arranged actions was described briefly.

Networks of systems. Later modeling work did address this topic.

Policies outside multilevel security. Work in the early 1990s showed that MLS is one version of boolean policies, as are all other published policies.

#### Biba

The Biba Model or Biba Integrity Model developed by Kenneth J. Biba in 1977, is a formal state transition system of computer security policy that describes a set of access control rules designed to ensure data integrity. Data and subjects are grouped into ordered levels of integrity. The model is designed so that subjects may not corrupt objects in a level ranked higher than the subject, or be corrupted by objects from a lower level than the subject.

In general the model was developed to circumvent a weakness in the Bell–LaPadula model which only addresses data confidentiality.

In general, preservation of data integrity has three goals:

Prevent data modification by unauthorized parties

Prevent unauthorized data modification by authorized parties

Maintain internal and external consistency (i.e. data reflects the real world)

Note: Biba address only the first goal of integrity while Clark-Wilson addresses all three

This security model is directed toward data integrity (rather than confidentiality) and is characterized by the phrase: "no read down, no write up". This is in contrast to the Bell-LaPadula model which is characterized by the phrase "no write down, no read up".

In the Biba model, users can only create content at or below their own integrity level (a monk may write a prayer book that can be read by commoners, but not one to be read by a high priest).

Conversely, users can only view content at or above their own integrity level (a monk may read a book written by the high priest, but may not read a pamphlet written by a lowly commoner).

Another analogy to consider is that of the military chain of command. A General may write orders to a Colonel, who can issue these orders to a Major. In this fashion, the General's original orders are kept intact and the mission of the military is protected (thus, "no read down" integrity).

Conversely, a Private can never issue orders to his Sergeant, who may never issue orders to a

Lieutenant, also protecting the integrity of the mission ("no write up").

The Biba model defines a set of security rules similar to the Bell-LaPadula model. These rules are the reverse of the Bell-LaPadula rules:

The Simple Integrity Axiom states that a subject at a given level of integrity must not read an object at a lower integrity level (no read down).

The \* (star) Integrity Axiom states that a subject at a given level of integrity must not write to any object at a higher level of integrity (no write up).

#### Lattice Model

In computer security, lattice-based access control (LBAC) is a complex access control model based on the interaction between any combination of objects (such as resources, computers, and applications) and subjects (such as individuals, groups or organizations).

In this type of label-based mandatory access control model, a lattice is used to define the levels of security that an object may have and that a subject may have access to. The subject is only allowed to access an object if the security level of the subject is greater than or equal to that of the object.

Mathematically, the security level access may also be expressed in terms of the lattice (a partial order set) where each object and subject have a greatest lower bound (meet) and least upper bound (join) of access rights. For example, if two subjects A and B need access to an object, the security level is defined as the meet of the levels of A and B. In another example, if two objects X and Y are combined, they form another object Z, which is assigned the security level formed by the join of the levels of X and Y.

The following reference(s) were/was used to create this question:

ISC2 Review Seminar Student Manual V8.00 page 255.

Dorothy Denning developed the information flow model to address convert channels .  
and

The ISC2 Official Study Guide, Second Edition, on page 683-685  
and

[https://secure.wikimedia.org/wikipedia/en/wiki/Biba\\_security\\_model](https://secure.wikimedia.org/wikipedia/en/wiki/Biba_security_model)

and

[https://secure.wikimedia.org/wikipedia/en/wiki/Bell%20LaPadula\\_model](https://secure.wikimedia.org/wikipedia/en/wiki/Bell%20LaPadula_model)

and

[https://secure.wikimedia.org/wikipedia/en/wiki/Lattice-based\\_access\\_control](https://secure.wikimedia.org/wikipedia/en/wiki/Lattice-based_access_control)

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### QUESTION 1008

Which of the following security models introduced the idea of mutual exclusivity which generates dynamically changing permissions?

- A. Biba
- B. Brewer & Nash
- C. Graham-Denning
- D. Clark-Wilson

Answer: B

Explanation: The Brewer and Nash model was constructed to provide information security access controls that can change dynamically. This security model, also known as the Chinese wall model,

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was designed to provide controls that mitigate conflict of interest in commercial organizations, and is built upon an information flow model.

In the Brewer and Nash Model no information can flow between the subjects and objects in a way that would create a conflict of interest.

The following answers are incorrect:

Graham-Denning

[https://en.wikipedia.org/wiki/Graham-Denning\\_model](https://en.wikipedia.org/wiki/Graham-Denning_model)

Biba

[https://en.wikipedia.org/wiki/Biba\\_model](https://en.wikipedia.org/wiki/Biba_model)

Clark-Wilson

[https://en.wikipedia.org/wiki/Clark-Wilson\\_model](https://en.wikipedia.org/wiki/Clark-Wilson_model)

The following reference(s) were/was used to create this question:

ISC2 Review V 8.00 . Mutual exclusivity is another way of saying prevent conflicts of interest and

[https://en.wikipedia.org/wiki/Brewer\\_and\\_Nash\\_model](https://en.wikipedia.org/wiki/Brewer_and_Nash_model)

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## QUESTION 1009

Pervasive Computing and Mobile Computing Devices have to sacrifice certain functions. Which statement concerning those devices is false.

- A. In many cases, security services has been enhanced due to the lack of services available.
- B. These devices share common security concerns with other resource-constrained devices.
- C. In many cases, security services have been sacrificed to provide richer user interaction when processing power is very limited.
- D. Their mobility has made them a prime vector for data loss since they can be used to transmit and store information in ways that may be difficult to control.

Answer: A

Explanation: This is a detailed oriented question to test if you are paying attention to both the question and answer. While the answer sounds legitimate, it is not truly the case in these types of devices. Just remember, even if you have one service running, that does not mean you are secure if the service itself has not been secured.

From the official guide:

"The number of small mobile devices has grown considerably in the past four or five years.

Products vary from sophisticated mobile phones, such as third-generation (3G) handsets, to fullfeatured "netbooks" and personal digital assistants (PDAs).

These devices share common security concerns with other resource-constrained devices. In many cases, security services have been sacrificed to provide richer user interaction when processing power is very limited. Also, their mobility has made them a prime vector for data loss since they can be used to transmit and store information in ways that may be difficult to control."

The following answers are incorrect:

- These devices share common security concerns with other resource-constrained devices.
- In many cases, security services have been sacrificed to provide richer user interaction when processing power is very limited.
- Their mobility has made them a prime vector for data loss since they can be used to transmit and

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store information in ways that may be difficult to control.

The following reference(s) were/was used to create this question:

Tipton, Harold F. (2010-04-20). Official (ISC)2 Guide to the CISSP CBK, Second Edition ((ISC)2 Press), Chapter 9, Security Architecture and Design

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### QUESTION 1010

Which International Organization for Standardization standard is commonly referred to as the 'common criteria'?

- A. 15408
- B. 27001
- C. 14000
- D. 22002

Answer: A

Explanation: From the official guide:

"The publication of the Common Criteria as the ISO/IEC 15408 standard provided the first truly international product evaluation criteria. It has largely superseded all other criteria, although there continue to be products in general use that were certified under TCSEC, ITSEC and other criteria. It takes a very similar approach to ITSEC by providing a flexible set of functional and assurance requirements, and like ITSEC, it is not very prescriptive as TCSEC had been. Instead, it is focused on standardizing the general approach to product evaluation and providing mutual recognition of such evaluations all over the world."

The following answers are incorrect:

- 27001 ISO/IEC 27000 is part of a growing family of ISO/IEC Information Security Management Systems (ISMS) standards, the 'ISO/IEC 27000 series'. ISO/IEC 27000 is an international standard entitled: Information technology — Security techniques — Information security management systems — Overview and vocabulary.

- 14000

ISO 14000 is a family of standards related to environmental management that exists to help organizations (a) minimize how their operations (processes etc.) negatively affect the environment (i.e. cause adverse changes to air, water, or land); (b) comply with applicable laws, regulations, and other environmentally oriented requirements, and (c) continually improve in the above.

ISO 14000 is similar to ISO 9000 quality management in that both pertain to the process of how a product is produced, rather than to the product itself. As with ISO 9000, certification is performed by third-party organizations rather than being awarded by ISO directly. The ISO 19011 audit standard applies when auditing for both 9000 and 14000 compliance at once.

The requirements of ISO 14000 are an integral part of the European Union's environmental management scheme EMAS. EMAS's structure and material requirements are more demanding, foremost concerning performance improvement, legal compliance and reporting duties.

- 22002 ISO/TS 22002- Prerequisite programmes on food safety—Part 1: Food manufacturing

The following reference(s) were/was used to create this question:

Tipton, Harold F. (2010-04-20). Official (ISC)2 Guide to the CISSP CBK, Second Edition ((ISC)2 Press), Chapter 9, Security Architecture and Design  
and

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[https://en.wikipedia.org/wiki/ISO\\_14000](https://en.wikipedia.org/wiki/ISO_14000)  
and  
[https://en.wikipedia.org/wiki/ISO/IEC\\_27000](https://en.wikipedia.org/wiki/ISO/IEC_27000)  
and  
[https://en.wikipedia.org/wiki/ISO\\_22000](https://en.wikipedia.org/wiki/ISO_22000)

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### QUESTION 1011

What Cloud Deployment model consist of a cloud infrastructure provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units)? Such deployment model may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

- A. Private Cloud
- B. Public Cloud
- C. Hybrid Cloud
- D. Community Cloud

Answer: A

Explanation: A Private cloud. The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

Other Cloud Deployment Models are:

Community cloud.

The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

Public cloud.

The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

Hybrid cloud.

The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

The following reference(s) were/was used to create this question:

NIST Special Publication 800-145 The NIST definition of Cloud Computing

and also see

NIST Special Publication 800-146 The Cloud Computing Synopsis and Recommendations

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### QUESTION 1012

When referring to the Cloud Computing Service models. What would you call a service model

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where the consumer does not manage or control the underlying cloud infrastructure including networks, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment?

- A. Code as a Service (CaaS)
- B. Platform as a Service (PaaS)
- C. Software as a Service (SaaS)
- D. Infrastructure as a Service (IaaS)

Answer: B

Explanation: The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including networks, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the applicationhosting environment.

Platform-as-a-Service (PaaS) is a model of service delivery whereby the computing platform is provided as an on-demand service upon which applications can be developed and deployed. Its main purpose is to reduce the cost and complexity of buying, housing, and managing the underlying hardware and software components of the platform, including any needed program and database development tools. The development environment is typically special purpose, determined by the cloud provider and tailored to the design and architecture of its platform. The cloud consumer has control over applications and application environment settings of the platform. Security provisions are split between the cloud provider and the cloud consumer.

The following answers are incorrect:

Software-as-a-Service.

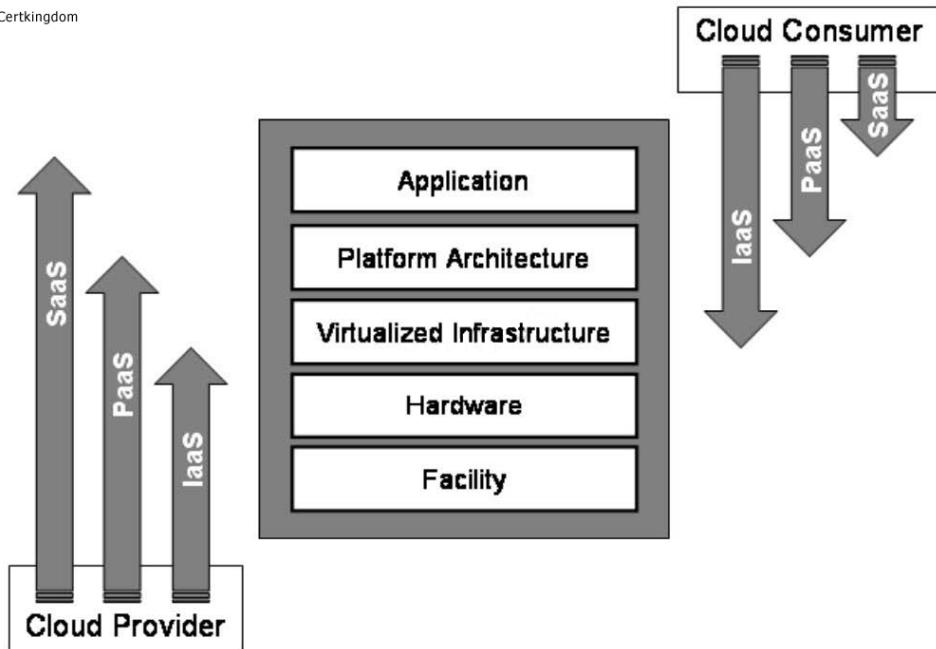
Software-as-a-Service (SaaS) is a model of service delivery whereby one or more applications and the computational resources to run them are provided for use on demand as a turnkey service. Its main purpose is to reduce the total cost of hardware and software development, maintenance, and operations. Security provisions are carried out mainly by the cloud provider. The cloud consumer does not manage or control the underlying cloud infrastructure or individual applications, except for preference selections and limited administrative application settings.

Infrastructure-as-a-Service.

Infrastructure-as-a-Service (IaaS) is a model of service delivery whereby the basic computing infrastructure of servers, software, and network equipment is provided as an on-demand service upon which a platform to develop and execute applications can be established. Its main purpose is to avoid purchasing, housing, and managing the basic hardware and software infrastructure components, and instead obtain those resources as virtualized objects controllable via a service interface. The cloud consumer generally has broad freedom to choose the operating system and development environment to be hosted. Security provisions beyond the basic infrastructure are carried out mainly by the cloud consumer

Code as a Service (CaaS)

CaaS does not exist and is only a detractor. This is no such service model.



**Figure 1: Differences in Scope and Control among Cloud Service Models**

### Cloud Deployment Models

#### NOTE: WHAT IS A CLOUD INFRASTRUCTURE?

A cloud infrastructure is the collection of hardware and software that enables the five essential characteristics of cloud computing. The cloud infrastructure can be viewed as containing both a physical layer and an abstraction layer. The physical layer consists of the hardware resources that are necessary to support the cloud services being provided, and typically includes server, storage and network components. The abstraction layer consists of the software deployed across the physical layer, which manifests the essential cloud characteristics. Conceptually the abstraction layer sits above the physical layer.

The following reference(s) were/was used to create this question:

NIST Special Publication 800-144 Guidelines on Security and Privacy in Public Cloud Computing and

NIST Special Publication 800-145 The NIST definition of Cloud Computing

### QUESTION 1013

Which of the following was the first mathematical model of a multilevel security policy used to define the concepts of a security state and mode of access, and to outline rules of access?

- A. Biba
- B. Bell-LaPadula
- C. Clark-Wilson
- D. State machine

Answer: B

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Explanation: This is a formal definition of the Bell-LaPadula model, which was created and implemented to protect confidential government and military information.

In the 1970s, the U.S. military used time-sharing mainframe systems and was concerned about the security of these systems and leakage of classified information. The Bell-LaPadula model was developed to address these concerns.

It was the first mathematical model of a multilevel security policy used to define the concept of a secure state machine and modes of access, and outlined rules of access. Its development was funded by the U.S. government to provide a framework for computer systems that would be used to store and process sensitive information.

The model's main goal was to prevent secret information from being accessed in an unauthorized manner. A system that employs the Bell-LaPadula model is called a multilevel security system because users with different clearances use the system , and the system processes data at different classification levels.

The level at which information is classified determines the handling procedures that should be used. The Bell-LaPadula model is a state machine model that enforces the confidentiality aspects of access control. A matrix and security levels are used to determine if subjects can access different objects. The subject's clearance is compared to the object's classification and then specific rules are applied to control how subject-to-object interactions can take place.

The following answers are incorrect:

Biba - The Biba model was developed after the Bell -LaPadula model. It is a state machine model similar to the Bell-LaPadula model. Biba addresses the integrity of data within applications. The Bell-LaPadula model uses a lattice of security levels (top secret, secret, sensitive, and so on). These security levels were developed mainly to ensure that sensitive data were only available to authorized individuals. The Biba model is not concerned with security levels and confidentiality, so it does not base access decisions upon this type of lattice. Instead, the Biba model uses a lattice of integrity levels.

Clark-Wilson - When an application uses the Clark -Wilson model, it separates data into one subset that needs to be highly protected, which is referred to as a constrained data item (CDI), and another subset that does not require a high level of protection, which is called an unconstrained data item (UDI). Users cannot modify critical data (CDI) directly. Instead, the subject (user) must be authenticated to a piece of software, and the software procedures (TPs) will carry out the operations on behalf of the user. For example, when Kathy needs to update information held within her company's database, she will not be allowed to do so without a piece of software controlling these activities. First, Kathy must authenticate to a program, which is acting as a front end for the database, and then the program will control what Kathy can and cannot do to the information in the database. This is referred to as access triple: subject (user), program (TP), and object (CDI). A user cannot modify CDI without using a TP.

State machine - In state machine models, to verify the security of a system, the state is used , which means that all current permissions and all current instances of subjects accessing objects must be captured. Maintaining the state of a system deals with each subject's association with objects. If the subjects can access objects only by means that are concurrent with the security policy, the system is secure. A state of a system is a snapshot of a system at one moment of time. Many activities can alter this state, which are referred to as state transitions. The developers of an operating system that will implement the state machine model need to look at all the different state transitions that are possible and assess whether a system that starts up in a secure state can be put into an insecure state by any of these events. If all of the activities that are allowed to happen

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in the system do not compromise the system and put it into an insecure state, then the system executes a secure state machine model.

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 369, 372-374, 367). McGraw-Hill . Kindle Edition.

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### QUESTION 1014

Which of the following is a true statement pertaining to memory addressing?

- A. The CPU uses absolute addresses. Applications use logical addresses. Relative addresses are based on a known address and an offset value.
- B. The CPU uses logical addresses. Applications use absolute addresses. Relative addresses are based on a known address and an offset value.
- C. The CPU uses absolute addresses. Applications use relative addresses. Logical addresses are based on a known address and an offset value.
- D. The CPU uses absolute addresses. Applications use logical addresses. Absolute addresses are based on a known address and an offset value.

Answer: A

Explanation: The physical memory addresses that the CPU uses are called absolute addresses. The indexed memory addresses that software uses are referred to as logical addresses. A relative address is a logical address which incorporates the correct offset value.

The following answers are incorrect:

The CPU uses logical addresses. Applications use absolute addresses. Relative addresses are based on a known address and an offset value.

The CPU uses absolute addresses. Applications use relative addresses. Logical addresses are based on a known address and an offset value.

The CPU uses absolute addresses. Applications use logical addresses. Absolute addresses are based on a known address and an offset value.

The following reference(s) were/was used to create this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 330). McGraw-Hill . Kindle Edition.

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### QUESTION 1015

Which of the following answers BEST describes the Bell La-Padula model of storage and access control of classified information?

- A. No read up and No write down
- B. No write up, no read down
- C. No read over and no write up
- D. No reading from higher classification levels

Answer: A

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Explanation: The Bell–LaPadula model is perhaps the most well-known and significant security model, in addition to being one of the oldest models used in the creation of modern secure computing systems. Like the Trusted Computer System Evaluation Criteria (or TCSEC), it was inspired by early U.S. Department of Defense security policies and the need to prove that confidentiality could be maintained. In other words, its primary goal is to prevent disclosure as the model system moves from one state (one point in time) to another.

In the world of Information Access Controls, there are multipl models, see some of them below:

- Bell La-Padula Model: Works to restrict users from reading data from a higher classification to protect that data. This model is concerned with information security.
- Biba Model: This model means that a user can't write information TO a higher level
- Clark-Wilson Model: This model requires that all data access occur through controlled access programs.
- Information Flow Model: This is concerned with the properties of information flow in both directions, not only in one direction. It requires that each piece of information has unique properties.

- Noninterference Model: This model is intended to ensure that higher-level security functions don't interfere with lower-level operations in an attempt to isolate one from the other.

Each are different and suited for different information processing environments.

The following answers are incorrect:

- No write up, no read down: Sorry but this is defines the Biba model of information integrity.
- No read over, no write up: This is an incorrect answer.
- No Reading from higher classification levels: This is incorrect but it is half correct in that data may not be written DOWN to a lower level of classification because it would create something called a spillage where data is leaked out of a more secure area into a less secure one.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 17597-17600). Auerbach Publications. Kindle Edition.

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## QUESTION 1016

In which of the following cloud computing service model are applications hosted by the service provider and made available to the customers over a network?

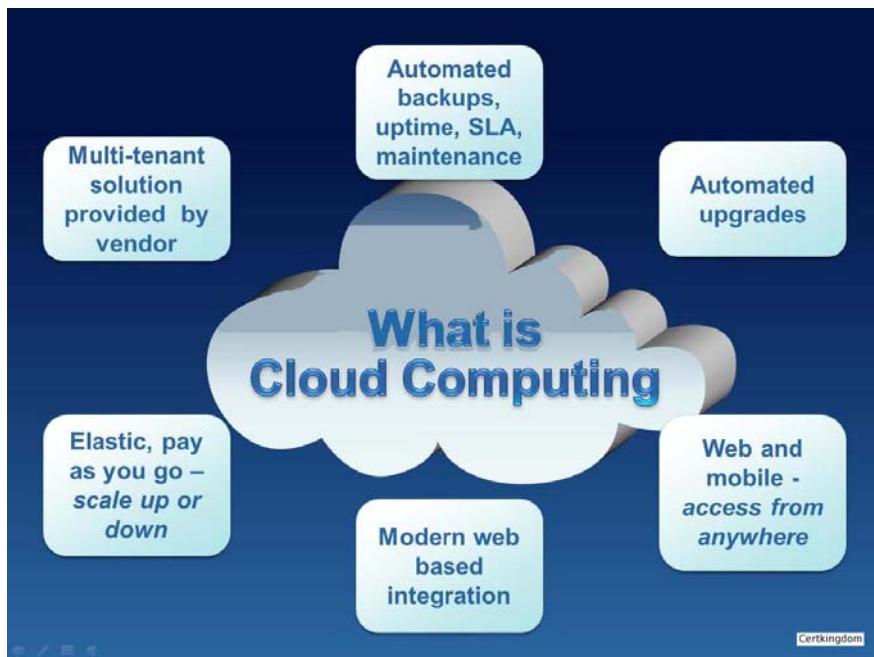
- A. Software as a service
- B. Data as a service
- C. Platform as a service
- D. Infrastructure as a service

Answer: A

Explanation: Software as a Service (SaaS) is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet. SaaS is closely related to the ASP (application service provider) and on demand computing software delivery models.

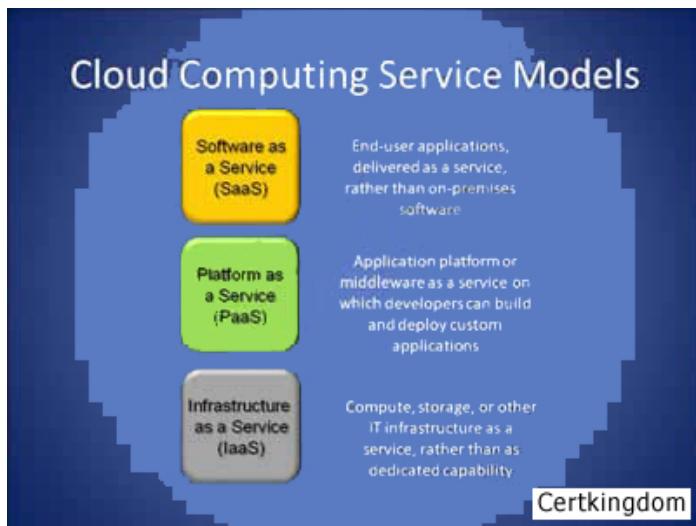
For your exam you should know below information about Cloud Computing:

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models.



## Cloud Computing

Image Reference <http://osarena.net/wp-content/uploads/2013/04/cloud-computing3.jpg>  
Cloud computing service model



## Cloud computing service models

Image Reference <http://www.esri.com/news/arcwatch/0110/graphics/feature2.jpg>

## Software as a Service (SaaS)

Software as a Service (SaaS) is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet. SaaS is closely related to the ASP (application service provider) and on demand computing software delivery models. IDC identifies two slightly different delivery models for SaaS. The hosted application management (hosted AM) model is similar to ASP: a provider hosts commercially available software for customers and delivers it over the Web. In the software on demand model, the provider gives customers network-based access to a single copy of an application created specifically for SaaS distribution.

Provider gives users access to specific application software (CRM, e-mail, games). The provider gives the customers network based access to a single copy of an application created specifically for SaaS distribution and use.

Benefits of the SaaS model include:

easier administration

automatic updates and patch management

compatibility: All users will have the same version of software.

easier collaboration, for the same reason

global accessibility.

## Platform as a Service (PaaS)

Platform as a Service (PaaS) is a way to rent hardware, operating systems, storage and network capacity over the Internet. The service delivery model allows the customer to rent virtualized servers and associated services for running existing applications or developing and testing new ones.

Cloud providers deliver a computing platform, which can include an operating system, database, and web server as a holistic execution environment. Where IaaS is the "raw IT network," PaaS is the software environment that runs on top of the IT network.

Platform as a Service (PaaS) is an outgrowth of Software as a Service (SaaS), a software distribution model in which hosted software applications are made available to customers over the Internet. PaaS has several advantages for developers. With PaaS, operating system features can be changed and upgraded frequently. Geographically distributed development teams can work together on software development projects. Services can be obtained from diverse sources that cross international boundaries. Initial and ongoing costs can be reduced by the use of infrastructure services from a single vendor rather than maintaining multiple hardware facilities that often perform duplicate functions or suffer from incompatibility problems. Overall expenses can also be minimized by unification of programming development efforts.

On the downside, PaaS involves some risk of "lock-in" if offerings require proprietary service interfaces or development languages. Another potential pitfall is that the flexibility of offerings may not meet the needs of some users whose requirements rapidly evolve.

## Infrastructure as a Service (IaaS)

Cloud providers offer the infrastructure environment of a traditional data center in an on-demand delivery method. Companies deploy their own operating systems, applications, and software onto this provided infrastructure and are responsible for maintaining them.

Infrastructure as a Service is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it.

The client typically pays on a per-use basis.

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The following answers are incorrect:

Data as a service - Data Provided as a service rather than needing to be loaded and prepared on premises.

Platform as a service - Platform as a Service (PaaS) is a way to rent hardware, operating systems, storage and network capacity over the Internet. The service delivery model allows the customer to rent virtualized servers and associated services for running existing applications or developing and testing new ones.

Infrastructure as a service - Infrastructure as a Service is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it. The client typically pays on a per-use basis.

The following reference(s) were/was used to create this question:

CISA review manual 2014 page number 102

Official ISC2 guide to CISSP 3rd edition Page number 689

<http://searchcloudcomputing.techtarget.com/definition/Software-as-a-Service>

<http://searchcloudcomputing.techtarget.com/definition/Platform-as-a-Service-PaaS>

<http://searchcloudcomputing.techtarget.com/definition/Infrastructure-as-a-Service-IaaS>

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## QUESTION 1017

Which of the following cloud computing service model provides a way to rent operating systems, storage and network capacity over the Internet?

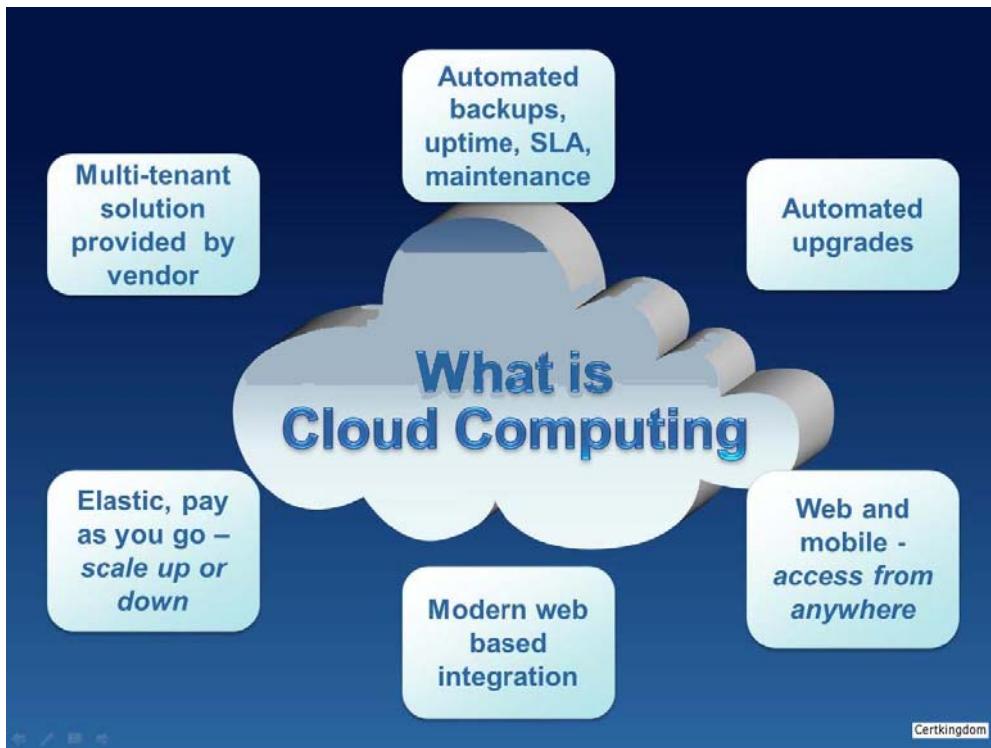
- A. Software as a service
- B. Data as a service
- C. Platform as a service
- D. Infrastructure as a service

Answer: C

Explanation: Platform as a Service (PaaS) is a way to rent operating systems, storage and network capacity over the Internet. The service delivery model allows the customer to rent virtualized servers and associated services for running existing applications or developing and testing new ones.

For your exam you should know below information about Cloud Computing:

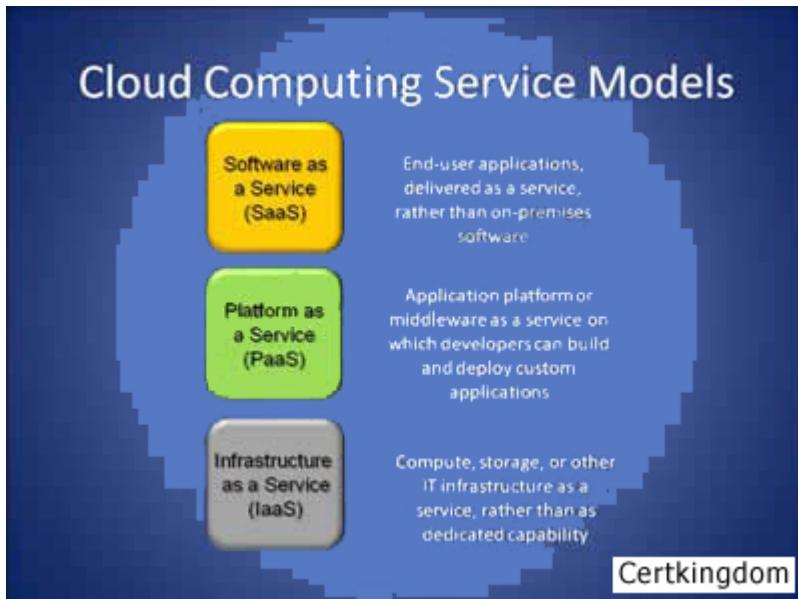
Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models.



## Cloud Computing

Image Reference <http://osarena.net/wp-content/uploads/2013/04/cloud-computing3.jpg>

Cloud computing service models:



## Cloud computing service models

Image Reference <http://www.esri.com/news/arcwatch/0110/graphics/feature2.jpg>

Software as a Service (SaaS)

Software as a Service (SaaS) is a software distribution model in which applications are hosted by

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a vendor or service provider and made available to customers over a network, typically the Internet. SaaS is closely related to the ASP (application service provider) and on demand computing software delivery models. IDC identifies two slightly different delivery models for SaaS. The hosted application management (hosted AM) model is similar to ASP: a provider hosts commercially available software for customers and delivers it over the Web. In the software on demand model, the provider gives customers network-based access to a single copy of an application created specifically for SaaS distribution.

Provider gives users access to specific application software (CRM, e-mail, games). The provider gives the customers network based access to a single copy of an application created specifically for SaaS distribution and use.

Benefits of the SaaS model include:

easier administration

automatic updates and patch management

compatibility: All users will have the same version of software.

easier collaboration, for the same reason

global accessibility.

#### Platform as a Service (PaaS)

Platform as a Service (PaaS) is a way to rent operating systems, storage and network capacity over the Internet. The service delivery model allows the customer to rent virtualized servers and associated services for running existing applications or developing and testing new ones.

Cloud providers deliver a computing platform, which can include an operating system, database, and web server as a holistic execution environment. Where IaaS is the “raw IT network,” PaaS is the software environment that runs on top of the IT network.

Platform as a Service (PaaS) is an outgrowth of Software as a Service (SaaS), a software distribution model in which hosted software applications are made available to customers over the Internet. PaaS has several advantages for developers. With PaaS, operating system features can be changed and upgraded frequently. Geographically distributed development teams can work together on software development projects. Services can be obtained from diverse sources that cross international boundaries. Initial and ongoing costs can be reduced by the use of infrastructure services from a single vendor rather than maintaining multiple hardware facilities that often perform duplicate functions or suffer from incompatibility problems. Overall expenses can also be minimized by unification of programming development efforts.

On the downside, PaaS involves some risk of "lock-in" if offerings require proprietary service interfaces or development languages. Another potential pitfall is that the flexibility of offerings may not meet the needs of some users whose requirements rapidly evolve.

#### Infrastructure as a Service (IaaS)

Cloud providers offer the infrastructure environment of a traditional data center in an on-demand delivery method. Companies deploy their own operating systems, applications, and software onto this provided infrastructure and are responsible for maintaining them.

Infrastructure as a Service is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it.

The client typically pays on a per-use basis.

Characteristics and components of IaaS include:

Utility computing service and billing model.

Automation of administrative tasks.

Dynamic scaling.

Desktop virtualization.

Policy-based services.

Internet connectivity.

Infrastructure as a Service is sometimes referred to as Hardware as a Service (HaaS).

The following answers are incorrect:

Data as a service - Data Provided as a service rather than needing to be loaded and prepared on premises.

Software as a service - Software as a Service (SaaS) is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet. SaaS is closely related to the ASP (application service provider) and on demand computing software delivery models.

Infrastructure as a service - Infrastructure as a Service is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it. The client typically pays on a per-use basis.

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<http://searchcloudcomputing.techtarget.com/definition/Infrastructure-as-a-Service-IaaS>

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## QUESTION 1018

Which of the following cloud computing service model is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components?

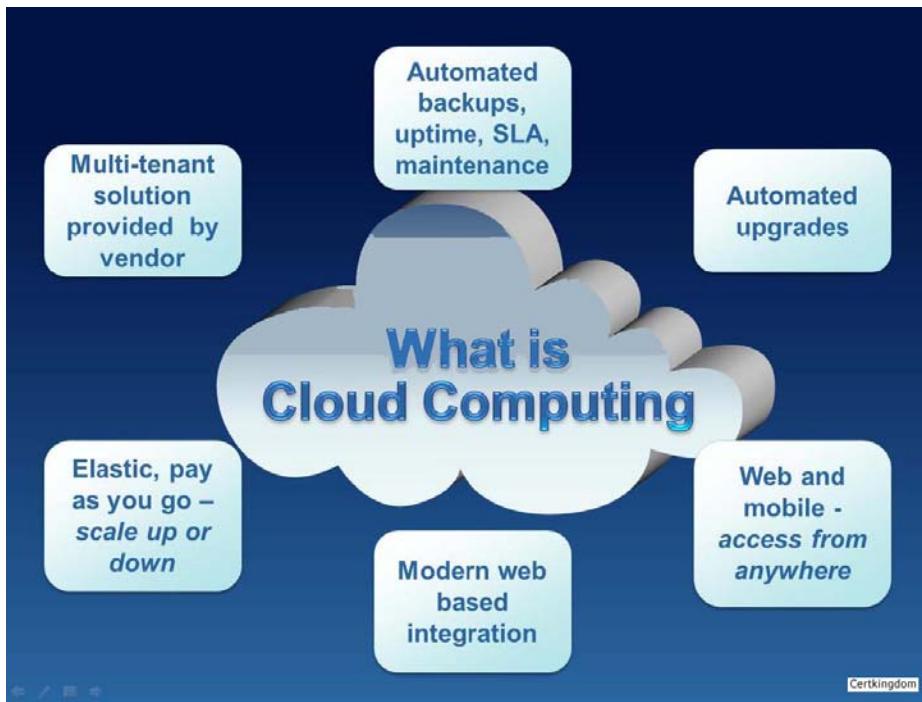
- A. Software as a service
- B. Data as a service
- C. Platform as a service
- D. Infrastructure as a service

Answer: D

Explanation: Infrastructure as a Service is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it. The client typically pays on a per-use basis.

For your exam you should know below information about Cloud Computing:

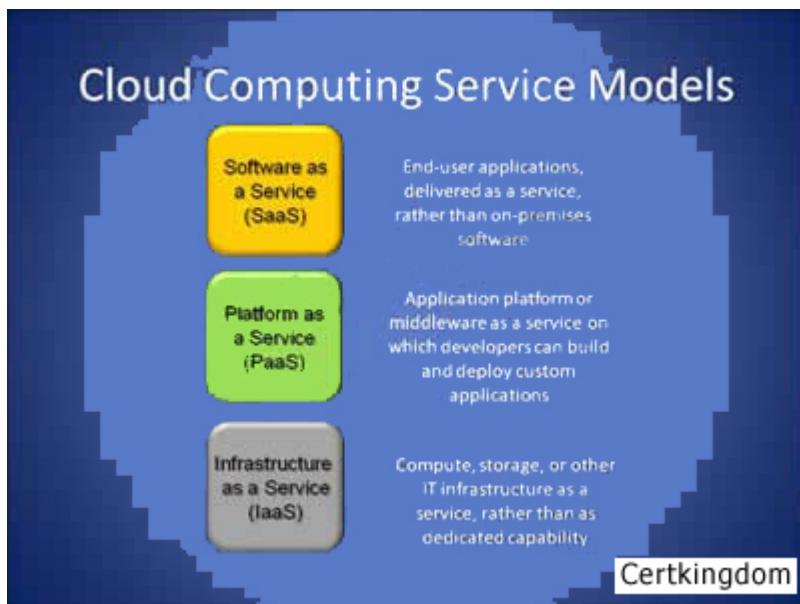
Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models.



## Cloud Computing

Image Reference <http://osarena.net/wp-content/uploads/2013/04/cloud-computing3.jpg>

Cloud computing service models:



## Cloud computing service models

Image Reference <http://www.esri.com/news/arcwatch/0110/graphics/feature2.jpg>

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Characteristics and components of IaaS include:

Utility computing service and billing model.

Automation of administrative tasks.

Dynamic scaling.

Desktop virtualization.

Policy-based services.

Internet connectivity.

Infrastructure as a Service is sometimes referred to as Hardware as a Service (HaaS).

The following answers are incorrect:

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Platform as a service - Platform as a Service (PaaS) is a way to rent hardware, operating systems, storage and network capacity over the Internet. The service delivery model allows the customer to rent virtualized servers and associated services for running existing applications or developing and testing new ones.

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CISA review manual 2014 page number 102

Official ISC2 guide to CISSP 3rd edition Page number 689

<http://searchcloudcomputing.techtarget.com/definition/Software-as-a-Service>

<http://searchcloudcomputing.techtarget.com/definition/Platform-as-a-Service-PaaS>

<http://searchcloudcomputing.techtarget.com/definition/Infrastructure-as-a-Service-IaaS>

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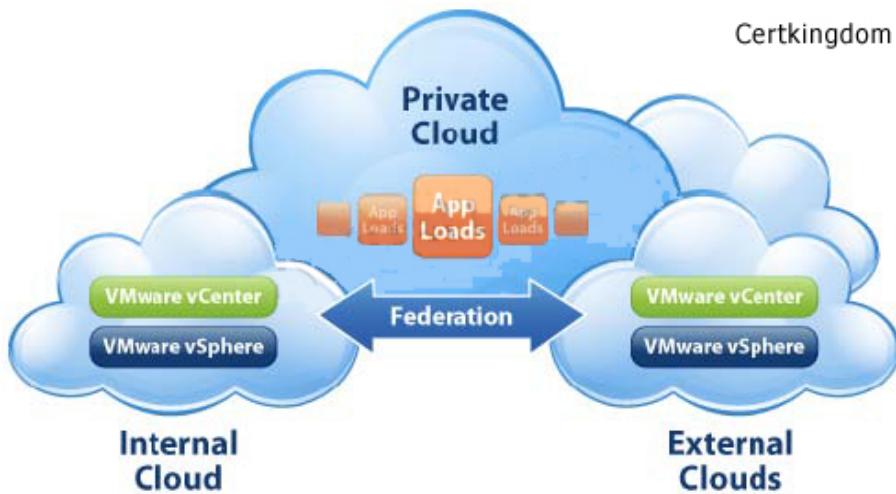
## QUESTION 1019

Which of the following cloud deployment model operates solely for an organization?

- A. Private Cloud
- B. Community Cloud
- C. Public Cloud
- D. Hybrid Cloud

Answer: A

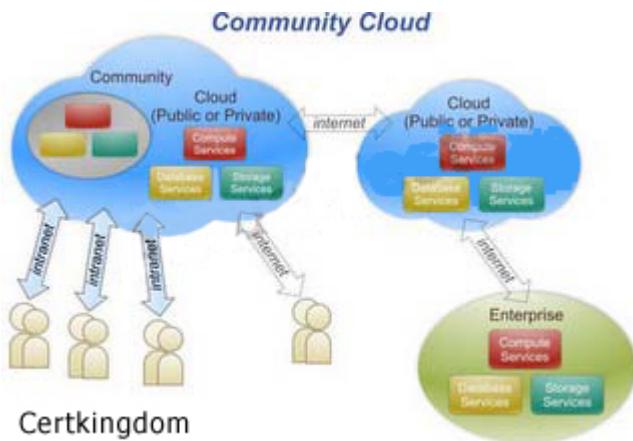
Explanation: In Private cloud, the cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.



For your exam you should know below information about Cloud Computing deployment models:

#### Private cloud

The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.



#### Private Cloud

Image Reference - <http://www.inflectionpoint.co.uk/Portals/5/VMware-vCloud.jpg>

#### Community Cloud

The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

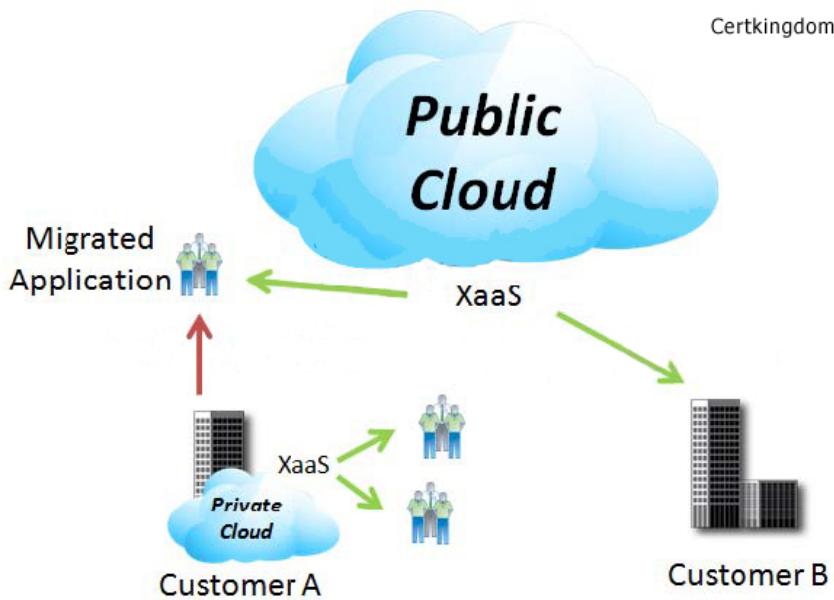
#### Community Cloud

Image Reference - <http://cloudcomputingksu.files.wordpress.com/2012/05/community-cloud.png>

#### Public Cloud

The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some

combination of them. It exists on the premises of the cloud provider.

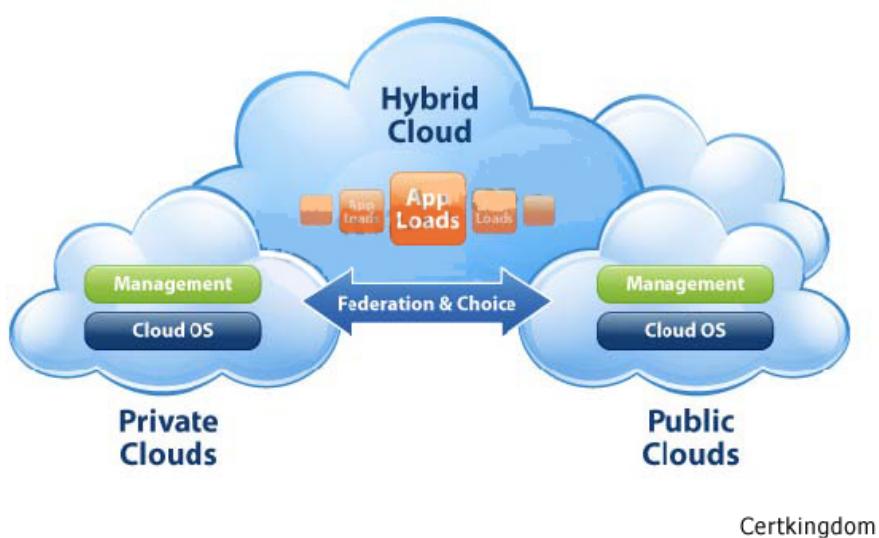


### Public Cloud

Image reference - <http://definethecloud.files.wordpress.com/2010/04/image3.png>

### Hybrid cloud

The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds)



Certkingdom

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hybrid cloud

Image reference - <http://www.virtualizationpractice.com/wp-content/uploads/2013/04/Hybrid-Cloud-Computing-Solution1.jpg>

The following answers are incorrect:

Community cloud - The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

Public cloud - The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

Hybrid cloud - The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds)

The following reference(s) were/was used to create this question:

CISA review manual 2014 page number 102

Official ISC2 guide to CISSP 3rd edition Page number 689 and 690

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## QUESTION 1020

Which of the following cloud deployment model can be shared by several organizations?

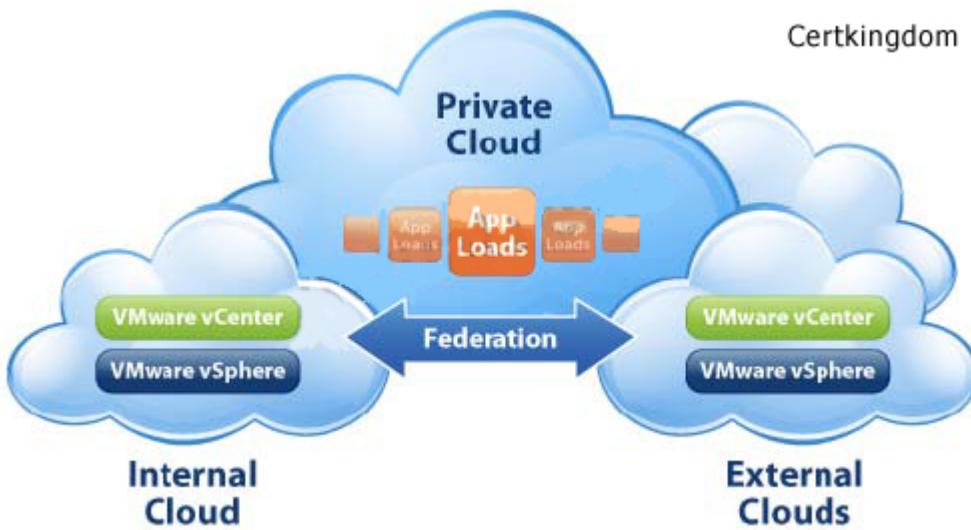
- A. Private Cloud
- B. Community Cloud
- C. Public Cloud
- D. Hybrid Cloud

Answer: B

Explanation: In Community cloud, the cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

For your exam you should know below information about Cloud Computing deployment models:  
Private cloud

The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

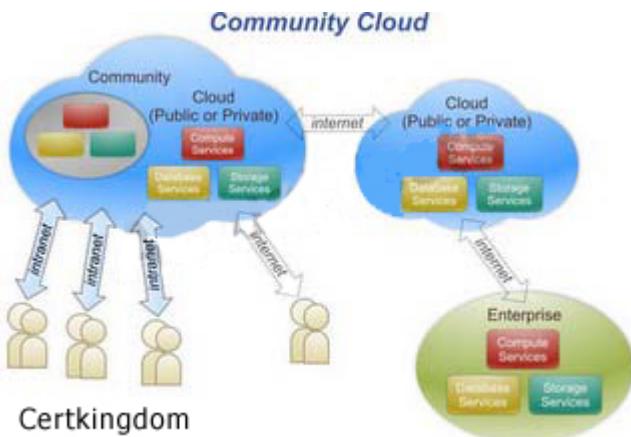


### Private Cloud

Image Reference - <http://www.inflectionpoint.co.uk/Portals/5/VMware-vCloud.jpg>

#### Community Cloud

The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

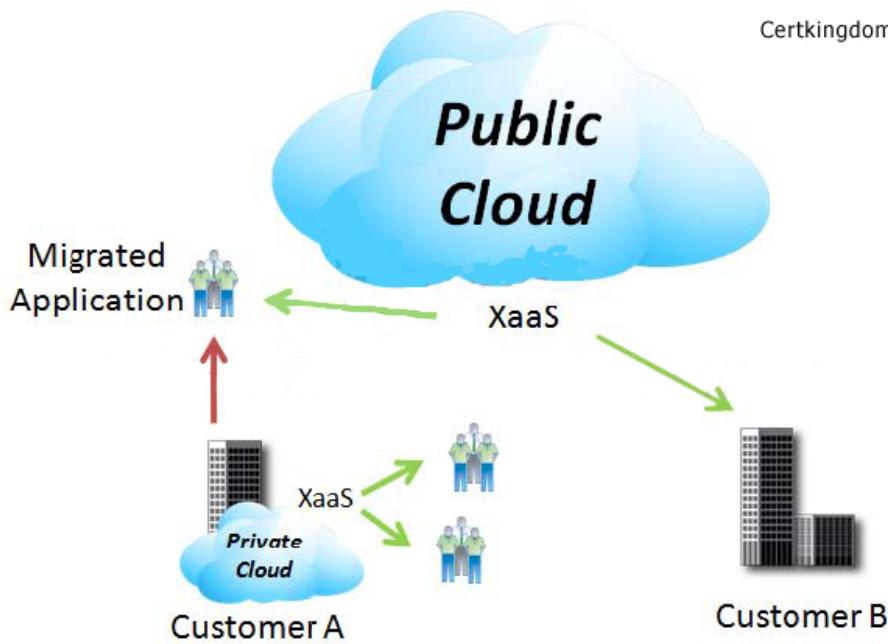


### Community Cloud

Image Reference - <http://cloudcomputingksu.files.wordpress.com/2012/05/community-cloud.png>

#### Public Cloud

The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.



## Public Cloud

Image reference - <http://definethecloud.files.wordpress.com/2010/04/image3.png>

### Hybrid cloud

The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds)

### hybrid cloud

Image reference - <http://www.virtualizationpractice.com/wp-content/uploads/2013/04/Hybrid-Cloud-Computing-Solution1.jpg>

The following answers are incorrect:

Private cloud - The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

Public cloud - The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

Hybrid cloud - The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds)

The following reference(s) were/was used to create this question:

CISA review manual 2014 page number 102

Official ISC2 guide to CISSP 3rd edition Page number 689 and 690

## QUESTION 1021

Which of the following cloud deployment model is provisioned for open use by the general public?

- A. Private Cloud
- B. Community Cloud
- C. Public Cloud
- D. Hybrid Cloud

Answer: C

**Explanation:** In Public cloud, the cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

For your exam you should know below information about Cloud Computing deployment models:

#### Private cloud

The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

#### Private Cloud

Image Reference - <http://www.inflectionpoint.co.uk/Portals/5/VMware-vCloud.jpg>

#### Community Cloud

The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

#### Community Cloud

Image Reference - <http://cloudcomputingksu.files.wordpress.com/2012/05/community-cloud.png>

#### Public Cloud

The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

#### Public Cloud

Image reference - <http://definethecloud.files.wordpress.com/2010/04/image3.png>

#### Hybrid cloud

The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds)

#### hybrid cloud

Image reference - <http://www.virtualizationpractice.com/wp-content/uploads/2013/04/Hybrid-Cloud-Computing-Solution1.jpg>

The following answers are incorrect:

Private cloud - The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

Community cloud - The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated

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by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

Hybrid cloud - The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds)

The following reference(s) were/was used to create this question:

CISA review manual 2014 page number 102

Official ISC2 guide to CISSP 3rd edition Page number 689 and 690

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## QUESTION 1022

Which of the following cloud deployment model is formed by the composition of two or more cloud deployment mode?

- A. Private Cloud
- B. Community Cloud
- C. Public Cloud
- D. Hybrid Cloud

Answer: D

Explanation: In Hybrid cloud, the cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds)

For your exam you should know below information about Cloud Computing deployment models:  
Private cloud

The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

Private Cloud

Image Reference - <http://www.inflectionpoint.co.uk/Portals/5/VMware-vCloud.jpg>

Community Cloud

The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

Community Cloud

Image Reference - <http://cloudcomputingksu.files.wordpress.com/2012/05/community-cloud.png>

Public Cloud

The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

Public Cloud

Image reference - <http://definethecloud.files.wordpress.com/2010/04/image3.png>

## Hybrid cloud

The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds) hybrid cloud

Image reference - <http://www.virtualizationpractice.com/wp-content/uploads/2013/04/Hybrid-Cloud-Computing-Solution1.jpg>

The following answers are incorrect:

Private cloud - The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

Community cloud - The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

Public cloud - The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

The following reference(s) were/was used to create this question:

CISA review manual 2014 page number 102

Official ISC2 guide to CISSP 3rd edition Page number 689 and 690

(Operations Security)

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## QUESTION 1023

Configuration Management controls what?

- A. Auditing of changes to the Trusted Computing Base.
- B. Control of changes to the Trusted Computing Base.
- C. Changes in the configuration access to the Trusted Computing Base.
- D. Auditing and controlling any changes to the Trusted Computing Base.

Answer: D

Explanation: All of these are components of Configuration Management.

The following answers are incorrect:

Auditing of changes to the Trusted Computing Base. Is incorrect because it refers only to auditing the changes, but nothing about controlling them.

Control of changes to the Trusted Computing Base. Is incorrect because it refers only to controlling the changes, but nothing about ensuring the changes will not lead to a weakness or fault in the system.

Changes in the configuration access to the Trusted Computing Base. Is incorrect because this does not refer to controlling the changes or ensuring the changes will not lead to a weakness or fault in the system.

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**QUESTION 1024**

If an operating system permits shared resources such as memory to be used sequentially by multiple users/application or subjects without a refresh of the objects/memory area, what security problem is MOST likely to exist?

- A. Disclosure of residual data.
- B. Unauthorized obtaining of a privileged execution state.
- C. Data leakage through covert channels.
- D. Denial of service through a deadly embrace.

Answer: A

Explanation: Allowing objects to be used sequentially by multiple users without a refresh of the objects can lead to disclosure of residual data. It is important that steps be taken to eliminate the chance for the disclosure of residual data.

Object reuse refers to the allocation or reallocation of system resources to a user or, more appropriately, to an application or process. Applications and services on a computer system may create or use objects in memory and in storage to perform programmatic functions. In some cases, it is necessary to share these resources between various system applications. However, some objects may be employed by an application to perform privileged tasks on behalf of an authorized user or upstream application. If object usage is not controlled or the data in those objects is not erased after use, they may become available to unauthorized users or processes.

Disclosure of residual data and Unauthorized obtaining of a privileged execution state are both a problem with shared memory and resources. Not clearing the heap/stack can result in residual data and may also allow the user to step on somebody's session if the security token/identify was maintained in that space. This is generally more malicious and intentional than accidental though. The MOST common issue would be Disclosure of residual data.

The following answers are incorrect:

Unauthorized obtaining of a privileged execution state. Is incorrect because this is not a problem with Object Reuse.

Data leakage through covert channels. Is incorrect because it is not the best answer. A covert channel is a communication path. Data leakage would not be a problem created by Object Reuse. In computer security, a covert channel is a type of computer security attack that creates a capability to transfer information objects between processes that are not supposed to be allowed to communicate by the computer security policy. The term, originated in 1973 by Lampson is defined as "(channels) not intended for information transfer at all, such as the service program's effect on system load." to distinguish it from Legitimate channels that are subjected to access controls by COMPUSEC.

Denial of service through a deadly embrace. Is incorrect because it is only a detractor.

References:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 4174-4179). Auerbach Publications. Kindle Edition.

and

<https://www.fas.org/irp/nsa/rainbow/tg018.htm>

and

[http://en.wikipedia.org/wiki/Covert\\_channel](http://en.wikipedia.org/wiki/Covert_channel)

**QUESTION 1025**

Operations Security seeks to primarily protect against which of the following?

- A. object reuse
- B. facility disaster
- C. compromising emanations
- D. asset threats

Answer: D

Explanation: The correct answer is asset threats. A threat is any circumstance or event with the potential to cause harm.

The most important reason for identifying threats is to know from what do the assets need protection and what is the likelihood that a threat will occur. Threats cannot be eliminated, but can be anticipated, and safeguards put in place to minimize their impact.

Operations Security provides audit and monitoring for mechanisms, tools and facilities which permit the identification of security events and documentation of subsequent corrective actions.

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Source: State of Nebraska - Information Security Systems (ISS) Security Officer Instruction Guide.

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**QUESTION 1026**

Which of the following components are considered part of the Trusted Computing Base?

- A. trusted hardware and firmware
- B. trusted hardware and software
- C. trusted hardware, software and firmware
- D. trusted computer operators and system managers

Answer: C

Explanation: The trusted computing base (TCB) is a collection of all the hardware, software, and firmware components within a system that provide some type of security and enforce the system's security policy. The TCB does not address only operating system components, because a computer system is not made up of only an operating system. Hardware, software components, and firmware components can affect the system in a negative or positive manner, and each has a responsibility to support and enforce the security policy of that particular system. Some components and mechanisms have direct responsibilities in supporting the security policy, such as firmware that will not let a user boot a computer from a USB drive, or the memory manager that will not let processes overwrite other processes' data. Then there are components that do not enforce the security policy but must behave properly and not violate the trust of a system.

Examples of the ways in which a component could violate the system's security policy include an application that is allowed to make a direct call to a piece of hardware instead of using the proper system calls through the operating system, a process that is allowed to read data outside of its approved memory space, or a piece of software that does not properly release resources after use.

To assist with the evaluation of secure products, TCSEC introduced the idea of the Trusted Computing Base (TCB) into product evaluation. In essence, TCSEC starts with the principle that there are some functions that simply must be working correctly for security to be possible and consistently enforced in a computing system. For example, the ability to define subjects and objects and the ability to distinguish between them is so fundamental that no system could be secure without it. The TCB then are these fundamental controls implemented in a given system, whether that is in hardware, software, or firmware. Each of the TCSEC levels describes a different set of fundamental functions that must be in place to be certified to that level.

The link below will take you to a one page document that describes the high-level requirements that any TCB would need to meet to achieve each division or class (essentially a subdivision) of 2

the TCSEC rating. See details at:

<https://www.freepracticetests.org/documents/TCB.pdf>

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (pp. 359-360). McGraw-Hill. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press (Kindle Locations 17936-17943). Auerbach Publications. Kindle Edition.

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## QUESTION 1027

Which of the following is NOT an example of an operational control?

- A. backup and recovery
- B. Auditing
- C. contingency planning
- D. operations procedures

Answer: B

Explanation: Operational controls are controls over the hardware, the media used and the operators using these resources.

Operational controls are controls that are implemented and executed by people, they are most often procedures.

Backup and recovery, contingency planning and operations procedures are operational controls. Auditing is considered an Administrative / detective control. However the actual auditing mechanisms in place on the systems would be consider operational controls.

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## QUESTION 1028

Degaussing is used to clear data from all of the following medias except:

- A. Floppy Disks
- B. Read-Only Media
- C. Video Tapes
- D. Magnetic Hard Disks

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Answer: B

#### Explanation: Atoms and Data

Shon Harris says: "A device that performs degaussing generates a coercive magnetic force that reduces the magnetic flux density of the storage media to zero. This magnetic force is what properly erases data from media. Data are stored on magnetic media by the representation of the polarization of the atoms. Degaussing changes"

The latest ISC2 book says:

"Degaussing can also be a form of media destruction. High-power degaussers are so strong in some cases that they can literally bend and warp the platters in a hard drive. Shredding and burning are effective destruction methods for non-rigid magnetic media. Indeed, some shredders are capable of shredding some rigid media such as an optical disk. This may be an effective alternative for any optical media containing nonsensitive information due to the residue size remaining after feeding the disk into the machine. However, the residue size might be too large for media containing sensitive information. Alternatively, grinding and pulverizing are acceptable choices for rigid and solid-state media. Specialized devices are available for grinding the face of optical media that either sufficiently scratches the surface to render the media unreadable or actually grinds off the data layer of the disk. Several services also exist which will collect drives, destroy them on site if requested and provide certification of completion. It will be the responsibility of the security professional to help, select, and maintain the most appropriate solutions for media cleansing and disposal."

Degaussing is achieved by passing the magnetic media through a powerful magnet field to rearrange the metallic particles, completely removing any resemblance of the previously recorded signal (from the "all about degaussers link below). Therefore, degaussing will work on any electronic based media such as floppy disks, or hard disks - all of these are examples of electronic storage. However, "read-only media" includes items such as paper printouts and CD-ROM which do not store data in an electronic form or is not magnetic storage. Passing them through a magnet field has no effect on them.

Not all clearing/ purging methods are applicable to all media—for example, optical media is not susceptible to degaussing, and overwriting may not be effective against Flash devices. The degree to which information may be recoverable by a sufficiently motivated and capable adversary must not be underestimated or guessed at in ignorance. For the highest-value commercial data, and for all data regulated by government or military classification rules, read and follow the rules and standards.

I will admit that this is a bit of a trick question. Determining the difference between "read-only media" and "read-only memory" is difficult for the question taker. However, I believe it is representative of the type of question you might one day see on an exam.

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The other answers are incorrect because:

Floppy Disks, Magnetic Tapes, and Magnetic Hard Disks are all examples of magnetic storage, and therefore are erased by degaussing.

A videotape is a recording of images and sounds on to magnetic tape as opposed to film stock used in filmmaking or random access digital media. Videotapes are also used for storing scientific or medical data, such as the data produced by an electrocardiogram. In most cases, a helical scan video head rotates against the moving tape to record the data in two dimensions, because video

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signals have a very high bandwidth, and static heads would require extremely high tape speeds. Videotape is used in both video tape recorders (VTRs) or, more commonly and more recently, videocassette recorder (VCR) and camcorders. A Tape use a linear method of storing information and since nearly all video recordings made nowadays are digital direct to disk recording (DDR), videotape is expected to gradually lose importance as non-linear/random-access methods of storing digital video data become more common.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 25627-25630). McGraw-Hill. Kindle Edition.

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Security Operations (Kindle Locations 580-588). . Kindle Edition.

All About Degaussers and Erasure of Magnetic Media:

<http://www.degausser.co.uk/degauss/degabout.htm>

<http://www.degaussing.net/>

<http://www.cerberussystems.com/INFOSEC/stds/ncsctg25.htm>

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## QUESTION 1029

It is a violation of the "separation of duties" principle when which of the following individuals access the software on systems implementing security?

- A. security administrator
- B. security analyst
- C. systems auditor
- D. systems programmer

Answer: D

Explanation:

Explanation: The security administrator, security analysis, and the system auditor need

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access to portions of the security systems to accomplish their jobs. The system programmer does not need access to the working (AKA: Production) security systems.

Programmers should not be allowed to have ongoing direct access to computers running production systems (systems used by the organization to operate its business). To maintain system integrity, any changes they make to production systems should be tracked by the organization's change management control system.

Because the security administrator's job is to perform security functions, the performance of nonsecurity tasks must be strictly limited. This separation of duties reduces the likelihood of loss that results from users abusing their authority by taking actions outside of their assigned functional responsibilities.

References:

OFFICIAL (ISC)2® GUIDE TO THE CISSP® EXAM (2003), Hansche, S., Berti, J., Hare, H., Auerbach Publication, FL, Chapter 5 - Operations Security, section 5.3,"Security Technology and Tools," Personnel section (page 32).

KRUTZ, R. & VINES, R. The CISSP Prep Guide: Gold Edition (2003), Wiley Publishing Inc., Chapter 6: Operations Security, Separations of Duties (page 303).

**QUESTION 1030**

When backing up an applications system's data, which of the following is a key question to be answered first?

- A. When to make backups
- B. Where to keep backups
- C. What records to backup
- D. How to store backups

Answer: C

Explanation: It is critical that a determination be made of WHAT data is important and should be retained and protected. Without determining the data to be backed up, the potential for error increases. A record or file could be vital and yet not included in a backup routine. Alternatively, temporary or insignificant files could be included in a backup routine unnecessarily.

The following answers were incorrect:

When to make backups Although it is important to consider schedules for backups, this is done after the decisions are made of what should be included in the backup routine.

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Where to keep backups The location of storing backup copies of data (Such as tapes, on-line backups, etc) should be made after determining what should be included in the backup routine and the method to store the backup.

How to store backups The backup methodology should be considered after determining what data should be included in the backup routine.

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**QUESTION 1031**

The number of violations that will be accepted or forgiven before a violation record is produced is called which of the following?

- A. clipping level
- B. acceptance level
- C. forgiveness level
- D. logging level

Answer: A

Explanation: The correct answer is "clipping level". This is the point at which a system decides to take some sort of action when an action repeats a preset number of times. That action may be to log the activity, lock a user account, temporarily close a port, etc.

Example: The most classic example of a clipping level is failed login attempts. If you have a system configured to lock a user's account after three failed login attempts, that is the "clipping level".

The other answers are not correct because:

Acceptance level, forgiveness level, and logging level are nonsensical terms that do not exist (to my knowledge) within network security.

**Reference:**

Official ISC2 Guide - The term "clipping level" is not in the glossary or index of that book. I cannot find it in the text either. However, I'm quite certain that it would be considered part of the CBK, despite its exclusion from the Official Guide.

All in One Third Edition page: 136 - 137

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**QUESTION 1032**

Which of the following is the most reliable, secure means of removing data from magnetic storage media such as a magnetic tape, or a cassette?

- A. Degaussing
- B. Parity Bit Manipulation
- C. Zeroization
- D. Buffer overflow

Answer: A

Explanation: A "Degausser (Otherwise known as a Bulk Eraser) has the main function of reducing to near zero the magnetic flux stored in the magnetized medium. Flux density is measured in Gauss or Tesla. The operation is speedier than overwriting and done in one short operation. This is achieved by subjecting the subject in bulk to a series of fields of alternating polarity and gradually decreasing strength.

The following answers are incorrect: Parity Bit Manipulation. Parity has to do with disk error detection, not data removal. A bit or series of bits appended to a character or block of characters to ensure that the information received is the same as the information that was sent.

Zeroization. Zeroization involves overwriting data to sanitize it. It is time-consuming and not foolproof. The potential of restoration of data does exist with this method.

Buffer overflow. This is a detractor. Although many Operating Systems use a disk buffer to temporarily hold data read from disk, its primary purpose has no connection to data removal. An overflow goes outside the constraints defined for the buffer and is a method used by an attacker to attempt access to a system.

The following reference(s) were/was used to create this question:

Shon Harris AIO v3. pg 908

Reference: What is degaussing.

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**QUESTION 1033**

Which of the following is true related to network sniffing?

- A. Sniffers allow an attacker to monitor data passing across a network.
- 8
- B. Sniffers alter the source address of a computer to disguise and exploit weak authentication methods.
- C. Sniffers take over network connections.
- D. Sniffers send IP fragments to a system that overlap with each other.

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Answer: A

Explanation: The following answers are incorrect: Sniffers alter the source address of a computer to disguise and exploit weak authentication methods. IP Spoofing is a network-based attack, which involves altering the source address of a computer to disguise the attacker and exploit weak authentication methods.

Sniffers take over network connections. Session Hijacking tools allow an attacker to take over network connections, kicking off the legitimate user or sharing a login.

Sniffers send IP fragments to a system that overlap with each other. Malformed Packet attacks are a type of DoS attack that involves one or two packets that are formatted in an unexpected way.

Many vendor product implementations do not take into account all variations of user entries or packet types. If software handles such errors poorly, the system may crash when it receives such packets. A classic example of this type of attack involves sending IP fragments to a system that overlap with each other (the fragment offset values are incorrectly set. Some unpatched Windows and Linux systems will crash when they encounter such packets.

The following reference(s) were/was used to create this question:

Source: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 2, Auerbach, NY, NY 2001, Chapter 22, Hacker Tools and Techniques by Ed Skoudis.

ISC2 OIG, 2007 p. 137-138, 419

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### QUESTION 1034

Which of the following is NOT a technique used to perform a penetration test?

- A. traffic padding
- B. scanning and probing
- C. war dialing
- D. sniffing

Answer: A

Explanation: Traffic padding is a countermeasure to traffic analysis.

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Even if perfect cryptographic routines are used, the attacker can gain knowledge of the amount of traffic that was generated. The attacker might not know what Alice and Bob were talking about, but can know that they were talking and how much they talked. In certain circumstances this can be very bad. Consider for example when a military is organising a secret attack against another nation: it may suffice to alert the other nation for them to know merely that there is a lot of secret activity going on.

As another example, when encrypting Voice Over IP streams that use variable bit rate encoding, the number of bits per unit of time is not obscured, and this can be exploited to guess spoken phrases.

Padding messages is a way to make it harder to do traffic analysis. Normally, a number of random bits are appended to the end of the message with an indication at the end how much this random data is. The randomness should have a minimum value of 0, a maximum number of N and an even distribution between the two extremes. Note, that increasing 0 does not help, only increasing

N helps, though that also means that a lower percentage of the channel will be used to transmit real data. Also note, that since the cryptographic routine is assumed to be uncrackable (otherwise the padding length itself is crackable), it does not help to put the padding anywhere else, e.g. at the beginning, in the middle, or in a sporadic manner.

The other answers are all techniques used to do Penetration Testing.

References:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, pages 233, 238.

and

[https://secure.wikimedia.org/wikipedia/en/wiki/Padding\\_%28cryptography%29#Traffic\\_analysis](https://secure.wikimedia.org/wikipedia/en/wiki/Padding_%28cryptography%29#Traffic_analysis)

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### QUESTION 1035

Which of the following is NOT a media viability control used to protect the viability of data storage media?

- A. clearing
- B. marking
- C. handling
- D. storage

Answer: A

Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering 0

the Ten Domains of Computer Security, pages 231, 348. Marking, handling and storage are all media viability controls used to protect the viability of data storage media.

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### QUESTION 1036

Which of the following are the two commonly defined types of covert channels:

- A. Storage and Timing
- B. Software and Timing
- C. Storage and Kernel
- D. Kernel and Timing

Answer: A

Explanation: A covert storage channel involves direct or indirect reading of a storage location by another process. A covert timing channel depends upon being able to influence the rate that some other process is able to acquire resources, such as the CPU.

A covert storage channel is a “covert channel that involves the direct or indirect writing of a storage location by one process and the direct or indirect reading of the storage location by another process. Covert storage channels typically involve a finite resource (e.g. sectors on a disk) that is shared by two subjects at different security levels.

A covert timing channel is a “covert channel in which one process signals information to another by modulating its own use of system resources (e.g. CPU time) in such a way that this

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manipulation affects the real response time observed by the second process

References:

TIPTON, Harold F., The Official (ISC)2 Guide to the CISSP CBK (2007), page 550.

and

<http://www.isg.rhul.ac.uk/~prai175/ISGStudentSem07/CovertChannels.ppt>

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### QUESTION 1037

Which of the following refers to the data left on the media after the media has been erased?

A. remanence

1

B. recovery

C. sticky bits

D. semi-hidden

Answer: A

Explanation: Actually the term "remanence" comes from electromagnetism, the study of the electromagnetics. Originally referred to (and still does in that field of study) the magnetic flux that remains in a magnetic circuit after an applied magnetomotive force has been removed. Absolutely no way a candidate will see anywhere near that much detail on any similar CISSP question, but having read this, a candidate won't be likely to forget it either.

It is becoming increasingly commonplace for people to buy used computer equipment, such as a hard drive, or router, and find information on the device left there by the previous owner; information they thought had been deleted. This is a classic example of data remanence: the remains of partial or even the entire data set of digital information. Normally, this refers to the data that remain on media after they are written over or degaussed. Data remanence is most common in storage systems but can also occur in memory.

Specialized hardware devices known as degaussers can be used to erase data saved to magnetic media. The measure of the amount of energy needed to reduce the magnetic field on the media to zero is known as coercivity.

It is important to make sure that the coercivity of the degausser is of sufficient strength to meet object reuse requirements when erasing data. If a degausser is used with insufficient coercivity, then a remanence of the data will exist. Remanence is the measure of the existing magnetic field on the media; it is the residue that remains after an object is degaussed or written over.

Data is still recoverable even when the remanence is small. While data remanence exists, there is no assurance of safe object reuse.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 4207-4210). Auerbach Publications. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 19694-19699). Auerbach Publications. Kindle Edition.

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### QUESTION 1038

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Which of the following ensures that security is not breached when a system crash or other system failure occurs?

- A. trusted recovery
- B. hot swappable
- C. redundancy
- D. secure boot

Answer: A

Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 222.

"System crash" and "system failure" are the key words. One "recovers" from a crash or failure.

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### QUESTION 1039

Which of the following ensures that a TCB is designed, developed, and maintained with formally controlled standards that enforces protection at each stage in the system's life cycle?

- A. life cycle assurance
- B. operational assurance
- C. covert timing assurance
- D. covert storage assurance

Answer: A

Explanation: Life-cycle Assurance - Requirements specified in the Orange Book are:  
security testing,

design specification and testing,  
configuration management, and  
trusted distribution.

Operational Assurance - Concentrates on the product's architecture, embedded features, and functionality that enable a customer to continually obtain the necessary level of protection when using the product.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 219.

Also check out: HARRIS, Shon, All-In-One CISSP Certification Exam Guide 3rd Edition, McGraw-Hill/Osborne, 2005 (pages 904, 961).

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### QUESTION 1040

Which of the following is the lowest TCSEC class wherein the systems must support separate operator and system administrator roles?

- A. B2
- B. B1

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- C. A1
  - D. A2

Answer: A

Explanation: For the purpose of the exam you must know what is being introduced at each of the TCSEC rating. There is a fantastic one page guide that shows clearly what is being introduced at each of the layers. You can download a copy of the guide at:

<https://www.freepracticetests.org/documents/tcsec.pdf>

You can also download a nice document that covers the modes of operations at:

<https://www.freepracticetests.org/documents/modesofoperation.pdf>

References:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 220.

and

<http://csrc.nist.gov/publications/secpubs/rainbow/std001.txt> (paragraph 3.2)

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### QUESTION 1041

Which of the following are NOT a countermeasure to traffic analysis?

- A. Padding messages.
- B. Eavesdropping.
- C. Sending noise.
- D. Faraday Cage

Answer: B

Explanation: Eavesdropping is not a countermeasure, it is a type of attack where you are collecting traffic and attempting to see what is being send between entities communicating with 4 each other.

The following answers are incorrect:

Padding Messages. Is incorrect because it is considered a countermeasure you make messages uniform size, padding can be used to counter this kind of attack, in which decoy traffic is sent out over the network to disguise patterns and make it more difficult to uncover patterns.

Sending Noise. Is incorrect because it is considered a countermeasure, transmitting noninformational data elements to disguise real data.

Faraday Cage Is incorrect because it is a tool used to prevent emanation of electromagnetic waves. It is a very effective tool to prevent traffic analysis.

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### QUESTION 1042

Which of the following are the three classifications of RAID identified by the RAID Advisory Board?

- A. Failure Resistant Disk Systems (FRDSs), Failure Tolerant Disk Systems, and Disaster Tolerant Disk Systems.
- B. Foreign Resistant Disk Systems (FRDSs), Failure Tolerant Disk Systems, and Disaster

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Tolerant Disk Systems.

- C. Failure Resistant Disk Systems (FRDSs), File Transfer Disk Systems, and Disaster Tolerant Disk Systems.
- D. Federal Resistant Disk Systems (FRDSs), Fault Tolerant Disk Systems, and Disaster Tolerant Disk Systems.

Answer: A

Explanation: The RAID Advisory Board has defined three classifications of RAID: Failure Resistant Disk Systems (FRDSs), Failure Tolerant Disk Systems, and Disaster Tolerant Disk Systems.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 65.

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#### **QUESTION 1043**

RAID Level 1 is commonly called which of the following?

- A. mirroring
- 5
- B. striping
- C. clustering
- D. hamming

Answer: A

Explanation: RAID Level 1 is commonly called mirroring.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 65.

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#### **QUESTION 1044**

Which of the following is often implemented by a one-for-one disk to disk ratio?

- A. RAID Level 1
- B. RAID Level 0
- C. RAID Level 2
- D. RAID Level 5

Answer: A

Explanation: This is often implemented by a one-for-one disk-to-disk ratio.

RAID Level 2 provides redundancy by writing all data to two or more drives set. The performance of a level 1 array tends to be faster on reads and slower on writes compared to a single drive, but if either of the drive sets fails, no data is lost. This is a good entry-level redundant system, since only two drives are required as a minimum; however, since one drive is used to store a duplicate of the data, the cost per megabyte is high. This level is commonly referred to as mirroring.

Please visit <http://www.sohoconsult.ch/raid/raid1.html> for a nice overview of RAID Levels.

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For the purpose of the exam you must be familiar with RAID 0 to 5, 10, and 50.

References:

<http://www.sohoconsult.ch/raid/raid1.html>

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 65.

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### QUESTION 1045

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The main issue with Level 1 of RAID is which of the following?

- A. It is very expensive.
- B. It is difficult to recover.
- C. It causes poor performance.
- D. It is relatively unreliable.

Answer: A

Explanation: The main issue with RAID Level 1 is that the one-for-one ratio is very expensive resulting in the highest cost per megabyte of data capacity.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 65.

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### QUESTION 1046

Which of the following effectively doubles the amount of hard drives needed but also provides redundancy?

- A. RAID Level 0
- B. RAID Level 1
- C. RAID Level 2
- D. RAID Level 5

Answer: B

Explanation: RAID Level 1 :- This level effectively doubles the amount of hard drives you need, therefore it is usually best for smaller capacity systems.

See the following link for some nice animated graphics showing each of the RAID levels:

<http://www.acnc.com/raid>

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 65.

and

<http://www.acnc.com/raid>

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### QUESTION 1047

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Which of the following is used to create parity information?

- A. a hamming code
- B. a clustering code
- C. a mirroring code
- D. a striping code

Answer: A

Explanation: RAID Level 2 :- The parity information is created using a hamming code that detects errors and establishes which part of which drive is in error.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 66.

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### QUESTION 1048

The only difference between RAID 3 and RAID 4 is that level 3 is implemented at the byte level while level 4 is usually implemented at which of the following?

- A. block level.
- B. bridge level.
- C. channel level.
- D. buffer level.

Answer: A

Explanation: The only difference is that level 3 is implemented at the byte level and level 4 is usually implemented at the block level.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 66.

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### QUESTION 1049

The spare drives that replace the failed drives are usually hot swappable, meaning they can be replaced on the server in which of the following scenarios?

- A. system is up and running
- 8
- B. system is quiesced but operational
- C. system is idle but operational
- D. system is up and in single-user-mode

Answer: A

Explanation: RAID Level 5 :- The spare drives that replace the failed drives are usually hot swappable, meaning they can be replaced on the server while the system is up and running.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 66.

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**QUESTION 1050**

RAID level 10 is created by combining which of the following?

- A. level 0 (striping) with level 1 (mirroring).
- B. level 0 (striping) with level 2 (hamming).
- C. level 0 (striping) with level 1 (clustering).
- D. level 0 (striping) with level 1 (hamming).

Answer: A

Explanation: RAID Level 10 is created by combining level 0 (striping) with level 1 (mirroring).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 66.

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**QUESTION 1051**

A hardware RAID implementation is usually:

- A. platform-independent.
- B. platform-dependent.
- C. operating system dependant.
- D. software dependant.

Answer: A

Explanation: A hardware RAID implementation is usually platform-independent.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 67.

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**QUESTION 1052**

RAID levels 3 and 5 run:

- A. faster on hardware.
- B. slower on hardware.
- C. faster on software.
- D. at the same speed on software and hardware.

Answer: A

Explanation: RAID levels 3 and 5 run faster on hardware.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 67.

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**QUESTION 1053**

When RAID runs as part of the operating system on the file server, it is an example of a:

- A. software implementation.
- B. hardware implementation.
- C. network implementation.
- D. server implementation.

Answer: A

Explanation: When RAID runs as part of the operating system on the file server, it is an example of a software implementation. RAID can also be implemented as hardware.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 67.

**QUESTION 1054**

A server cluster looks like a:

- A. single server from the user's point of view.  
0
- B. dual server from the user's point of view.
- C. triple server from the user's point of view.
- D. quardle server from the user's point of view.

Answer: A

Explanation: The cluster looks like a single server from the user's point of view.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 67.

**QUESTION 1055**

Which of the following backup methods makes a complete backup of every file on the server every time it is run?

- A. full backup method.
- B. incremental backup method.
- C. differential backup method.
- D. tape backup method.

Answer: A

Explanation: The Full Backup Method makes a complete backup of every file on the server every time it is run.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 69.

**QUESTION 1056**

Which backup method usually resets the archive bit on the files after they have been backed up?

- A. Incremental backup method.
- B. Differential backup method.
- C. Partial backup method.
- D. Tape backup method.

Answer: A

Explanation: The incremental backup method usually resets the archive bit on the files after they have been backed up.

An Incremental Backup will backup all the files that have changed since the last Full Backup (the first time it is run after a full backup was previously completed) or after an Incremental Backup (for 1

the second backup and subsequent backups) and sets the archive bit to 0. This type of backup take less time during the backup phase but it will take more time to restore.

The other answers are all incorrect choices.

The following backup types also exists:

Full Backup - All data are backed up. The archive bit is cleared, which means that it is set to 0.

Differential Backup - Backup the files that have been modified since the last Full Backup. The archive bit does not change. Take more time while the backup phase is performed and take less time to restore.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 69.

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**QUESTION 1057**

Which backup method is additive because the time and tape space required for each night's backup grows during the week as it copies the day's changed files and the previous days' changed files up to the last full backup?

- A. differential backup method.
- B. full backup method.
- C. incremental backup method.
- D. tape backup method.

Answer: A

Explanation: The Differential Backup Method is additive because the time and tape space required for each night's backup grows during the week as it copies the day's changed files and the previous days' changed files up to the last full backup.

Archive Bits

Unless you've done a lot of backups in your time you've probably never heard of an Archive Bit. An archive bit is, essentially, a tag that is attached to every file. In actuality, it is a binary digit that is set on or off in the file, but that's crummy technical jargon that doesn't really tell us anything. For

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the sake of our discussion, just think of it as the flag on a mail box. If the flag is up, it means the file has been changed. If it's down, then the file is unchanged.

Archive bits let the backup software know what needs to be backed up. The differential and

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incremental backup types rely on the archive bit to direct them.

Backup Types

Full or Normal

The "Full" or "normal" backup type is the most standard. This is the backup type that you would use if you wanted to backup every file in a given folder or drive. It backs up everything you direct it to regardless of what the archive bit says. It also resets all archive bits (puts the flags down). Most backup software, including the built-in Windows backup software, lets you select down to the individual file that you want backed up. You can also choose to backup things like the "system state".

Incremental

When you schedule an incremental backup, you are in essence instructing the software to only backup files that have been changed, or files that have their flag up. After the incremental backup of that file has occurred, that flag will go back down. If you perform a normal backup on Monday, then an incremental backup on Wednesday, the only files that will be backed up are those that have changed since Monday. If on Thursday someone deletes a file by accident, in order to get it back you will have to restore the full backup from Monday, followed by the Incremental backup from Wednesday.

Differential

Differential backups are similar to incremental backups in that they only backup files with their archive bit, or flag, up. However, when a differential backup occurs it does not reset those archive bits which means, if the following day, another differential backup occurs, it will back up that file again regardless of whether that file has been changed or not.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 69.

And: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 9: Disaster Recovery and Business continuity (pages 617-619).

And: <http://www.brighthub.com/computing/windows-platform/articles/24531.aspx>

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## QUESTION 1058

Which of the following backup method must be made regardless of whether Differential or Incremental methods are used?

- A. Full Backup Method.
- B. Incremental backup method.
- 3
- C. Supplemental backup method.
- D. Tape backup method.

Answer: A

Explanation: A Full Backup must be made regardless of whether Differential or Incremental methods are used.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 69.  
And: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 9: Disaster Recovery and Business continuity (pages 617-619).

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**QUESTION 1059**

Which of the following tape formats can be used to backup data systems in addition to its original intended audio uses?

- A. Digital Video Tape (DVT).
- B. Digital Analog Tape (DAT).
- C. Digital Voice Tape (DVT).
- D. Digital Audio Tape (DAT).

Answer: D

Explanation: Digital Audio Tape (DAT) can be used to backup data systems in addition to its original intended audio uses.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 70.

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**QUESTION 1060**

This type of backup management provides a continuous on-line backup by using optical or tape "jukeboxes," similar to WORMs (Write Once, Read Many):

- A. Hierarchical Storage Management (HSM).
- B. Hierarchical Resource Management (HRM).
- C. Hierarchical Access Management (HAM).
- D. Hierarchical Instance Management (HIM).

Answer: A

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Explanation: Hierarchical Storage Management (HSM) provides a continuous on-line backup by using optical or tape "jukeboxes," similar to WORMs.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 71.

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**QUESTION 1061**

Physically securing backup tapes from unauthorized access is obviously a security concern and is considered a function of the:

- A. Operations Security Domain.
- B. Operations Security Domain Analysis.
- C. Telecommunications and Network Security Domain.
- D. Business Continuity Planning and Disaster Recovery Planning.

Answer: A

Explanation: Physically securing the tapes from unauthorized access is obviously a security concern and is considered a function of the Operations Security Domain.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 71.

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### QUESTION 1062

The high availability of multiple all-inclusive, easy-to-use hacking tools that do NOT require much technical knowledge has brought a growth in the number of which type of attackers?

- A. Black hats
- B. White hats
- C. Script kiddies
- D. Phreakers

Answer: C

Explanation: As script kiddies are low to moderately skilled hackers using available scripts and tools to easily launch attacks against victims.

The other answers are incorrect because :

Black hats is incorrect as they are malicious , skilled hackers.

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White hats is incorrect as they are security professionals.

Phreakers is incorrect as they are telephone/PBX (private branch exchange) hackers.

Reference : Shon Harris AIO v3 , Chapter 12: Operations security , Page : 830

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### QUESTION 1063

Which of the following computer crime is MORE often associated with INSIDERS?

- A. IP spoofing
- B. Password sniffing
- C. Data diddling
- D. Denial of service (DOS)

Answer: C

Explanation: It refers to the alteration of the existing data , most often seen before it is entered into an application.This type of crime is extremely common and can be prevented by using appropriate access controls and proper segregation of duties. It will more likely be perpetrated by insiders, who have access to data before it is processed.

The other answers are incorrect because :

IP Spoofing is not correct as the questions asks about the crime associated with the insiders.

Spoofing is generally accomplished from the outside.

Password sniffing is also not the BEST answer as it requires a lot of technical knowledge in

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understanding the encryption and decryption process.

Denial of service (DOS) is also incorrect as most Denial of service attacks occur over the internet.

Reference : Shon Harris , AIO v3 , Chapter-10 : Law , Investigation & Ethics , Page : 758-760.

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### QUESTION 1064

Which of the following logical access exposures INVOLVES CHANGING data before, or as it is entered into the computer?

- A. Data diddling
- B. Salami techniques
- C. Trojan horses
- D. Viruses

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Answer: A

Explanation: It involves changing data before , or as it is entered into the computer or in other words , it refers to the alteration of the existing data.

The other answers are incorrect because :

Salami techniques : A salami attack is the one in which an attacker commits several small crimes with the hope that the overall larger crime will go unnoticed.

Trojan horses : A Trojan Horse is a program that is disguised as another program.

Viruses :A Virus is a small application , or a string of code , that infects applications.

Reference : Shon Harris , AIO v3

Chapter - 11 : Application and System Development , Page : 875-880

Chapter - 10 : Law , Investigation and Ethics , Page : 758-759

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### QUESTION 1065

Notifying the appropriate parties to take action in order to determine the extent of the severity of an incident and to remediate the incident's effects is part of:

- A. Incident Evaluation
- B. Incident Recognition
- C. Incident Protection
- D. Incident Response

Answer: C

Explanation: These are core functions of the incident response process.

"Incident Evaluation" is incorrect. Evaluation of the extent and cause of the incident is a component of the incident response process.

"Incident Recognition" is incorrect. Recognition that an incident has occurred is the precursor to the initiation of the incident response process.

"Incident Protection" is incorrect. This is an almost-right-sounding nonsense answer to distract the unwary.

References:

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7CBK, pp. 698 - 703

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**QUESTION 1066**

An Intrusion Detection System (IDS) is what type of control?

- A. A preventive control.
- B. A detective control.
- C. A recovery control.
- D. A directive control.

Answer: B

Explanation: These controls can be used to investigate what happen after the fact. Your IDS may collect information on where the attack came from, what port was use, and other details that could be used in the investigation steps.

"Preventative control" is incorrect. Preventative controls preclude events or actions that might compromise a system or cause a policy violation. An intrusion prevention system would be an example of a preventative control.

"Recovery control" is incorrect. Recover controls include processes used to return the system to a secure state after the occurrence of a security incident. Backups and redundant components are examples of recovery controls.

"Directive controls" is incorrect. Directive controls are administrative instruments such as policies, procedures, guidelines, and agreements. An acceptable use policy is an example of a directive control.

References:

CBK, pp. 646 - 647

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**QUESTION 1067**

The main issue with RAID Level 1 is that the one-for-one ratio is:

- A. very expensive, resulting in the highest cost per megabyte of data capacity.
- 8
- B. very inexpensive, resulting in the lowest cost per megabyte of data capacity.
- C. very unreliable resulting in a greater risk of losing data.
- D. very reliable resulting in a lower risk of losing data.

Answer: A

Explanation: The main issue with RAID Level 1 is that the one-for-one ratio is very expensive resulting in the highest cost per megabyte of data capacity.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 90.

RAID Level 0 - "Writes files in stripes across multiple disks without the use of parity informaiton. This technique allows for fast reading and writing to disk. However, without parity information, it is

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not possible to recover from a hard drive failure." Source: Official ISC2 Guide to the CISSP CBK. p. 657

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**QUESTION 1068**

Which of the following RAID levels is not used in practice and was quickly superseded by the more flexible levels?

- A. RAID Level 0
- B. RAID Level 1
- C. RAID Level 2
- D. RAID Level 7

Answer: C

Explanation: RAID Level 2 is the correct answer. RAID Level 2 is not used in practice and was quickly superseded by the more flexible levels. Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2003, John Wiley & Sons, Page 90.

RAID Level 1 "This level duplicates all disk writes from one disk to another to create two identical drives. This technique is also known as data mirroring. Redundancy is provided at this level; when one hard drive fails, the other is still available. Mirroring also allows the redundancy of hard drive controllers, which is called duplexing." Source: Official ISC2 Guide to the CISSP CBK p. 657

RAID Level 0 "Writes files in stripes across multiple disks without the use of parity information. This technique allows for fast reading and writing to disk. However, without the parity information, it is not possible to recover from a hard drive failure. This technique does not provide redundancy and should not be used for systems with high availability requirements." Source: Official ISC2

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Guide to the CISSP CBK p. 657

RAID Level 7 - non standard RAID level, please see the wikipedia articles for non standard RAID levels.

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**QUESTION 1069**

Which RAID implementation is commonly called mirroring?

- A. RAID level 2
- B. RAID level 3
- C. RAID level 5
- D. RAID level 1

Answer: D

Explanation: RAID level 1 actually mirrors data from one disk or a set of disks to another disk or set of disks. Each drive is normally mirrored to an equal drive partner that is being updated at the same time, thus allowing to recover from the other drive should one drive fail.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten

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Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 65).

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**QUESTION 1070**

What is the main objective of proper separation of duties?

- A. To prevent employees from disclosing sensitive information.
- B. To ensure access controls are in place.
- C. To ensure that no single individual can compromise a system.
- D. To ensure that audit trails are not tampered with.

Answer: C

Explanation: The primary objective of proper separation of duties is to ensure that one person acting alone cannot compromise the company's security in any way. A proper separation of duties does not prevent employees from disclosing information, nor does it ensure that access controls are in place or that audit trails are not tampered with.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, 0  
Chapter 12: Operations Security (Page 808).

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**QUESTION 1071**

Which of the following is not a component of a Operations Security "triples"?

- A. Asset
- B. Threat
- C. Vulnerability
- D. Risk

Answer: D

Explanation: The Operations Security domain is concerned with triples - threats, vulnerabilities and assets.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 216.

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**QUESTION 1072**

Which of the following Operation Security controls is intended to prevent unauthorized intruders from internally or externally accessing the system, and to lower the amount and impact of unintentional errors that are entering the system?

- A. Detective Controls
- B. Preventative Controls
- C. Corrective Controls
- D. Directive Controls

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Answer: B

Explanation: In the Operations Security domain, Preventative Controls are designed to prevent unauthorized intruders from internally or externally accessing the system, and to lower the amount and impact of unintentional errors that are entering the system.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 217.

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### QUESTION 1073

This type of control is used to ensure that transactions are properly entered into the system once. Elements of this type of control may include counting data and time stamping it with the date it was entered or edited?

- A. Processing Controls
- B. Output Controls
- C. Input Controls
- D. Input/Output Controls

Answer: C

Explanation: Input Controls are used to ensure that transactions are properly entered into the system once.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 218.

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### QUESTION 1074

When two or more separate entities (usually persons) operating in concert to protect sensitive functions or information must combine their knowledge to gain access to an asset, this is known as?

- A. Dual Control
- B. Need to know
- C. Separation of duties
- D. Segregation of duties

Answer: A

Explanation: The question mentions clearly "operating together". Which means the BEST answer is Dual Control.

Two mechanisms necessary to implement high integrity environments where separation of duties is paramount are dual control or split knowledge.

Dual control enforces the concept of keeping a duo responsible for an activity. It requires more than one employee available to perform a task. It utilizes two or more separate entities (usually persons), operating together, to protect sensitive functions or information.

Whenever the dual control feature is limited to something you know., it is often called split

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knowledge (such as part of the password, cryptographic keys etc.) Split knowledge is the unique “what each must bring” and joined together when implementing dual control.

To illustrate, let say you have a box containing petty cash is secured by one combination lock and one keyed lock. One employee is given the combination to the combo lock and another employee has possession of the correct key to the keyed lock. In order to get the cash out of the box both employees must be present at the cash box at the same time. One cannot open the box without the other. This is the aspect of dual control.

On the other hand, split knowledge is exemplified here by the different objects (the combination to the combo lock and the correct physical key), both of which are unique and necessary, that each brings to the meeting.

This is typically used in high value transactions / activities (as per the organizations risk appetite) such as:

Approving a high value transaction using a special user account, where the password of this user account is split into two and managed by two different staff. Both staff should be present to enter the password for a high value transaction. This is often combined with the separation of duties principle. In this case, the posting of the transaction would have been performed by another staff. This leads to a situation where collusion of at least 3 people are required to make a fraud transaction which is of high value.

Payment Card and PIN printing is separated by SOD principles. Now the organization can even enhance the control mechanism by implementing dual control / split knowledge. The card printing activity can be modified to require two staff to key in the passwords for initiating the printing process. Similarly, PIN printing authentication can also be made to be implemented with dual control. Many Host Security modules (HSM) comes with built in controls for dual controls where physical keys are required to initiate the PIN printing process.

Managing encryption keys is another key area where dual control / split knowledge to be implemented.

PCI DSS defines Dual Control as below. This is more from a cryptographic perspective, still useful:

Dual Control: Process of using two or more separate entities (usually persons) operating in concert to protect sensitive functions or information. Both entities are equally responsible for the physical protection of materials involved in vulnerable transactions. No single person is permitted to access or use the materials (for example, the cryptographic key). For manual key generation, conveyance, loading, storage, and retrieval, dual control requires dividing knowledge of the key among the entities. (See also Split Knowledge).

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Split knowledge: Condition in which two or more entities separately have key components that individually convey no knowledge of the resultant cryptographic key.

It is key for information security professionals to understand the differences between Dual Control and Separation of Duties. Both complement each other, but are not the same.

The following were incorrect answers:

Segregation of Duties address the splitting of various functions within a process to different users so that it will not create an opportunity for a single user to perform conflicting tasks.

For example, the participation of two or more persons in a transaction creates a system of checks and balances and reduces the possibility of fraud considerably. So it is important for an organization to ensure that all tasks within a process has adequate separation.

Let us look at some use cases of segregation of duties

A person handling cash should not post to the accounting records  
A loan officer should not disburse loan proceeds for loans they approved  
Those who have authority to sign cheques should not reconcile the bank accounts  
The credit card printing personal should not print the credit card PINs  
Customer address changes must be verified by a second employee before the change can be activated.

In situations where the separation of duties are not possible, because of lack of staff, the senior management should set up additional measure to offset the lack of adequate controls.

To summarise, Segregation of Duties is about Separating the conflicting duties to reduce fraud in an end to end function.

#### Need To Know (NTK):

The term "need to know", when used by government and other organizations (particularly those related to the military), describes the restriction of data which is considered very sensitive. Under need-to-know restrictions, even if one has all the necessary official approvals (such as a security clearance) to access certain information, one would not be given access to such information, unless one has a specific need to know; that is, access to the information must be necessary for the conduct of one's official duties. As with most security mechanisms, the aim is to make it difficult for unauthorized access to occur, without inconveniencing legitimate access. Need-to-know also aims to discourage "browsing" of sensitive material by limiting access to the smallest possible number of people.

#### EXAM TIP: HOW TO DECIPHER THIS question

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First, you probably noticed that both Separation of Duties and Segregation of Duties are synonymous with each others. This means they are not the BEST answers for sure. That was an easy first step.

For the exam remember:

Separation of Duties is synonymous with Segregation of Duties

Dual Control is synonymous with Split Knowledge

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 16048-16078). Auerbach Publications. Kindle Edition.  
and

<http://www.ciso.in/dual-control-or-segregation-of-duties/>

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### QUESTION 1075

Configuration Management is a requirement for the following level(s) of the Orange Book?

- A. B3 and A1
- B. B1, B2 and B3
- C. A1
- D. B2, B3, and A1

Answer: D

Explanation: Configuration Management is a requirement only for B2, B3, and A1.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 223.

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**QUESTION 1076**

Which of the following is NOT a proper component of Media Viability Controls?

- A. Storage
- B. Writing
- C. Handling
- D. Marking

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Answer: B

Explanation: Media Viability Controls include marking, handling and storage.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 231.

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**QUESTION 1077**

In this type of attack, the intruder re-routes data traffic from a network device to a personal machine. This diversion allows an attacker to gain access to critical resources and user credentials, such as passwords, and to gain unauthorized access to critical systems of an organization. Pick the best choice below.

- A. Network Address Translation
- B. Network Address Hijacking
- C. Network Address Supernetting
- D. Network Address Sniffing

Answer: B

Explanation: Network address hijacking allows an attacker to reroute data traffic from a network device to a personal computer.

Also referred to as session hijacking, network address hijacking enables an attacker to capture and analyze the data addressed to a target system. This allows an attacker to gain access to critical resources and user credentials, such as passwords, and to gain unauthorized access to critical systems of an organization.

Session hijacking involves assuming control of an existing connection after the user has successfully created an authenticated session. Session hijacking is the act of unauthorized insertion of packets into a data stream. It is normally based on sequence number attacks, where sequence numbers are either guessed or intercepted.

The following are incorrect answers:

Network address translation (NAT) is a methodology of modifying network address information in Internet Protocol (IP) datagram packet headers while they are in transit across a traffic routing device for the purpose of remapping one IP address space into another. See RFC 1918 for more details.

Network Address Supernetting There is no such thing as Network Address Supernetting. However, a supernet, or supernet, is an Internet Protocol (IP) network that is formed from the 6

combination of two or more networks (or subnets) with a common Classless Inter-Domain Routing (CIDR) prefix. The new routing prefix for the combined network aggregates the prefixes of the constituent networks.

Network Address Sniffing This is another bogus choice that sounds good but does not even exist. However, sniffing is a common attack to capture cleartext password and information unencrypted over the network. Sniffing is accomplished using a sniffer also called a Protocol Analyzer. A network sniffer monitors data flowing over computer network links. It can be a self-contained software program or a hardware device with the appropriate software or firmware programming. Also sometimes called "network probes" or "snoops," sniffers examine network traffic, making a copy of the data but without redirecting or altering it.

The following reference(s) were used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press ) (Kindle Locations 8641-8642). Auerbach Publications. Kindle Edition.

[http://comppnetworking.about.com/od/networksecurityprivacy/g/bldef\\_sniffer.htm](http://comppnetworking.about.com/od/networksecurityprivacy/g/bldef_sniffer.htm)

[http://wiki.answers.com/Q/What\\_is\\_network\\_address\\_hijacking](http://wiki.answers.com/Q/What_is_network_address_hijacking)

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 239.

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### QUESTION 1078

What best describes a scenario when an employee has been shaving off pennies from multiple accounts and depositing the funds into his own bank account?

- A. Data fiddling
- B. Data diddling
- C. Salami techniques
- D. Trojan horses

Answer: C

Explanation: Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, Page 644.

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### QUESTION 1079

When attempting to establish Liability, which of the following would be described as performing the 7

ongoing maintenance necessary to keep something in proper working order, updated, effective, or to abide by what is commonly expected in a situation?

- A. Due care
- B. Due concern
- C. Due diligence
- D. Due practice

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Answer: A

Explanation: My friend JD Murray at Techexams.net has a nice definition of both, see his explanation below:

Oh, I hate these two. It's like describing the difference between "jealously" and "envy." Kinda the same thing but not exactly. Here it goes:

Due diligence is performing reasonable examination and research before committing to a course of action. Basically, "look before you leap." In law, you would perform due diligence by researching the terms of a contract before signing it. The opposite of due diligence might be "haphazard" or "not doing your homework."

Due care is performing the ongoing maintenance necessary to keep something in proper working order, or to abide by what is commonly expected in a situation. This is especially important if the due care situation exists because of a contract, regulation, or law. The opposite of due care is "negligence."

In summary, Due Diligence is Identifying threats and risks while Due Care is Acting upon findings to mitigate risks

**EXAM TIP:**

The Due Diligence refers to the steps taken to identify risks that exists within the environment.

This is base on best practices, standards such as ISO 27001, ISO 17799, and other consensus.

The first letter of the word Due and the word Diligence should remind you of this. The two letters are DD = Do Detect.

In the case of due care, it is the actions that you have taken (implementing, designing, enforcing, updating) to reduce the risks identified and keep them at an acceptable level. The same apply here, the first letters of the work Due and the work Care are DC. Which should remind you that DC = Do correct.

The other answers are only detractors and not valid.

Reference(s) used for this question:

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CISSP Study Guide, Syngress, By Eric Conrad, Page 419

HARRIS, Shon, All-In-One CISSP Certification Exam Guide Fifth Edition, McGraw-Hill, Page 49 and 110.

and

Corporate; (Isc)<sup>2</sup> (2010-04-20). Official (ISC)<sup>2</sup> Guide to the CISSP CBK, Second Edition ((ISC)<sup>2</sup> Press) (Kindle Locations 11494-11504). Taylor & Francis. Kindle Edition.

and

My friend JD Murray at Techexams.net

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**QUESTION 1080**

Which of the following is not a critical security aspect of Operations Controls?

- A. Controls over hardware.
- B. Data media used.
- C. Operators using resources.
- D. Environmental controls.

Answer: D

Explanation: While it is important that environmental concerns are addressed they are part of the Physical Security Domain.

All of the other answers fall directly under Operations Security.

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### QUESTION 1081

This baseline sets certain thresholds for specific errors or mistakes allowed and the amount of these occurrences that can take place before it is considered suspicious?

- A. Checkpoint level
- B. Ceiling level
- C. Clipping level
- D. Threshold level

Answer: C

Explanation: Organizations usually forgive a particular type, number, or pattern of violations, thus permitting a predetermined number of user errors before gathering this data for analysis. An organization attempting to track all violations, without sophisticated statistical computing ability,  
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would be unable to manage the sheer quantity of such data. To make a violation listing effective, a clipping level must be established.

The clipping level establishes a baseline for violation activities that may be normal user errors. Only after this baseline is exceeded is a violation record produced. This solution is particularly effective for small- to medium-sized installations. Organizations with large-scale computing facilities often track all violations and use statistical routines to cull out the minor infractions (e.g., forgetting a password or mistyping it several times).

If the number of violations being tracked becomes unmanageable, the first step in correcting the problems should be to analyze why the condition has occurred. Do users understand how they are to interact with the computer resource? Are the rules too difficult to follow? Violation tracking and analysis can be valuable tools in assisting an organization to develop thorough but useable controls. Once these are in place and records are produced that accurately reflect serious violations, tracking and analysis become the first line of defense. With this procedure, intrusions are discovered before major damage occurs and sometimes early enough to catch the perpetrator. In addition, business protection and preservation are strengthened.

The following answers are incorrect:

All of the other choices presented were simply detractors.

The following reference(s) were used for this question:

Handbook of Information Security Management

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### QUESTION 1082

In order to enable users to perform tasks and duties without having to go through extra steps it is important that the security controls and mechanisms that are in place have a degree of?

- A. Complexity
- B. Non-transparency

- C. Transparency
- D. Simplicity

Answer: C

Explanation: The security controls and mechanisms that are in place must have a degree of transparency.

This enables the user to perform tasks and duties without having to go through extra steps

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because of the presence of the security controls. Transparency also does not let the user know too much about the controls, which helps prevent him from figuring out how to circumvent them. If the controls are too obvious, an attacker can figure out how to compromise them more easily.

Security (more specifically, the implementation of most security controls) has long been a sore point with users who are subject to security controls. Historically, security controls have been very intrusive to users, forcing them to interrupt their work flow and remember arcane codes or processes (like long passwords or access codes), and have generally been seen as an obstacle to getting work done. In recent years, much work has been done to remove that stigma of security controls as a detractor from the work process adding nothing but time and money. When developing access control, the system must be as transparent as possible to the end user. The users should be required to interact with the system as little as possible, and the process around using the control should be engineered so as to involve little effort on the part of the user.

For example, requiring a user to swipe an access card through a reader is an effective way to ensure a person is authorized to enter a room. However, implementing a technology (such as RFID) that will automatically scan the badge as the user approaches the door is more transparent to the user and will do less to impede the movement of personnel in a busy area.

In another example, asking a user to understand what applications and data sets will be required when requesting a system ID and then specifically requesting access to those resources may allow for a great deal of granularity when provisioning access, but it can hardly be seen as transparent. A more transparent process would be for the access provisioning system to have a role-based structure, where the user would simply specify the role he or she has in the organization and the system would know the specific resources that user needs to access based on that role. This requires less work and interaction on the part of the user and will lead to more accurate and secure access control decisions because access will be based on predefined need, not user preference.

When developing and implementing an access control system special care should be taken to ensure that the control is as transparent to the end user as possible and interrupts his work flow as little as possible.

The following answers were incorrect:

All of the other detractors were incorrect.

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 6th edition. Operations Security, Page 1239-1240

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 25278-25281). McGraw-Hill. Kindle Edition.

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Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Access Control ((ISC)2 Press) (Kindle Locations 713-729). Auerbach Publications. Kindle Edition.

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**QUESTION 1083**

Who is responsible for implementing user clearances in computer-based information systems at the B3 level of the TCSEC rating?

- A. Security administrators
- B. Operators
- C. Data owners
- D. Data custodians

Answer: A

Explanation: Security administrator functions include user-oriented activities such as setting user clearances, setting initial password, setting other security characteristics for new users or changing security profiles for existing users. Data owners have the ultimate responsibility for protecting data, thus determining proper user access rights to data.

Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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**QUESTION 1084**

Which TCSEC (Orange Book) rating or level requires the system to clearly identify functions of the security administrator to perform security-related functions?

- A. C2
- B. B1
- C. B2
- D. B3

Answer: D

Explanation: The Security Administrator role is define only at level B3 (and A1). It requires the system to clearly identify functions of security administrator to perform security-related functions. TCSEC B2 level specifies that the system must support separation of operator and administrator roles.

References:

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- TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.
  - U.S. Department of Defense, Trusted Computer System Evaluation Criteria (Orange Book), DOD 5200.28-STD. December 1985 (also available here).
  - The CISSP® Prep Guide, Second Edition: Mastering the CISSP and ISSEP™ Exams By Ronald L. Krutz and Russell Dean Vines on Page 308
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**QUESTION 1085**

Which of the following is NOT a valid reason to use external penetration service firms rather than corporate resources?

- A. They are more cost-effective
- B. They offer a lack of corporate bias
- C. They use highly talented ex-hackers
- D. They ensure a more complete reporting

Answer: C

Explanation: Two points are important to consider when it comes to ethical hacking: integrity and independence.

By not using an ethical hacking firm that hires or subcontracts to ex-hackers of others who have criminal records, an entire subset of risks can be avoided by an organization. Also, it is not costeffective for a single firm to fund the effort of the ongoing research and development, systems development, and maintenance that is needed to operate state-of-the-art proprietary and open source testing tools and techniques.

External penetration firms are more effective than internal penetration testers because they are not influenced by any previous system security decisions, knowledge of the current system environment, or future system security plans. Moreover, an employee performing penetration testing might be reluctant to fully report security gaps.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Appendix F: The Case for Ethical Hacking (page 517).

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### QUESTION 1086

Which of the following statements pertaining to ethical hacking is incorrect?

- A. An organization should use ethical hackers who do not sell auditing, hardware, software, firewall, hosting, and/or networking services.
- B. Testing should be done remotely to simulate external threats.
- C. Ethical hacking should not involve writing to or modifying the target systems negatively.
- D. Ethical hackers never use tools that have the potential of affecting servers or services.

Answer: D

Explanation: This means that many of the tools used for ethical hacking have the potential of exploiting vulnerabilities and causing disruption to IT system. It is up to the individuals performing the tests to be familiar with their use and to make sure that no such disruption can happen or at least shoudl be avoided.

The first step before sending even one single packet to the target would be to have a signed agreement with clear rules of engagement and a signed contract. The signed contract explains to the client the associated risks and the client must agree to them before you even send one packet to the target range. This way the client understand that some of the test could lead to interruption of service or even crash a server. The client signs that he is aware of such risks and willing to accept them.

The following are incorrect answers:

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An organization should use ethical hackers who do not sell auditing, hardware, software, firewall, hosting, and/or networking services. An ethical hacking firm's independence can be questioned if they sell security solutions at the same time as doing testing for the same client. There has to be independence between the judge (the tester) and the accuse (the client).

Testing should be done remotely to simulate external threats. Testing simulating a cracker from the Internet is often one of the first test being done, this is to validate perimeter security. By performing tests remotely, the ethical hacking firm emulates the hacker's approach more realistically.

Ethical hacking should not involve writing to or modifying the target systems negatively. Even though ethical hacking should not involve negligence in writing to or modifying the target systems or reducing its response time, comprehensive penetration testing has to be performed using the most complete tools available just like a real cracker would.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of 4

Computer Security, John Wiley & Sons, 2001, Appendix F: The Case for Ethical Hacking (page 520).

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### QUESTION 1087

What is the essential difference between a self-audit and an independent audit?

- A. Tools used
- B. Results
- C. Objectivity
- D. Competence

Answer: C

Explanation: To maintain operational assurance, organizations use two basic methods: system audits and monitoring. Monitoring refers to an ongoing activity whereas audits are one-time or periodic events and can be either internal or external. The essential difference between a selfaudit and an independent audit is objectivity, thus indirectly affecting the results of the audit.

Internal and external auditors should have the same level of competence and can use the same tools.

Source: SWANSON, Marianne & GUTTMAN, Barbara, National Institute of Standards and Technology (NIST), NIST Special Publication 800-14, Generally Accepted Principles and Practices for Securing Information Technology Systems, September 1996 (page 25).

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### QUESTION 1088

When it comes to magnetic media sanitization, what difference can be made between clearing and purging information?

- A. Clearing completely erases the media whereas purging only removes file headers, allowing the recovery of files.
- B. Clearing renders information unrecoverable by a keyboard attack and purging renders information unrecoverable against laboratory attack.

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- C. They both involve rewriting the media.
  - D. Clearing renders information unrecoverable against a laboratory attack and purging renders information unrecoverable to a keyboard attack.

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Answer: B

Explanation: The removal of information from a storage medium is called sanitization. Different kinds of sanitization provide different levels of protection. A distinction can be made between clearing information (rendering it unrecoverable by a keyboard attack) and purging (rendering it unrecoverable against laboratory attack).

There are three general methods of purging media: overwriting, degaussing, and destruction. There should be continuous assurance that sensitive information is protected and not allowed to be placed in a circumstance wherein a possible compromise can occur. There are two primary levels of threat that the protector of information must guard against: keyboard attack (information scavenging through system software capabilities) and laboratory attack (information scavenging through laboratory means). Procedures should be implemented to address these threats before the Automated Information System (AIS) is procured, and the procedures should be continued throughout the life cycle of the AIS.

Reference(s) use for this question:

SWANSON, Marianne & GUTTMAN, Barbara, National Institute of Standards and Technology (NIST), NIST Special Publication 800-14, Generally Accepted Principles and Practices for Securing Information Technology Systems, September 1996 (page 26).

and

A guide to understanding Data Remanence in Automated Information Systems

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### QUESTION 1089

A periodic review of user account management should not determine:

- A. Conformity with the concept of least privilege.
- B. Whether active accounts are still being used.
- C. Strength of user-chosen passwords.
- D. Whether management authorizations are up-to-date.

Answer: C

Explanation: Organizations should have a process for (1) requesting, establishing, issuing, and closing user accounts; (2) tracking users and their respective access authorizations; and (3) managing these functions.

Reviews should examine the levels of access each individual has, conformity with the concept of least privilege, whether all accounts are still active, whether management authorizations are up-to-

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date, whether required training has been completed, and so forth. These reviews can be conducted on at least two levels: (1) on an application-by-application basis, or (2) on a system wide basis.

The strength of user passwords is beyond the scope of a simple user account management

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review, since it requires specific tools to try and crack the password file/database through either a dictionary or brute-force attack in order to check the strength of passwords.

Reference(s) used for this question:

SWANSON, Marianne & GUTTMAN, Barbara, National Institute of Standards and Technology (NIST), NIST Special Publication 800-14, Generally Accepted Principles and Practices for Securing Information Technology Systems, September 1996 (page 28).

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### QUESTION 1090

What is the main issue with media reuse?

- A. Degaussing
- B. Data remanence
- C. Media destruction
- D. Purging

Answer: B

Explanation: The main issue with media reuse is data remanence, where residual information still resides on a media that has been erased. Degaussing, purging and destruction are ways to handle media that contains data that is no longer needed or used.

Source: WALLHOFF, John, CBK#10 Physical Security (CISSP Study Guide), April 2002 (page 5).

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### QUESTION 1091

Which of the following should NOT be performed by an operator?

- A. Implementing the initial program load
- B. Monitoring execution of the system
- C. Data entry
- D. Controlling job flow

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Answer: C

Explanation: Under the principle of separation of duties, an operator should not be performing data entry. This should be left to data entry personnel.

System operators represent a class of users typically found in data center environments where mainframe systems are used. They provide day-to-day operations of the mainframe environment, ensuring that scheduled jobs are running effectively and troubleshooting problems that may arise. They also act as the arms and legs of the mainframe environment, load and unloading tape and results of job print runs. Operators have elevated privileges, but less than those of system administrators. If misused, these privileges may be used to circumvent the system's security policy. As such, use of these privileges should be monitored through audit logs.

Some of the privileges and responsibilities assigned to operators include:

Implementing the initial program load: This is used to start the operating system. The boot process or initial program load of a system is a critical time for ensuring system security. Interruptions to this process may reduce the integrity of the system or cause the system to crash, precluding its

availability.

Monitoring execution of the system: Operators respond to various events, to include errors, interruptions, and job completion messages.

Volume mounting: This allows the desired application access to the system and its data.

Controlling job flow: Operators can initiate, pause, or terminate programs. This may allow an operator to affect the scheduling of jobs. Controlling job flow involves the manipulation of configuration information needed by the system. Operators with the ability to control a job or application can cause output to be altered or diverted, which can threaten the confidentiality.

Bypass label processing: This allows the operator to bypass security label information to run foreign tapes (foreign tapes are those from a different data center that would not be using the same label format that the system could run). This privilege should be strictly controlled to prevent unauthorized access.

Renaming and relabeling resources: This is sometimes necessary in the mainframe environment to allow programs to properly execute. Use of this privilege should be monitored, as it can allow the unauthorized viewing of sensitive information.

Reassignment of ports and lines: Operators are allowed to reassign ports or lines. If misused, reassignment can cause program errors, such as sending sensitive output to an unsecured location. Furthermore, an incidental port may be opened, subjecting the system to an attack

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through the creation of a new entry point into the system.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 19367-19395). Auerbach Publications. Kindle Edition.

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### QUESTION 1092

Which of the following should be performed by an operator?

- A. Changing profiles
- B. Approving changes
- C. Adding and removal of users
- D. Installing system software

Answer: D

Explanation: Of the listed tasks, installing system software is the only task that should normally be performed by an operator in a properly segregated environment.

Source: MOSHER, Richard & ROTHKE, Ben, CISSP CBK Review presentation on domain 7.

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### QUESTION 1093

Which of the following is not appropriate in addressing object reuse?

- A. Degaussing magnetic tapes when they're no longer needed.
- B. Deleting files on disk before reusing the space.
- C. Clearing memory blocks before they are allocated to a program or data.
- D. Clearing buffered pages, documents, or screens from the local memory of a terminal or printer.

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Answer: B

Explanation: Object reuse requirements, applying to systems rated TCSEC C2 and above, are used to protect files, memory, and other objects in a trusted system from being accidentally accessed by users who are not authorized to access them. Deleting files on disk merely erases file headers in a directory structure. It does not clear data from the disk surface, thus making files still recoverable. All other options involve clearing used space, preventing any unauthorized access.  
Source: RUSSEL, Deborah & GANGEMI, G.T. Sr., Computer Security Basics, O'Reilly, July 1992 (page 119).

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#### QUESTION 1094

Which of the following is not a preventive operational control?

- A. Protecting laptops, personal computers and workstations.
- B. Controlling software viruses.
- C. Controlling data media access and disposal.
- D. Conducting security awareness and technical training.

Answer: D

Explanation: Conducting security awareness and technical training to ensure that end users and system users are aware of the rules of behaviour and their responsibilities in protecting the organization's mission is an example of a preventive management control, therefore not an operational control.

Source: STONEBURNER, Gary et al., NIST Special publication 800-30, Risk management Guide for Information Technology Systems, 2001 (page 37).

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#### QUESTION 1095

Which of the following questions is less likely to help in assessing controls over hardware and software maintenance?

- A. Is access to all program libraries restricted and controlled?
- B. Are integrity verification programs used by applications to look for evidences of data tampering, errors, and omissions?
- C. Is there version control?
- D. Are system components tested, documented, and approved prior to promotion to production?

Answer: B

Explanation: Hardware and software maintenance access controls are used to monitor the installation of, and updates to, hardware and software to ensure that the system functions as expected and that a historical record of changes is maintained. Integrity verification programs are more integrity controls than software maintenance controls.

Source: SWANSON, Marianne, NIST Special Publication 800-26, Security Self-Assessment Guide

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for Information Technology Systems, November 2001 (Pages A-30 to A-32).

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**QUESTION 1096**

Which of the following questions is less likely to help in assessing identification and authentication controls?

- A. Is a current list maintained and approved of authorized users and their access?
- B. Are passwords changed at least every ninety days or earlier if needed?
- C. Are inactive user identifications disabled after a specified period of time?
- D. Is there a process for reporting incidents?

Answer: D

Explanation: Identification and authentication is a technical measure that prevents unauthorized people (or unauthorized processes) from entering an IT system. Access control usually requires that the system be able to identify and differentiate among users. Reporting incidents is more related to incident response capability (operational control) than to identification and authentication (technical control).

Source: SWANSON, Marianne, NIST Special Publication 800-26, Security Self-Assessment Guide for Information Technology Systems, November 2001 (Pages A-30 to A-32).

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**QUESTION 1097**

Which of the following questions are least likely to help in assessing controls covering audit trails?

- A. Does the audit trail provide a trace of user actions?
- B. Are incidents monitored and tracked until resolved?
- C. Is access to online logs strictly controlled?
- D. Is there separation of duties between security personnel who administer the access control function and those who administer the audit trail?

Answer: B

Explanation: Audit trails maintain a record of system activity by system or application processes and by user activity. In conjunction with appropriate tools and procedures, audit trails can provide individual accountability, a means to reconstruct events, detect intrusions, and identify problems. Audit trail controls are considered technical controls. Monitoring and tracking of incidents is more an operational control related to incident response capability.

Reference(s) used for this question:

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SWANSON, Marianne, NIST Special Publication 800-26, Security Self-Assessment Guide for Information Technology Systems, November 2001 (Pages A-50 to A-51).

NOTE: NIST SP 800-26 has been superceded By: FIPS 200, SP 800-53, SP 800-53A

You can find the new replacement at: <http://csrc.nist.gov/publications/PubsSPs.html>

However, if you really wish to see the old standard, it is listed as an archived document at:

<http://csrc.nist.gov/publications/PubsSPArch.html>

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**QUESTION 1098**

What setup should an administrator use for regularly testing the strength of user passwords?

- A. A networked workstation so that the live password database can easily be accessed by the cracking program.
- B. A networked workstation so the password database can easily be copied locally and processed by the cracking program.
- C. A standalone workstation on which the password database is copied and processed by the cracking program.
- D. A password-cracking program is unethical; therefore it should not be used.

Answer: C

Explanation: Poor password selection is frequently a major security problem for any system's security. Administrators should obtain and use password-guessing programs frequently to identify those users having easily guessed passwords.

Because password-cracking programs are very CPU intensive and can slow the system on which it is running, it is a good idea to transfer the encrypted passwords to a standalone (not networked) workstation. Also, by doing the work on a non-networked machine, any results found will not be accessible by anyone unless they have physical access to that system.

Out of the four choice presented above this is the best choice.

However, in real life you would have strong password policies that enforce complexity requirements and does not let the user choose a simple or short password that can be easily cracked or guessed. That would be the best choice if it was one of the choice presented.

Another issue with password cracking is one of privacy. Many password cracking tools can avoid this by only showing the password was cracked and not showing what the password actually is. It is masking the password being used from the person doing the cracking.

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Source: National Security Agency, Systems and Network Attack Center (SNAC), The 60 Minute Network Security Guide, February 2002, page 8.

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**QUESTION 1099**

Which of the following rules is least likely to support the concept of least privilege?

- A. The number of administrative accounts should be kept to a minimum.
- B. Administrators should use regular accounts when performing routine operations like reading mail.
- C. Permissions on tools that are likely to be used by hackers should be as restrictive as possible.
- D. Only data to and from critical systems and applications should be allowed through the firewall.

Answer: D

Explanation: Only data to and from critical systems and applications should be allowed through the firewall is a detractor. Critical systems or applications do not necessarily need to have traffic go through a firewall. Even if they did, only the minimum required services should be allowed.

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Systems that are not deemed critical may also need to have traffic go through the firewall. Least privilege is a basic tenet of computer security that means users should be given only those rights required to do their jobs or tasks. Least privilege is ensuring that you have the minimum privileges necessary to do a task. An admin NOT using his admin account to check email is a clear example of this.

Reference(s) used for this question:

National Security Agency, Systems and Network Attack Center (SNAC), The 60 Minute Network Security Guide, February 2002, page 9.

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### QUESTION 1100

Ensuring that printed reports reach proper users and that receipts are signed before releasing sensitive documents are examples of:

- A. Deterrent controls
- B. Output controls
- C. Information flow controls
- D. Asset controls

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Answer: B

Explanation: Output controls are used for two things: for verifying the integrity and protecting the confidentiality of an output. These are examples of proper output controls.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 6: Operations Security (page 218).

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### QUESTION 1101

Which of the following is an unintended communication path that is NOT protected by the system's normal security mechanisms?

- A. A trusted path
- B. A protection domain
- C. A covert channel
- D. A maintenance hook

Answer: C

Explanation: A covert channel is an unintended communication path within a system, therefore it is not protected by the system's normal security mechanisms. Covert channels are a secret way to convey information.

Covert channels are addressed from TCSEC level B2.

The following are incorrect answers:

A trusted path is the protected channel that allows a user to access the Trusted Computing Base (TCB) without being compromised by other processes or users.

A protection domain consists of the execution and memory space assigned to each process.

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A maintenance hook is a hardware or software mechanism that was installed to permit system maintenance and to bypass the system's security protections.

Reference used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 6: Operations Security (page 219).

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### QUESTION 1102

According to the Orange Book, which security level is the first to require a system to support separate operator and system administrator roles?

- A. A1
- B. B1
- C. B2
- D. B3

Answer: C

Explanation: B2 security level requires that systems must support separate operator and system administrator roles.

At B3 and A1, systems must clearly identify the functions of the security administrator to perform the security-related functions.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 6: Operations Security (page 220).

Also:

U.S. Department of Defense, Trusted Computer System Evaluation Criteria (Orange Book), DOD 5200.28-STD. December 1985 (also available here).

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### QUESTION 1103

What is the most effective means of determining that controls are functioning properly within an operating system?

- A. Interview with computer operator
- B. Review of software control features and/or parameters
- C. Review of operating system manual
- D. Interview with product vendor

Answer: B

Explanation: Various operating system software products provide parameters and options for the tailoring of the system and activation of features such as activity logging. Parameters are important in determining how a system runs because they allow a standard piece of software to be customized to diverse environments. The reviewing of software control features and/or parameters is the most effective means of determining how controls are functioning within an operating system

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and of assessing and operating system's integrity.

The operating system manual should provide information as to what settings can be used but will not likely give any hint as to how parameters are actually set. The product vendor and computer operator are not necessarily aware of the detailed setting of all parameters.

The review of software control features and/or parameters would be part of your security audit. A security audit is typically performed by an independent third party to the management of the system. The audit determines the degree with which the required controls are implemented. A security review is conducted by the system maintenance or security personnel to discover vulnerabilities within the system. A vulnerability occurs when policies are not followed, misconfigurations are present, or flaws exist in the hardware or software of the system. System reviews are sometimes referred to as a vulnerability assessment.

Reference(s) used for this question:

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Security Operations, Page 1054, for users with the Kindle edition look at Locations 851-855 and

Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, Chapter 3: Technical Infrastructure and Operational Practices (page 102).

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### QUESTION 1104

Which of the following is used to interrupt the opportunity to use or perform collusion to subvert operation for fraudulent purposes?

- A. Key escrow
- B. Rotation of duties
- C. Principle of need-to-know
- D. Principle of least privilege

Answer: B

Explanation: Job rotations reduce the risk of collusion of activities between individuals.

Companies with individuals working with sensitive information or systems where there might be the opportunity for personal gain through collusion can benefit by integrating job rotation with segregation of duties. Rotating the position may uncover activities that the individual is performing outside of the normal operating procedures, highlighting errors or fraudulent behavior.

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Rotation of duties is a method of reducing the risk associated with a subject performing a (sensitive) task by limiting the amount of time the subject is assigned to perform the task before being moved to a different task.

The following are incorrect answers:

Key escrow is related to the protection of keys in storage by splitting the key in pieces that will be controlled by different departments. Key escrow is the process of ensuring a third party maintains a copy of a private key or key needed to decrypt information. Key escrow also should be considered mandatory for most organization's use of cryptography as encrypted information belongs to the organization and not the individual; however often an individual's key is used to encrypt the information.

Separation of duties is a basic control that prevents or detects errors and irregularities by

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assigning responsibility for different parts of critical tasks to separate individuals, thus limiting the effect a single person can have on a system. One individual should not have the capability to execute all of the steps of a particular process. This is especially important in critical business areas, where individuals may have greater access and capability to modify, delete, or add data to the system. Failure to separate duties could result in individuals embezzling money from the company without the involvement of others.

The need-to-know principle specifies that a person must not only be cleared to access classified or other sensitive information, but have requirement for such information to carry out assigned job duties. Ordinary or limited user accounts are what most users are assigned. They should be restricted only to those privileges that are strictly required, following the principle of least privilege. Access should be limited to specific objects following the principle of need-to-know.

The principle of least privilege requires that each subject in a system be granted the most restrictive set of privileges (or lowest clearance) needed for the performance of authorized tasks. Least privilege refers to granting users only the accesses that are required to perform their job functions. Some employees will require greater access than others based upon their job functions. For example, an individual performing data entry on a mainframe system may have no need for Internet access or the ability to run reports regarding the information that they are entering into the system. Conversely, a supervisor may have the need to run reports, but should not be provided the capability to change information in the database.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 10628-10631). Auerbach Publications. Kindle Edition.  
and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 10635-10638). Auerbach Publications. Kindle Edition.

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and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 10693-10697). Auerbach Publications. Kindle Edition.  
and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 16338-16341). Auerbach Publications. Kindle Edition.

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## QUESTION 1105

Which of the following security controls might force an operator into collusion with personnel assigned organizationally within a different function in order to gain access to unauthorized data?

- A. Limiting the local access of operations personnel
- B. Job rotation of operations personnel
- C. Management monitoring of audit logs
- D. Enforcing regular password changes

Answer: A

Explanation: The questions specifically said: "within a different function" which eliminate Job Rotation as a choice.

Management monitoring of audit logs is a detective control and it would not prevent collusion. Changing passwords regularly would not prevent such attack. This question validates if you understand the concept of separation of duties and least privilege. By having operators that have only the minimum access level they need and only what they need to do their duties within a company, the operations personnel would be forced to use collusion to defeat those security mechanism.

Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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**QUESTION 1106**

An electrical device (AC or DC) which can generate coercive magnetic force for the purpose of reducing magnetic flux density to zero on storage media or other magnetic media is called:

- A. a magnetic field.
- B. a degausser.
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- C. magnetic remanence.
- D. magnetic saturation.

Answer: B

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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**QUESTION 1107**

What is the most secure way to dispose of information on a CD-ROM?

- A. Sanitizing
- B. Physical damage
- C. Degaussing
- D. Physical destruction

Answer: D

Explanation: First you have to realize that the question is specifically talking about a CDROM. The information stored on a CDROM is not in electro magnetic format, so a degausser would be ineffective.

You cannot sanitize a CDROM but you might be able to sanitize a RW/CDROM. A CDROM is a write once device and cannot be overwritten like a hard disk or other magnetic device.

Physical Damage would not be enough as information could still be extracted in a lab from the undamaged portion of the media or even from the pieces after the physical damage has been done.

Physical Destruction using a shredder, your microwave oven, melting it, would be very effective and the best choice for a non magnetic media such as a CDROM.

Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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**QUESTION 1108**

Fault tolerance countermeasures are designed to combat threats to which of the following?

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- A. an uninterruptible power supply.
  - B. backup and retention capability.
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- C. design reliability.
  - D. data integrity.

Answer: C

Explanation: Fault tolerance countermeasures are designed to combat threats to design reliability. Tolerance and Reliability are almost synonymous, this was a good indication of the best choice. Reliability tools are tools such as fail over mechanism, load balancer, clustering tools, etc...

None of the other answer would improve reliability.

Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 1109

In what way can violation clipping levels assist in violation tracking and analysis?

- A. Clipping levels set a baseline for acceptable normal user errors, and violations exceeding that threshold will be recorded for analysis of why the violations occurred.
- B. Clipping levels enable a security administrator to customize the audit trail to record only those violations which are deemed to be security relevant.
- C. Clipping levels enable the security administrator to customize the audit trail to record only actions for users with access to user accounts with a privileged status.
- D. Clipping levels enable a security administrator to view all reductions in security levels which have been made to user accounts which have incurred violations.

Answer: A

Explanation: Companies can set predefined thresholds for the number of certain types of errors that will be allowed before the activity is considered suspicious. The threshold is a baseline for violation activities that may be normal for a user to commit before alarms are raised. This baseline is referred to as a clipping level.

The following are incorrect answers:

Clipping levels enable a security administrator to customize the audit trail to record only those violations which are deemed to be security relevant. This is not the best answer, you would not record ONLY security relevant violations, all violations would be recorded as well as all actions performed by authorized users which may not trigger a violation. This could allow you to identify abnormal activities or fraud after the fact.

Clipping levels enable the security administrator to customize the audit trail to record only actions 0

for users with access to user accounts with a privileged status. It could record all security violations whether the user is a normal user or a privileged user.

Clipping levels enable a security administrator to view all reductions in security levels which have been made to user accounts which have incurred violations. The keyword "ALL" makes this

question wrong. It may detect SOME but not all of violations. For example, application level attacks may not be detected.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 1239). McGraw-Hill. Kindle Edition.

and

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 1110

An incremental backup process

- A. Backs up all the files that have changed since the last full or incremental backup and sets the archive bit to 0.
- B. Backs up the files that been modified since the last full backup. It does not change the archive bit value.
- C. Backs up all the data and changes the archive bit to 0.
- D. Backs up all the data and changes the archive bit to 1.

Answer: A

Explanation: The following answers are incorrect:

"Backs up the files that been modified since the last full backup. It does not change the archive bit value." This is incorrect because this describes the differential backup process.

"Backs up all the data and changes the archive bit to 0." This is incorrect because this describes the full backup process.

Backs up all the data and changes the archive bit to 1. This is incorrect because this describes neither the full backup process, differential backup process, or the incremental backup process.

The following reference(s) were/was used to create this question:

All-in-One CISSP Exam Guide Fourth Edition by Shon Harris pages 801-802

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### QUESTION 1111

In Operations Security trusted paths provide:

- A. trustworthy integration into integrity functions.
- B. trusted access to unsecure paths.
- C. trustworthy interfaces into priviledged user functions.
- D. trustworthy interfaces into priviledged MTBF functions.

Answer: C

Explanation: The following answers are incorrect:

Integrity paths has no meaning in the context of this question. Trusted paths brings to mind the word integrity only in the context that the data was not changed and is in it's orginal condition. This question also has less to do with integration and more to do with actual implementation of a concept.

There is less need to create trusted paths to something that is already not secure.  
MTBF is Mean Time Between Failure. This is not really related to a trusted path therefore not related to this question.

The following reference(s) were/was used to create this question:

"Trusted paths provide trustworthy interfaces into privileged user functions and are intended to provide a way to ensure that any communications over that path cannot be intercepted or corrupted."

pp. 544 Official Guide to the CISSP CBK, Second Edition, copyright 2010, Edited by Harold F. Tipton, Trusted Paths and Fail Secure Mechanisms;

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### QUESTION 1112

The Loki attack exploits a covert channel using which network protocol?

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- A. TCP
- B. PPP
- C. ICMP
- D. SMTP

Answer: C

Explanation: The Loki attack uses the ICMP protocol for communications between two systems, but ICMP was designed to be used only for sending status and error messages about the network. Because the Loki attack is using ICMP in an unintended manner, this constitutes a covert channel attack.

The following answers are incorrect:

TCP, PPP, and SMTP are all incorrect.

The following reference(s) were/was used to create this question:

Shon Harris, AIO, 5th Edition, Chapter 12: Operations Security, p. 1107

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### QUESTION 1113

Of the various types of "Hackers" that exist, the ones who are not worried about being caught and spending time in jail and have a total disregard for the law or police force, are labeled as what type of hackers?

- A. Suicide Hackers
- B. Black Hat Hackers
- C. White Hat Hackers
- D. Gray Hat Hackers

Answer: A

Explanation: Suicide Hackers are a type of hackers without fear, who disregard the authority, the police, or law. Suicide Hackers hack for a cause important to them and find the end goal more important than their individual freedom.

The term "Hacker" originally meant a Unix computer enthusiast but has been villainized in the

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media as a "Criminal Hacker" for a mass audience. A hacker used to be known as a good person who would add functionality within software or would make things work better. To most people today "Hacker" means criminal "Criminal Cracker", it is synonymous with Cracker or someone who gets access to a system without the owner authorization.

As seen in news reports in 2011 and later hackers associated with the "Anonymous" movement  
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have attacked finance and/or credit card companies, stolen enough information to make contributions to worthy charities on behalf of organizations they see as contrary to the public good. These sorts of attackers/hackers could be considered suicide hackers. Some did get caught and prosecuted while carrying out their cause. Nobody can know if they knew their activities would land them in court and/or prison but they had to have known of the risk and proceeded anyway.

The following answers are incorrect:

Black Hat hackers are also known as crackers and are merely hackers who "violates computer security for little reason beyond maliciousness or for personal gain". Black Hat Hackers are "the epitome of all that the public fears in a computer criminal". Black Hat Hackers break into secure networks to destroy data or make the network unusable for those who are authorized to use the network.

White Hat Hackers are law-abiding, reputable experts defending assets and not breaking laws. A white hat hacker breaks security for non-malicious reasons, for instance testing their own security system. The term "white hat" in Internet slang refers to an ethical hacker. This classification also includes individuals who perform penetration tests and vulnerability assessments within a contractual agreement. Often, this type of 'white hat' hacker is called an ethical hacker. The International Council of Electronic Commerce Consultants, also known as the EC-Council has developed certifications, courseware, classes, and online training covering the diverse arena of Ethical Hacking.

Note about White Hat: As reported by Adin Kerimov, a white hat would not be worried about going to jail as he is doing a test with authorization as well and he has a signed agreement. While this is a true point he BEST choice is Suicide Hackers for the purpose of the exam, a white hat hacker would not disregard law and the authority..

Gray Hat Hackers work both offensively and defensively and can cross the border between legal/ethical behavior and illegal/unethical behavior. A grey hat hacker is a combination of a Black Hat and a White Hat Hacker. A Grey Hat Hacker may surf the internet and hack into a computer system for the sole purpose of notifying the administrator that their system has been hacked, for example. Then they may offer to repair their system for a small fee.

#### OTHER TYPES OF HACKERS

Elite hacker is a social status among hackers, elite is used to describe the most skilled. Newly discovered exploits will circulate among these hackers. Elite groups such as Masters of Deception conferred a kind of credibility on their members.

Script kiddie A script kiddie(or skiddie) is a non-expert who breaks into computer systems by using pre-packaged automated tools written by others, usually with little understanding of the underlying  
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concept—hence the term script (i.e. a prearranged plan or set of activities) kiddie (i.e. kid, child—an individual lacking knowledge and experience, immature). Often time they do not even understand how they are taken advantage of the system, they do not understand the weakness being exploited, all they know is how to use a tool that someone else has built.

Neophyte A neophyte, "n00b", or "newbie" is someone who is new to hacking or phreaking and

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has almost no knowledge or experience of the workings of technology, and hacking.

Hacktivist A hacktivist is a hacker who utilizes technology to announce a social, ideological, religious, or political message. In general, most hacktivism involves website defacement or denial-of-service attacks.

The following reference(s) were/was used to create this question:

2011. EC-COUNCIL Official Curriculum, Ethical Hacking and Countermeasures, v7.1, Module 1, Page. 15.

and

[https://en.wikipedia.org/wiki/Hacker\\_%28computer\\_security%29](https://en.wikipedia.org/wiki/Hacker_%28computer_security%29)

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### QUESTION 1114

A Differential backup process will:

- A. Backs up data labeled with archive bit 1 and leaves the data labeled as archive bit 1
- B. Backs up data labeled with archive bit 1 and changes the data label to archive bit 0
- C. Backs up data labeled with archive bit 0 and leaves the data labeled as archive bit 0
- D. Backs up data labeled with archive bit 0 and changes the data label to archive bit 1

Answer: A

Explanation: Archive bit 1 = On (the archive bit is set).

Archive bit 0 = Off (the archive bit is NOT set).

When the archive bit is set to ON, it indicates a file that has changed and needs to be backed up. Differential backups backup all files changed since the last full. To do this, they don't change the archive bit value when they backup a file. Instead the differential let's the full backup make that change. An incremental only backs up data since the last incremental backup. Thus it does change the archive bit from 1 (On) to 0 (Off).

The following answers are incorrect:

Backs up data labeled with archive bit 1 and changes the data label to archive bit 0. - This is the behavior of an incremental backup, not a differential backup.

Backs up data labeled with archive bit 0 and leaves the data labeled as archive bit 0. - If the archive bit is set to 0 (Off), it will only be backed up via a Full backup. Everything else will ignore it.

Backs up data labeled with archive bit 0 and changes the data label to archive bit 1. - If the archive bit is set to 0 (Off), it will only be backed up via a Full backup. Everything else will ignore it.

The following reference(s) were/was used to create this question:

[https://en.wikipedia.org/wiki/Archive\\_bit](https://en.wikipedia.org/wiki/Archive_bit)

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### QUESTION 1115

Ding Ltd. is a firm specialized in intellectual property business. A new video streaming application needs to be installed for the purpose of conducting the annual awareness program as per the firm security program. The application will stream internally copyrighted computer based training videos. The requirements for the application installation are to use a single server, low cost technologies, high performance and no high availability capacities.

In regards to storage technology, what is the most suitable configuration for the server hard drives?

- A. Single hard disk (no RAID)
- B. RAID 0
- C. RAID 1
- D. RAID 10

Answer: B

Explanation: Single hard disk does provide low cost requirement and no high availability but doesn't provide high performance  
RAID 1 (mirroring) provides the exact opposite of the needs : low performance, high cost and high availability  
RAID 10 provides performance but it is an expensive solution with high availability capacities  
The following reference(s) were/was used to create this question:  
Shon Harris, AIO 5th, Operations Security, Page 1086  
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### QUESTION 1116

According to Requirement 3 of the Payment Card Industry's Data Security Standard (PCI DSS) there is a requirement to "protect stored cardholder data." Which of the following items cannot be stored by the merchant?

- A. Primary Account Number
- B. Cardholder Name
- C. Expiration Date
- D. The Card Validation Code (CVV2)

Answer: D

Explanation: Requirement 3 of the Payment Card Industry's Data Security Standard (PCI DSS) is to "protect stored cardholder data." The public assumes merchants and financial institutions will protect data on payment cards to thwart theft and prevent unauthorized use.

But merchants should take note: Requirement 3 applies only if cardholder data is stored.

MERCHANTS who do not store any cardholder data automatically provide stronger protection by having eliminated a key target for data thieves.

For merchants who have a legitimate business reason to store cardholder data, it is important to understand what data elements PCI DSS allows them to store and what measures they must take to protect those data. To prevent unauthorized storage, only council certified PIN entry devices and payment applications may be used.

PCI DSS compliance is enforced by the major payment card brands who established the PCI DSS and the PCI Security Standards Council: American Express, Discover Financial Services, JCB International, MasterCard Worldwide and Visa Inc.

#### PCI DSS Requirement 3

It details technical guidelines for protecting stored cardholder data. Merchants should develop a data retention and storage policy that strictly limits storage amount and retention time to that which is required for business, legal, and/or regulatory purposes.

Sensitive authentication data must never be stored after authorization – even if this data is encrypted.

- Never store full contents of any track from the card’s magnetic stripe or chip (referred to as full track, track, track 1, track 2, or magnetic stripe data). If required for business purposes, the cardholder’s name, PAN, expiration date, and service code may be stored as long as they are

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protected in accordance with PCI DSS requirements.

- Never store the card-validation code (CVV) or value (three- or four-digit number printed on the front or back of a payment card used to validate card-not-present transactions).
- Never store the personal identification number (PIN) or PIN Block. Be sure to mask PAN whenever it is displayed. The first six and last four digits are the maximum number of digits that may be displayed. This requirement does not apply to those authorized with a specific need to see the full PAN, nor does it supersede stricter requirements in place for displays of cardholder data such as in a point-of-sale receipt.

#### PCI Data Storage

[1] These data elements must be protected if stored in conjunction with the PAN. This protection should be per PCI DSS requirements for general protection of the cardholder data environment. Additionally, other legislation (e.g., related to consumer personal data protection, privacy, identity theft, or data security) may require specific protection of this data, or proper disclosure of a company’s practices if consumer related personal data is being collected during the course of business. PCI DSS, however, does not apply if PANs are not stored, processed, or transmitted.

[2] Sensitive authentication data must not be stored after authorization (even if encrypted).

[3] Full track data from the magnetic stripe, magnetic stripe image on the chip, or elsewhere.

#### Technical Guidelines for Protecting Stored Payment Card Data

At a minimum, PCI DSS requires PAN to be rendered unreadable anywhere it is stored – including portable digital media, backup media, and in logs. Software solutions for this requirement may include one of the following:

- One-way hash functions based on strong cryptography – also called hashed index, which displays only index data that point to records in the database where sensitive data actually reside.
- Truncation – removing a data segment, such as showing only the last four digits.
- Index tokens and securely stored pads – encryption algorithm that combines sensitive plain text data with a random key or “pad” that works only once.
- Strong cryptography – with associated key management processes and procedures. Refer to the PCI DSS and PA-DSS Glossary of Terms, Abbreviations and Acronyms for the definition of “strong cryptography.”

Some cryptography solutions encrypt specific fields of information stored in a database; others encrypt a singular file or even the entire disk where data is stored. If full-disk encryption is used, logical access must be managed independently of native operating system access control

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mechanisms. Decryption keys must not be tied to user accounts. Encryption keys used for encryption of cardholder data must be protected against both disclosure and misuse. All key management processes and procedures for keys used for encryption of cardholder data must be fully documented and implemented.

Strong Cryptography is define in the glossary of PCI DSS as:

Cryptography based on industry-tested and accepted algorithms, along with strong key lengths and proper key-management practices. Cryptography is a method to protect data and includes

both encryption (which is reversible) and hashing (which is not reversible, or “one way”). Examples of industry-tested and accepted standards and algorithms for encryption include AES (128 bits and higher), TDES (minimum double-length keys), RSA (1024 bits and higher), ECC (160 bits and higher), and ElGamal (1024 bits and higher).

See NIST Special Publication 800-57 ([www.csrc.nist.gov/publications/](http://www.csrc.nist.gov/publications/)) for more information on strong crypto.

The following answers are all incorrect:

Primary Account Number

Cardholder Name

Expiration Date

All of the items above can be stored according to the PCI Data Storage Guidelines. See graphic above.

The following reference(s) were/was used to create this question:

[https://www.pcisecuritystandards.org/pdfs/pci\\_fs\\_data\\_storage.pdf](https://www.pcisecuritystandards.org/pdfs/pci_fs_data_storage.pdf)

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### QUESTION 1117

Which of the following answers best describes the type of penetration testing where the analyst has full knowledge of the network on which he is going to perform his test?

- A. White-Box Penetration Testing
- B. Black-Box Pen Testing
- C. Penetration Testing
- D. Gray-Box Pen Testing

Answer: A

Explanation: In general there are three ways a pen tester can test a target system.

- White-Box: The tester has full access and is testing from inside the system.

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- Gray-Box: The tester has some knowledge of the system he's testing.

- Black-Box: The tester has no knowledge of the system.

Each of these forms of testing has different benefits and can test different aspects of the system from different approaches.

The following answers are incorrect:

- Black-Box Pen Testing: This is where no prior knowledge is given about the target network. Only a domain name or business name may be given to the analyst.

- Penetration Testing: This is half correct but more specifically it is white-box testing because the tester has full access.

- Gray-Box Pen Testing: This answer is not right because Gray-Box testing you are given a little information about the target network.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

and

tester is provided no information about the target's network or environment. The tester is simply left to his abilities

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Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 4742-4743). Auerbach Publications. Kindle Edition.

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**QUESTION 1118**

Which of the following answers BEST indicates the most important part of a data backup plan?

- A. Testing the backups with restore operations
- B. An effective backup plan
- C. A reliable network infrastructure
- D. Expensive backup hardware

Answer: A

Explanation: If you can't restore lost files from your backup system then your backup plan is useless. You could have the best backup system and plan available but if you are unable to restore files then the system can't assure data availability.

Develop an effective disaster recovery plan and include in that plan a good backup strategy that meets the needs of your organization. Be sure to include periodic recovery practice operations to

prove the effectiveness of the system.

The following answers are incorrect:

- An effective backup plan: This is vital but testing the plan with restores is vital to operate a network safely.
- A reliable network infrastructure: This is incorrect because it is only part of what you need to have an effective backup and restore plan.
- Expensive backup hardware: This is good to have but if you don't rest your restore plan and it doesn't work when you need it, it is useless.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

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**QUESTION 1119**

Which of the following answers is directly related to providing High Availability to your users?

- A. Backup data circuits
- B. Good hiring practices
- C. Updated Antivirus Software
- D. Senior Executive Support

Answer: A

Explanation: When planning for high availability, any critical component of your data network should have some sort of redundancy or backup plan in case it does fail.

Usually this involves things like backup data circuits, fault tolerant systems and otherwise redundant technology across the board.

This can include items like these:

- RAID array disks on servers so that if any single drive fails the server remains available.

- 
- Backup network connections. Many internet services providers provide these for a fee.
  - Backup power for all systems and circuits.
  - Fire suppression and evacuation plans.
  - A data backup practice to backup and restore data while storing backups offsite in a safe, remote location.

Also critical to high availability is a well-planned and tested disaster recovery plan. You can either 1

develop one, find one free online or pay a contract agency to develop one for you.

The lines get a little blurry between fault tolerance and high availability because one is the direct result of the other but the questions on the exam should be pretty clear.

The following answers are incorrect:

- Good hiring practices: High Availability doesn't really involve good hiring practices but when you hire good technicians your availability would definitely improve.
- Updated Antivirus Software: This isn't directly related to high availability, although it's a critical part of defense in depth.
- Senior Executive Support: While this is important for funding equipment for high availability it isn't directly related to providing the high availability.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

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### QUESTION 1120

Which of the following answers presents the MOST significant threat to network based IDS or IPS systems?

- A. Encrypted Traffic
- B. Complex IDS/IPS Signature Syntax
- C. Digitally Signed Network Packets
- D. Segregated VLANs

Answer: A

Explanation: Discussion: Encrypted network packets present the biggest threat to an effective IDS/IPS plan because the network cannot easily (Or quickly) be decoded and examined.

Encrypted packets can't be examined by the IDS to determine if there is a threat there so in most cases the traffic is just forwarded along with the potential threat.

There is an industry where a company provides examination services for your network traffic, acting like a proxy server for all your network traffic.

You simply send them copies of your certificates so they can decode the traffic. This is common in the financial industry where violating federal law or being sued by federal investigators for insider trading can lead to business collapse.

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The external company examines all the network traffic coming and going from your network for potential liabilities.

The following answers are incorrect:

- Complex IDS/IPS Signature syntax: IDS/IPS signatures can be complex but this isn't the MOST significant threat to the functionality of an IDS/IPS system.

- Digitally Signed Network Packets: This is an incorrect answer because it isn't a threat to IDS/IPS systems looking for dangerous network traffic. Foremost because we don't commonly digitally sign each network packet we send.
- Segregated VLANs: This is not a correct answer but VLANs can present barriers to IDS/IPS systems spotting dangerous traffic. There is an easy solution to VLANs and IDS/IPS systems and that would be simply placing an IDS/IPS sensor on that VLAN and set it up to send its traffic to the IDS/IPS management system.

The following reference(s) was used to create this question:

Gregg, Michael; Haines, Billy (2012-02-16). CASP: CompTIA Advanced Security Practitioner Study Guide Authorized Courseware: Exam CAS-001 (Pg. 138) Wiley. Kindle Edition.

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### QUESTION 1121

Which of the following method is recommended by security professional to PERMANENTLY erase sensitive data on magnetic media?

- A. Degaussing
- B. Overwrite every sector of magnetic media with pattern of 1's and 0's
- C. Format magnetic media
- D. Delete File allocation table

Answer: A

Explanation: PERMANENTLY is the keyword used in the question. You need to find out data removal method which remove data permanently from magnetic media.

Degaussing is the most effective method out of all provided choices to erase sensitive data on magnetic media provided magnetic media is not required to be reused. Some degaussers can destroy drives. The security professional should exercise caution when recommending or using degaussers on media for reuse.

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A device that performs degaussing generates a coercive magnetic force that reduces the magnetic flux density of the storage media to zero. This magnetic force is what properly erases data from media. Data are stored on magnetic media by the representation of the polarization of the atoms. Degaussing changes this polarization (magnetic alignment) by using a type of large magnet to bring it back to its original flux (magnetic alignment).

For your exam you should know the information below:

When media is to be reassigned (a form of object reuse), it is important that all residual data is carefully removed.

Simply deleting files or formatting the media does not actually remove the information. File deletion and media formatting often simply remove the pointers to the information. Providing assurance for object reuse requires specialized tools and techniques according to the type of media on which the data resides.

Specialized hardware devices known as degaussers can be used to erase data saved to magnetic media. The measure of the amount of energy needed to reduce the magnetic field on the media to zero is known as coercivity. It is important to make sure that the coercivity of the degausser is of sufficient strength to meet object reuse requirements when erasing data. If a degausser is used with insufficient coercivity, then a remanence of the data will exist.

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Remanence is the measure of the existing magnetic field on the media; it is the residue that remains after an object is degaussed or written over. Data is still recoverable even when the remanence is small. While data remanence exists, there is no assurance of safe object reuse. Some degaussers can destroy drives. The security professional should exercise caution when recommending or using degaussers on media for reuse.

Software tools also exist that can provide object reuse assurance. These tools overwrite every sector of magnetic media with a random or predetermined bit pattern. Overwrite methods are effective for all forms of electronic media with the exception of read-only optical media. There is a drawback to using overwrite software. During normal write operations with magnetic media, the head of the drive moves back-and-forth across the media as data is written. The track of the head does not usually follow the exact path each time. The result is a minuscule amount of data remanence with each pass. With specialized equipment, it is possible to read data that has been overwritten.

To provide higher assurance in this case, it is necessary to overwrite each sector multiple times. Security practitioners should keep in mind that a one-time pass may be acceptable for noncritical information, but sensitive data should be overwritten with multiple passes. Overwrite software can also be used to clear the sectors within solid-state media such as USB thumb drives. It is

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suggested that physical destruction methods such as incineration or secure recycling should be considered for solid-state media that is no longer used.

The last form of preventing unauthorized access to sensitive data is media destruction. Shredding, burning, grinding, and pulverizing are common methods of physically destroying media.

Degaussing can also be a form of media destruction. High-power degaussers are so strong in some cases that they can literally bend and warp the platters in a hard drive.

Shredding and burning are effective destruction methods for non-rigid magnetic media. Indeed, some shredders are capable of shredding some rigid media such as an optical disk. This may be an effective alternative for any optical media containing nonsensitive information due to the residue size remaining after feeding the disk into the machine.

However, the residue size might be too large for media containing sensitive information.

Alternatively, grinding and pulverizing are acceptable choices for rigid and solid-state media.

Specialized devices are available for grinding the face of optical media that either sufficiently scratches the surface to render the media unreadable or actually grinds off the data layer of the disk. Several services also exist which will collect drives, destroy them on site if requested and provide certification of completion. It will be the responsibility of the security professional to help, select, and maintain the most appropriate solutions for media cleansing and disposal.

The following answers are incorrect:

Overwrite every sector of magnetic media with pattern of 1's and 0's- Less effective than degaussing provided magnetic media is not require to be reuse.

Format magnetic media – Formatting magnetic media does not erase all data. Data can be recoverable after formatting using software tools.

Delete File allocation table - It will not erase all data. Data can be recoverable using software tools.

The following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 338

Official ISC2 guide to CISSP CBK 3rd Edition Page number 720

(Business Continuity and Disaster Recovery Planning)

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**QUESTION 1122**

5

Which of the following best describes what would be expected at a "hot site"?

- A. Computers, climate control, cables and peripherals
- B. Computers and peripherals
- C. Computers and dedicated climate control systems.
- D. Dedicated climate control systems

Answer: A

Explanation: A Hot Site contains everything needed to become operational in the shortest amount of time.

The following answers are incorrect:

Computers and peripherals. Is incorrect because no mention is made of cables. You would not be fully operational without those.

Computers and dedicated climate control systems. Is incorrect because no mention is made of peripherals. You would not be fully operational without those.

Dedicated climate control systems. Is incorrect because no mention is made of computers, cables and peripherals. You would not be fully operational without those.

According to the OIG, a hot site is defined as a fully configured site with complete customer required hardware and software provided by the service provider. A hot site in the context of the CBK is always a RENTAL place. If you have your own site fully equipped that you make use of in case of disaster that would be called a redundant site or an alternate site.

Wikipedia: "A hot site is a duplicate of the original site of the organization, with full computer systems as well as near-complete backups of user data."

References:

OIG CBK, Business Continuity and Disaster Recovery Planning (pages 367 - 368)

AIO, 3rd Edition, Business Continuity Planning (pages 709 - 714)

AIO, 4th Edition, Business Continuity Planning , p 790.

Wikipedia - [http://en.wikipedia.org/wiki/Hot\\_site#Hot\\_Sites](http://en.wikipedia.org/wiki/Hot_site#Hot_Sites)

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**QUESTION 1123**

Who should direct short-term recovery actions immediately following a disaster?

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- A. Chief Information Officer.
- B. Chief Operating Officer.
- C. Disaster Recovery Manager.
- D. Chief Executive Officer.

Answer: C

Explanation: The Disaster Recovery Manager should also be a member of the team that assisted in the development of the Disaster Recovery Plan. Senior-level management need to support the

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process but would not be involved with the initial process.

The following answers are incorrect:

Chief Information Officer. Is incorrect because the Senior-level management are the ones to authorize the recovery plan and process but during the initial recovery process they will most likely be heavily involved in other matters.

Chief Operating Officer. Is incorrect because the Senior-level management are the ones to authorize the recovery plan and process but during the initial recovery process they will most likely be heavily involved in other matters.

Chief Executive Officer. Is incorrect because the Senior-level management are the ones to authorize the recovery plan and process but during the initial recovery process they will most likely be heavily involved in other matters.

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### QUESTION 1124

Prior to a live disaster test also called a Full Interruption test, which of the following is most important?

- A. Restore all files in preparation for the test.
- B. Document expected findings.
- C. Arrange physical security for the test site.
- D. Conduct of a successful Parallel Test

Answer: D

Explanation: A live disaster test or Full interruption test is an actual simulation of the Disaster Recovery Plan. All operations are shut down and brought back online at the alternate site. This test poses the biggest threat to an organization and should not be performed until a successful Parallel Test has been conducted.

1. A Checklist test would be conducted where each of the key players will get a copy of the plan 7

and they read it to make sure it has been properly developed for the specific needs of their departments.

2. A Structure Walk Through would be conducted next. This is when all key players meet together in a room and they walk through the test together to identify shortcomings and dependencies between department.

3. A simulation test would be next. In this case you go through a disaster scenario up to the point where you would move to the alternate site. You do not move to the alternate site and you learn from your mistakes and you improve the plan. It is the right time to find shortcomings.

4. A Parallel Test would be done. You go through a disaster scenario. You move to the alternate site and you process from both sites simultaneously.

5. A full interruption test would be conducted. You move to the alternate site and you resume processing at the alternate site.

The following answers are incorrect:

Restore all files in preparation for the test. Is incorrect because you would restore the files at the alternate site as part of the test not in preparation for the test.

Document expected findings. Is incorrect because it is not the best answer. Documenting the expected findings won't help if you have not performed tests prior to a Full interruption test or live

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disaster test.

Arrange physical security for the test site. Is incorrect because it is not the best answer. why physical security for the test site is important if you have not performed a successful structured walk-through prior to performing a Full interruption test or live disaster test you might have some unexpected and disasterous results.

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### QUESTION 1125

Which of the following should be emphasized during the Business Impact Analysis (BIA) considering that the BIA focus is on business processes?

- A. Composition
- B. Priorities
- C. Dependencies
- D. Service levels

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Answer: C

Explanation: The Business Impact Analysis (BIA) identifies time-critical aspects of the critical business processes, and determines their maximum tolerable downtime. The BIA helps to Identify organization functions, the capabilities of each organization unit to handle outages, and the priority and sequence of functions and applications to be recovered, identify resources required for recovery of those areas and interdependencies

In performing the Business Impact Analysis (BIA) it is very important to consider what the dependencies are. You cannot bring a system up if it depends on another system to be operational. You need to look at not only internal dependencies but external as well. You might not be able to get the raw materials for your business so dependencies are very important aspect of a BIA.

The BIA committee will not truly understand all business processes, the steps that must take place, or the resources and supplies these processes require. So the committee must gather this information from the people who do know— department managers and specific employees throughout the organization. The committee starts by identifying the people who will be part of the BIA data-gathering sessions. The committee needs to identify how it will collect the data from the selected employees, be it through surveys, interviews, or workshops. Next, the team needs to collect the information by actually conducting surveys, interviews, and workshops. Data points obtained as part of the information gathering will be used later during analysis. It is important that the team members ask about how different tasks— whether processes, transactions, or services, along with any relevant dependencies— get accomplished within the organization.

The following answers are incorrect:

composition This is incorrect because it is not the best answer. While the make up of business may be important, if you have not determined the dependencies first you may not be able to bring the critical business processes to a ready state or have the materials on hand that are needed.

priorities This is incorrect because it is not the best answer. While the priorities of processes are important, if you have not determined the dependencies first you may not be able to bring the critical business processes to a ready state or have the materials on hand that are needed.

service levels This is incorrect because it is not the best answer. Service levels are not as

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important as dependencies.

Reference(s) used for this question:

Schneiter, Andrew (2013-04-15). Official (ISC)2 Guide to the CISSP CBK, Third Edition : Business Continuity and Disaster Recovery Planning (Kindle Locations 188-191). . Kindle Edition.

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 18562-9 18568). McGraw-Hill. Kindle Edition.

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### QUESTION 1126

Which of the following recovery plan test results would be most useful to management?

- A. elapsed time to perform various activities.
- B. list of successful and unsuccessful activities.
- C. amount of work completed.
- D. description of each activity.

Answer: B

Explanation: After a test has been performed the most useful test results for management would be knowing what worked and what didn't so that they could correct the mistakes where needed.

The following answers are incorrect:

elapsed time to perform various activities. This is incorrect because it is not the best answer, these results are not as useful as list of successful and unsuccessful activities would be to management.  
amount of work completed. This is incorrect because it is not the best answer, these results are not as useful as list of successful and unsuccessful activities would be to management.  
description of each activity. This is incorrect because it is not the best answer, these results are not as useful as list of successful and unsuccessful activities would be to management.

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### QUESTION 1127

Which of the following computer recovery sites is only partially equipped with processing equipment?

- A. hot site.
- B. rolling hot site.
- C. warm site.
- D. cold site.

Answer: C

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Explanation: A warm site has some basic equipment or in some case almost all of the equipment but it is not sufficient to be operational without bringing in the last backup and in some cases more computers and other equipment.

The following answers are incorrect:

hot site. Is incorrect because a hot-site is fully configured with all the required hardware. The only

thing missing is the last backup and you are up and running.

Rolling hot site. Is incorrect because a rolling hot-site is fully configured with all the required hardware.

cold site. Is incorrect because a cold site has basically power, HVAC, basic cabling, but no or little as far as processing equipment is concerned. All other equipment must be brought to this site. It might take a week or two to reconstruct.

References:

OIG CBK Business Continuity and Disaster Recovery Planning (pages 368 - 369)

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**QUESTION 1128**

Which of the following computer recovery sites is the least expensive and the most difficult to test?

- A. non-mobile hot site.
- B. mobile hot site.
- C. warm site.
- D. cold site.

Answer: D

Explanation: Is the least expensive because it is basically a structure with power and would be the most difficult to test because you would have to install all of the hardware infrastructure in order for it to be operational for the test.

The following answers are incorrect:

non-mobile hot site. Is incorrect because it is more expensive than a cold site and easier to test because all of the infrastructure is in place.

mobile hot site. Is incorrect because it is more expensive than a cold site and easier to test

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because all of the infrastructure is in place.

warm site. Is incorrect because it is more expensive than a cold site and easier to test because more of the infrastructure is in place.

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**QUESTION 1129**

Which of the following is the most important consideration in locating an alternate computing facility during the development of a disaster recovery plan?

- A. It is unlikely to be affected by the same disaster.
- B. It is close enough to become operational quickly.
- C. It is close enough to serve its users.
- D. It is convenient to airports and hotels.

Answer: A

Explanation: You do not want the alternate or recovery site located in close proximity to the original site because the same event that creates the situation in the first place might very well impact that site also.

From NIST: "The fixed site should be in a geographic area that is unlikely to be negatively affected

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by the same disaster event (e.g., weather-related impacts or power grid failure) as the organization's primary site.

The following answers are incorrect:

It is close enough to become operational quickly. Is incorrect because it is not the best answer. You'd want the alternate site to be close but if it is too close the same event could impact that site as well.

It is close enough to serve its users. Is incorrect because it is not the best answer. You'd want the alternate site to be close to users if applicable, but if it is too close the same event could impact that site as well

It is convenient to airports and hotels. Is incorrect because it is not the best answer, it is more important that the same event does not impact the alternate site than convenience.

References:

OIG CBK Business Continuity and Disaster Recovery Planning (pages 368 - 369)

NIST document 800-34 pg 21

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### QUESTION 1130

Contracts and agreements are often times unenforceable or hard to enforce in which of the following alternate facility recovery agreement?

- A. hot site.
- B. warm site.
- C. cold site.
- D. reciprocal agreement.

Answer: D

Explanation: A reciprocal agreement is where two or more organizations mutually agree to provide facilities to the other if a disaster occurs. The organizations must have similar hardware and software configurations. Reciprocal agreements are often not legally binding.

Reciprocal agreements are not contracts and cannot be enforced. You cannot force someone you have such an agreement with to provide processing to you.

Government regulators do not accept reciprocal agreements as valid disaster recovery sites.

Cold sites are empty computer rooms consisting only of environmental systems, such as air conditioning and raised floors, etc. They do not meet the requirements of most regulators and boards of directors that the disaster plan be tested at least annually.

Time Brokers promise to deliver processing time on other systems. They charge a fee, but cannot guarantee that processing will always be available, especially in areas that experienced multiple disasters.

With the exception of providing your own hot site, commercial hot sites provide the greatest protection. Most will allow you up to six weeks to restore your sites if you declare a disaster. They also permit an annual amount of time to test the Disaster Plan.

References:

OIG CBK Business Continuity and Disaster Recovery Planning (pages 368 - 369)

The following answers are incorrect:

hot site. Is incorrect because you have a contract in place stating what services are to be

provided.

warm site. Is incorrect because you have a contract in place stating what services are to be  
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provided.

cold site. Is incorrect because you have a contract in place stating what services are to be  
provided.

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**QUESTION 1131**

Organizations should not view disaster recovery as which of the following?

- A. Committed expense.
- B. Discretionary expense.
- C. Enforcement of legal statutes.
- D. Compliance with regulations.

Answer: B

Explanation: Disaster Recovery should never be considered a discretionary expense. It is far too important a task. In order to maintain the continuity of the business Disaster Recovery should be a commitment of and by the organization.

A discretionary fixed cost has a short future planning horizon—under a year. These types of costs arise from annual decisions of management to spend in specific fixed cost areas, such as marketing and research. DR would be an ongoing long term commitment not a short term effort only.

A committed fixed cost has a long future planning horizon— more than one year. These types of costs relate to a company's investment in assets such as facilities and equipment. Once such costs have been incurred, the company is required to make future payments.

The following answers are incorrect:

committed expense. Is incorrect because Disaster Recovery should be a committed expense.  
enforcement of legal statutes. Is incorrect because Disaster Recovery can include enforcement of legal statutes. Many organizations have legal requirements toward Disaster Recovery.  
compliance with regulations. Is incorrect because Disaster Recovery often means compliance with regulations. Many financial institutions have regulations requiring Disaster Recovery Plans and Procedures.

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**QUESTION 1132**

Which of the following backup sites is the most effective for disaster recovery?

- A. Time brokers
- B. Hot sites
- C. Cold sites
- D. Reciprocal Agreement

Answer: B

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Explanation: A hot site has the equipment, software and communications capabilities to facilitate a recovery within a few minutes or hours following the notification of a disaster to the organization's primary site. With the exception of providing your own hot site, commercial hot sites provide the greatest protection. Most will allow you up to six weeks to restore your sites if you declare a disaster. They also permit an annual amount of time to test the Disaster Plan.

The following answers are incorrect:

Cold sites. Cold sites are empty computer rooms consisting only of environmental systems, such as air conditioning and raised floors, etc. They do not meet the requirements of most regulators and boards of directors that the disaster plan be tested at least annually.

Reciprocal Agreement. Reciprocal agreements are not contracts and cannot be enforced. You cannot force someone you have such an agreement with to provide processing to you.

Government regulators do not accept reciprocal agreements as valid disaster recovery backup sites.

Time Brokers. Time Brokers promise to deliver processing time on other systems. They charge a fee, but cannot guarantee that processing will always be available, especially in areas that experienced multiple disasters.

The following reference(s) were/was used to create this question:

ISC2 OIG, 2007 p368

Shon Harris AIO v3. p.710

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### QUESTION 1133

Which of the following is NOT a transaction redundancy implementation?

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- A. on-site mirroring
- B. Electronic Vaulting
- C. Remote Journaling
- D. Database Shadowing

Answer: A

Explanation: Three concepts are used to create a level of fault tolerance and redundancy in transaction processing.

They are Electronic vaulting, remote journaling and database shadowing provide redundancy at the transaction level.

Electronic vaulting is accomplished by backing up system data over a network. The backup location is usually at a separate geographical location known as the vault site. Vaulting can be used as a mirror or a backup mechanism using the standard incremental or differential backup cycle. Changes to the host system are sent to the vault server in real-time when the backup method is implemented as a mirror. If vaulting updates are recorded in real-time, then it will be necessary to perform regular backups at the off-site location to provide recovery services due to inadvertent or malicious alterations to user or system data.

Journaling or Remote Journaling is another technique used by database management systems to provide redundancy for their transactions. When a transaction is completed, the database management system duplicates the journal entry at a remote location. The journal provides sufficient detail for the transaction to be replayed on the remote system. This provides for

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database recovery in the event that the database becomes corrupted or unavailable. There are also additional redundancy options available within application and database software platforms. For example, database shadowing may be used where a database management system updates records in multiple locations. This technique updates an entire copy of the database at a remote location.

Reference used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 20403-20407). Auerbach Publications. Kindle Edition. and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 20375-20377). Auerbach Publications. Kindle Edition.

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### QUESTION 1134

Which of the following provides enterprise management with a prioritized list of time-critical business processes, and estimates a recovery time objective for each of the time critical processes and the components of the enterprise that support those processess?

- A. Business Impact Assessment
- B. Current State Assessment
- C. Risk Mitigation Assessment.
- D. Business Risk Assessment.

Answer: A

Explanation: Source: TIPTON, H., et. al., Official (ISC)2 Guide to the CISSP CBK, 2007, page 359.

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### QUESTION 1135

Which of the following steps is NOT one of the eight detailed steps of a Business Impact Assessment (BIA):

- A. Notifying senior management of the start of the assessment.
- B. Creating data gathering techniques.
- C. Identifying critical business functions.
- D. Calculating the risk for each different business function.

Answer: A

Explanation: Source: HARRIS, S., CISSP All- In-One Exam Guide, 3rd. Edition, 2005, Chapter 9, Page 701.

There have been much discussion about the steps of the BIA and I struggled with this before deciding to scrape the question about "the four steps," and re-write the question using the AIO for a reference. This question should be easy.... if you know all eight steps.

The eight detailed and granular steps of the BIA are:

1. Select Individuals to interview for the data gathering.

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2. Create data gathering techniques (surveys, questionnaires, qualitative and quantitative approaches).

3. Identify the company's critical business functions.

4. Identify the resources that these functions depend upon.

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5. Calculate how long these functions can survive without these resources.

6. Identify vulnerabilities and the threats to these functions.

7. Calculate risk for each of the different business functions.

8. Document findings and report them to management.

9. Shon goes on to cover each step in Chapter

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### QUESTION 1136

A site that is owned by the company and mirrors the original production site is referred to as a \_\_\_\_\_?

- A. Hot site.
- B. Warm Site.
- C. Reciprocal site.
- D. Redundant Site.

Answer: D

Explanation: Usually within most certification body of knowledge the terms Cold, Warm, and Hot sites refer to rental places.

The official study book has the following:

Redundant sites....are owned by the company and are mirrors of the original production environment

A synonym for Redundant site would also be Alternate Side.

Reference(s) used for this question:

HARRIS, Shon, CISSP All-In-One Exam Guide, 3rd. Edition Chapter 9, page 714.

and

Also mentioned in AIO V4 Chapter 9 P 749.

Quote: "Redundant sites....are owned by the company and are mirrors of the original production environment"

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### QUESTION 1137

Which of the following results in the most devastating business interruptions?

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- A. Loss of Hardware/Software
- B. Loss of Data
- C. Loss of Communication Links
- D. Loss of Applications

Answer: B

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Explanation: Source: Veritas eLearning CD - Introducing Disaster Recovery Planning, Chapter 1.  
All of the others can be replaced or repaired. Data that is lost and was not backed up, cannot be restored.

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**QUESTION 1138**

Which of the following is the most critical item from a disaster recovery point of view?

- A. Data
- B. Hardware/Software
- C. Communication Links
- D. Software Applications

Answer: A

Explanation: The most important point is ALWAYS the data. Everything else can be replaced or repaired.

Data MUST be backed up, backups must be regularly tested, because once it is truly lost, it is lost forever.

The goal of disaster recovery is to minimize the effects of a disaster or disruption. It means taking the necessary steps to ensure that the resources, personnel, and business processes are able to resume operation in a timely manner . This is different from continuity planning, which provides methods and procedures for dealing with longer-term outages and disasters.

The goal of a disaster recovery plan is to handle the disaster and its ramifications right after the disaster hits; the disaster recovery plan is usually very information technology (IT)- focused. A disaster recovery plan (DRP) is carried out when everything is still in emergency mode, and everyone is scrambling to get all critical systems back online.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 887). McGraw-Hill. Kindle Edition.

9

and

Veritas eLearning CD - Introducing Disaster Recovery Planning, Chapter 1.

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**QUESTION 1139**

Which of the following is defined as the most recent point in time to which data must be synchronized without adversely affecting the organization (financial or operational impacts)?

- A. Recovery Point Objective
- B. Recovery Time Objective
- C. Point of Time Objective
- D. Critical Time Objective

Answer: A

Explanation: The recovery point objective (RPO) is the maximum acceptable level of data loss following an unplanned “event”, like a disaster (natural or man-made), act of crime or terrorism, or

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any other business or technical disruption that could cause such data loss. The RPO represents the point in time, prior to such an event or incident, to which lost data can be recovered (given the most recent backup copy of the data).

The recovery time objective (RTO) is a period of time within which business and / or technology capabilities must be restored following an unplanned event or disaster. The RTO is a function of the extent to which the interruption disrupts normal operations and the amount of revenue lost per unit of time as a result of the disaster.

These factors in turn depend on the affected equipment and application(s). Both of these numbers represent key targets that are set by key businesses during business continuity and disaster recovery planning; these targets in turn drive the technology and implementation choices for business resumption services, backup / recovery / archival services, and recovery facilities and procedures.

Many organizations put the cart before the horse in selecting and deploying technologies before understanding the business needs as expressed in RPO and RTO; IT departments later bear the brunt of user complaints that their service expectations are not being met. Defining the RPO and RTO can avoid that pitfall, and in doing so can also make for a compelling business case for recovery technology spending and staffing.

For the CISSP candidate studying for the exam, there are no such objectives for "point of time," and "critical time." Those two answers are simply detractors.

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Reference:

[http://www.wikibon.org/Recovery\\_point\\_objective/\\_recovery\\_time\\_objective\\_strategy](http://www.wikibon.org/Recovery_point_objective/_recovery_time_objective_strategy)

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## QUESTION 1140

Valuable paper insurance coverage does not cover damage to which of the following?

- A. Inscribed, printed and Written documents
- B. Manuscripts
- C. Records
- D. Money and Securities

Answer: D

Explanation: All businesses are driven by records. Even in today's electronic society businesses generate mountains of critical documents everyday. Invoices, client lists, calendars, contracts, files, medical records, and innumerable other records are generated every day.

Stop and ask yourself what happens if your business lost those documents today.

Valuable papers business insurance coverage provides coverage to your business in case of a loss of vital records. Over the years policy language has evolved to include a number of different types of records. Generally, the policy will cover "written, printed, or otherwise inscribed documents and records, including books, maps, films, drawings, abstracts, deeds, mortgages, and manuscripts." But, read the policy coverage carefully. The policy language typically "does not mean "money" or "securities," converted data, programs or instructions used in your data processing operations, including the materials on which the data is recorded."

The coverage is often included as a part of property insurance or as part of a small business owner policy. For example, a small business owner policy includes in many cases valuable papers

coverage up to \$25,000.

It is important to realize what the coverage actually entails and, even more critical, to analyze your business to determine what it would cost to replace records.

The coverage pays for the loss of vital papers and the cost to replace the records up to the limit of the insurance and after application of any deductible. For example, the insurer will pay to have waterlogged papers dried and reproduced (remember, fires are put out by water and the fire department does not stop to remove your book keeping records). The insurer may cover

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temporary storage or the cost of moving records to avoid a loss.

For some businesses, losing customer lists, some business records, and contracts, can mean the expense and trouble of having to recreate those documents, but is relatively easy and a low level risk and loss. Larger businesses and especially professionals (lawyers, accountants, doctors) are in an entirely separate category and the cost of replacement of documents is much higher.

Consider, in analyzing your business and potential risk, what it would actually cost to reproduce your critical business records. Would you need to hire temporary personnel? How many hours of productivity would go into replacing the records? Would you need to obtain originals? Would original work need to be recreated (for example, home inspectors, surveyors, cartographers)?

Often when a business owner considers the actual cost related to the reproduction of records, the owner quickly realizes that their business insurance policy limits for valuable papers coverage is woefully inadequate.

Insurers (and your insurance professional) will often suggest higher coverages for valuable papers. The extra premium is often worth the cost and should be considered.

Finally, most policies will require records to be protected. You need to review your declarations pages and speak with your insurer to determine what is required. Some insurers may offer discounted coverage if there is a document retention and back up plan in place and followed.

There are professional organizations that can assist your business in designing a records management policy to lower the risk (and your premiums). For example, ARMA International has been around since 1955 and its members consist of some of the top document retention and storage companies.

Reference(s) used for this question:

<http://businessinsure.about.com/od/propertyinsurance/f/vpcov.htm>

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### QUESTION 1141

Which of the following is covered under Crime Insurance Policy Coverage?

- A. Inscribed, printed and Written documents
- B. Manuscripts
- C. Accounts Receivable
- D. Money and Securities

Answer: D

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Explanation: Source: TIPTON, Harold F. & KRAUSE, MICKI, Information Security Management Handbook, 4th Edition, Volume 1, Property Insurance overview, Page 589.

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**QUESTION 1142**

If your property Insurance has Actual Cash Valuation (ACV) clause, your damaged property will be compensated based on:

- A. Value of item on the date of loss
- B. Replacement with a new item for the old one regardless of condition of lost item
- C. Value of item one month before the loss
- D. Value of item on the date of loss plus 10 percent

Answer: A

Explanation: This is called the Actual Cash Value (ACV) or Actual Cost Valuation (ACV)

All of the other answers were only detractors. Below you have an explanation of the different types of valuation you could use. It is VERY important for you to validate with your insurer which one applies to you as you could have some very surprising finding the day you have a disaster that takes place.

#### Replacement Cost

Property replacement cost insurance promises to replace old with new. Generally, replacement of a building must be done on the same premises and used for the same purpose, using materials comparable to the quality of the materials in the damaged or destroyed property.

There are some other limitations to this promise. For example, the cost of repairs or replacement for buildings

doesn't include the increased cost associated with building codes or other laws controlling how buildings must be built today. An endorsement adding coverage for the operation of Building Codes and the increased costs associated with complying with them is available separately — usually for additional premium.

In addition, some insurance underwriters will only cover certain property on a depreciated value (actual cash value — ACV) basis even when attached to the building. This includes awnings and floor coverings, appliances for refrigerating, ventilating, cooking, dishwashing, and laundering. Depreciated value also applies to outdoor equipment or furniture.

#### Actual Cash Value (ACV)

The ACV is the default valuation clause for commercial property insurance. It is also known as

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depreciated value, but this is not the same as accounting depreciated value. The actual cash value is determined by first calculating the replacement value of the property. The next step involves estimating the amount to be subtracted, which reflects the building's age, wear, and tear.

This amount deducted from the replacement value is known as depreciation. The amount of depreciation is reduced by inflation (increased cost of replacing the property); regular maintenance; and repair (new roofs, new electrical systems, etc.) because these factors reduce the effective age of the buildings.

The amount of depreciation applicable is somewhat subjective and certainly subject to negotiation. In fact, there is often disagreement and a degree of uncertainty over the amount of depreciation applicable to a particular building.

Given this reality, property owners should not leave the determination of depreciation to chance or wait until suffering

a property loss to be concerned about it. Every three to five years, property owners should obtain a professional appraisal of the replacement value and depreciated value of the buildings.

The ACV valuation is an option for directors to consider when certain buildings are in need of repair, or budget constraints prevent insuring all of your facilities on a replacement cost basis. There are other valuation options for property owners to consider as well.

#### Functional Replacement Cost

This valuation method has been available for some time but has not been widely used. It is beginning to show up on property insurance policies imposed by underwriters with concerns about older, buildings. It can also be used for buildings, which are functionally obsolete.

This method provides for the replacement of a building with similar property that performs the same function, using less costly material. The endorsement includes coverage for building codes automatically.

In the event of a loss, the insurance company pays the smallest of four payment options.

1. In the event of a total loss, the insurer could pay the limit of insurance on the building or the cost to replace the building on the same (or different) site with a payment that is “functionally equivalent.”

2. In the event of a partial loss, the insurance company could pay the cost to repair or replace the damaged portion in the same architectural style with less costly material (if available).

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3. The insurance company could also pay the amount actually spent to demolish the undamaged portion of the building and clear the site if necessary.

4. The fourth payment option is to pay the amount actually spent to repair, or replace the building using less costly materials, if available (Hillman and McCracken 1997).

Unlike the replacement cost valuation method, which excluded certain fixtures and personal property used to service the premises, this endorsement provides functional replacement cost coverage for these items (awnings, floor coverings, appliances, etc.) (Hillman and McCracken 1997).

As in the standard replacement cost value option, the insured can elect not to repair or replace the property. Under these circumstances the company pays the smallest of the following:

1. The Limit of Liability

2. The “market value” (not including the value of the land) at the time of the loss. The endorsement defines “market value” as the price which the property might be expected to realize if offered for sale in fair market.”

3. A modified form of ACV (the amount to repair or replace on the same site with less costly material and in the same architectural style, less depreciation) (Hillman and McCracken 1997).

#### Agreed Value or Agreed Amount

Agreed value or agreed amount is not a valuation method. Instead, this term refers to a waiver of the coinsurance clause in the property insurance policy. Availability of this coverage feature varies among insurers but, it is usually available only when the underwriter has proof (an independent appraisal, or compliance with an insurance company valuation model) of the value of your property.

#### When do I get paid?

Generally, the insurance company will not pay a replacement cost settlement until the property that was damaged or destroyed is actually repaired or replaced as soon as reasonably possible after the loss.

Under no circumstances will the insurance company pay more than your limit of insurance or more

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than the actual amount you spend to repair or replace the damaged property if this amount is less than the limit of insurance.

Replacement cost insurance terms give the insured the option of settling the loss on an ACV basis. This option may be exercised if you don't plan to replace the building or if you are faced with  
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a significant coinsurance penalty on a replacement cost settlement.

References:

<http://www.schirickinsurance.com/resources/value2005.pdf>  
and

TIPTON, Harold F. & KRAUSE, MICKI

Information Security Management Handbook, 4th Edition, Volume 1

Property Insurance overview, Page 587.

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### QUESTION 1143

If your property Insurance has Replacement Cost Valuation (RCV) clause your damaged property will be compensated:

- A. Based on the value of item on the date of loss
- B. Based on new, comparable, or identical item for old regardless of condition of lost item
- C. Based on value of item one month before the loss
- D. Based on the value listed on the Ebay auction web site

Answer: B

Explanation: RCV is the maximum amount your insurance company will pay you for damage to covered property before deducting for depreciation. The RCV payment is based on the current cost to replace your property with new, identical or comparable property.

The other choices were detractor:

Application and definition of the insurance terms Replacement Cost Value (RCV), Actual Cash Value (ACV) and depreciation can be confusing. It's important that you understand the terms to help settle your claim fairly.

An easy way to understand RCV and ACV is to think in terms of "new" and "used."

Replacement cost is the item's current price, new. "What will it cost when I replace it?"

Actual cash is the item's used price, old. "How much money is it worth since I used it for five years?"

Hold Back

Most policies only pay the Actual Cash Value upfront, and then they pay you the "held back" depreciation after you incur the expense to repair or replace your personal property items.

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NOTE: You must remember to send documentation to the insurance company proving you've incurred the additional expense you will be reimbursed.

Actual Cash Value (ACV)

ACV is the amount your insurance company will pay you for damage to covered property after deducting for depreciation. ACV is the replacement cost of a new item, minus depreciation. If stated as a simple equation, ACV could be defined as follows:  $ACV = RCV - \text{Depreciation}$

Unfortunately, ACV is not always as easy to agree upon as a simple math equation. The ACV can

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also be calculated as the price a willing buyer would pay for your used item.

#### Depreciation

Depreciation (sometimes called “hold back”) is defined as the “loss in value from all causes, including age, and wear and tear.” Although the definition seems to be clear, in our experience, “value” as a real-world application is clearly subjective and varies widely. We have seen the same adjuster apply NO depreciation (100 percent value) on one claim and 40 percent depreciation (almost half value) on an almost identical claim.

This shows that the process of applying depreciation is subjective and clearly negotiable.

#### Excessive Depreciation

When the insurance company depreciates more than they should, it is called “Excessive depreciation.” Although not ethical, it is very common. Note any items that have excessive depreciation and write a letter to your insurance company.

#### References:

<http://carehelp.org/downloads/category/1-insurance-handouts.html?download=17%3Ahandout08-rcv-and-acv>

and

<http://www.schirickinsurance.com/resources/value2005.pdf>

and

TIPTON, Harold F. & KRAUSE, MICKI, information Security Management Handbook, 4th Edition, Volume 1

Property Insurance overview, Page 587.

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### QUESTION 1144

What is the Maximum Tolerable Downtime (MTD)?

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- A. Maximum elapsed time required to complete recovery of application data
- B. Minimum elapsed time required to complete recovery of application data
- C. Maximum elapsed time required to move back to primary site after a major disruption
- D. It is maximum delay businesses can tolerate and still remain viable

Answer: D

Explanation: The Maximum Tolerable Downtime (MTD) is the maximum length of time a BUSINESS FUNCTION can endure without being restored, beyond which the BUSINESS is no longer viable

#### NIST SAYS:

The ISCP Coordinator should analyze the supported mission/business processes and with the process owners, leadership and business managers determine the acceptable downtime if a given process or specific system data were disrupted or otherwise unavailable. Downtime can be identified in several ways.

Maximum Tolerable Downtime (MTD). The MTD represents the total amount of time the system owner/authorizing official is willing to accept for a mission/business process outage or disruption and includes all impact considerations. Determining MTD is important because it could leave contingency planners with imprecise direction on selection of an appropriate recovery method, and the depth of detail which will be required when developing recovery procedures, including their

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scope and content.

Other BCP and DRP terms you must be familiar with are:

Recovery Time Objective (RTO). RTO defines the maximum amount of time that a system resource can remain unavailable before there is an unacceptable impact on other system resources, supported mission/business processes, and the MTD. Determining the information system resource RTO is important for selecting appropriate technologies that are best suited for meeting the MTD. When it is not feasible to immediately meet the RTO and the MTD is inflexible, a Plan of Action and Milestone should be initiated to document the situation and plan for its mitigation.

Recovery Point Objective (RPO). The RPO represents the point in time, prior to a disruption or system outage, to which mission/business process data can be recovered (given the most recent backup copy of the data) after an outage. Unlike RTO, RPO is not considered as part of MTD. Rather, it is a factor of how much data loss the mission/business process can tolerate during the recovery process. Because the RTO must ensure that the MTD is not exceeded, the RTO must normally be shorter than the MTD. For example, a system outage may prevent a particular process from being completed, and because it takes time to reprocess the data, that additional processing time must be added to the RTO to stay within the time limit established by the MTD.

References used for this question:

8

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Page 276.

and

[http://csrc.nist.gov/publications/nistpubs/800-34-rev1/sp800-34-rev1\\_errata-Nov11-2010.pdf](http://csrc.nist.gov/publications/nistpubs/800-34-rev1/sp800-34-rev1_errata-Nov11-2010.pdf)

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### QUESTION 1145

Out of the steps listed below, which one is not one of the steps conducted during the Business Impact Analysis (BIA)?

- A. Alternate site selection
- B. Create data-gathering techniques
- C. Identify the company's critical business functions
- D. Select individuals to interview for data gathering

Answer: A

Explanation: Selecting an Alternate Site would not be done within the initial BI

A. It would be

done at a later stage of the BCP and DRP recovery effort. All of the other choices were steps that would be conducted during the BI

A. See below the list of steps that would be done during the BIA.

A BIA (business impact analysis) is considered a functional analysis, in which a team collects data through interviews and documentary sources; documents business functions, activities, and transactions; develops a hierarchy of business functions; and finally applies a classification scheme to indicate each individual function's criticality level.

BIA Steps

1. Select individuals to interview for data gathering.

- 
2. Create data-gathering techniques (surveys, questionnaires, qualitative and quantitative approaches).
  3. Identify the company's critical business functions.
  4. Identify the resources these functions depend upon.
  5. Calculate how long these functions can survive without these resources.
  6. Identify vulnerabilities and threats to these functions.
  7. Calculate the risk for each different business function.
  8. Document findings and report them to management.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 905-909). McGraw-Hill. Kindle Edition.

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### QUESTION 1146

Which one of the following is NOT one of the outcomes of a vulnerability assessment?

- A. Quantitative loss assessment
- B. Qualitative loss assessment
- C. Formal approval of BCP scope and initiation document
- D. Defining critical support areas

Answer: C

Explanation: When seeking to determine the security position of an organization, the security professional will eventually turn to a vulnerability assessment to help identify specific areas of weakness that need to be addressed. A vulnerability assessment is the use of various tools and analysis methodologies to determine where a particular system or process may be susceptible to attack or misuse. Most vulnerability assessments concentrate on technical vulnerabilities in systems or applications, but the assessment process is equally as effective when examining physical or administrative business processes.

The vulnerability assessment is often part of a BI

A. It is similar to a Risk Assessment in that there

is a quantitative (financial) section and a qualitative (operational) section. It differs in that it is smaller than a full risk assessment and is focused on providing information that is used solely for the business continuity plan or disaster recovery plan.

A function of a vulnerability assessment is to conduct a loss impact analysis. Because there will be two parts to the assessment, a financial assessment and an operational assessment, it will be necessary to define loss criteria both quantitatively and qualitatively.

Quantitative loss criteria may be defined as follows:

- Incurring financial losses from loss of revenue, capital expenditure, or personal liability resolution
- The additional operational expenses incurred due to the disruptive event
- Incurring financial loss from resolution of violation of contract agreements
- Incurring financial loss from resolution of violation of regulatory or compliance requirements

Qualitative loss criteria may consist of the following:

- The loss of competitive advantage or market share
- The loss of public confidence or credibility, or incurring public embarrassment

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During the vulnerability assessment, critical support areas must be defined in order to assess the impact of a disruptive event. A critical support area is defined as a business unit or function that must be present to sustain continuity of the business processes, maintain life safety, or avoid public relations embarrassment.

Critical support areas could include the following:

- Telecommunications, data communications, or information technology areas
- Physical infrastructure or plant facilities, transportation services
- Accounting, payroll, transaction processing, customer service, purchasing

The granular elements of these critical support areas will also need to be identified. By granular elements we mean the personnel, resources, and services the critical support areas need to maintain business continuity

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 4628-4632). Auerbach Publications. Kindle Edition.

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Page 277.

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### QUESTION 1147

The scope and focus of the Business continuity plan development depends most on:

- A. Directives of Senior Management
- B. Business Impact Analysis (BIA)
- C. Scope and Plan Initiation
- D. Skills of BCP committee

Answer: B

Explanation: SearchStorage.com Definitions mentions "As part of a disaster recovery plan, BIA is likely to identify costs linked to failures, such as loss of cash flow, replacement of equipment, salaries paid to catch up with a backlog of work, loss of profits, and so on.

A BIA report quantifies the importance of business components and suggests appropriate fund allocation for measures to protect them. The possibilities of failures are likely to be assessed in terms of their impacts on safety, finances, marketing, legal compliance, and quality assurance. Where possible, impact is expressed monetarily for purposes of comparison. For example, a business may spend three times as much on marketing in the wake of a disaster to rebuild

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customer confidence."

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Page 278.

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### QUESTION 1148

Which of the following items is NOT a benefit of cold sites?

- A. No resource contention with other organisation
- B. Quick Recovery

- 
- C. A secondary location is available to reconstruct the environment
  - D. Low Cost

Answer: B

Explanation: A cold site is a permanent location that provide you with your own space that you can move into in case of a disaster or catastrophe. It is one of the cheapest solution available as a rental place but it is also the one that would take the most time to recover. A cold site usually takes one to two weeks for recovery.

Although major disruptions with long-term effects may be rare, they should be accounted for in the contingency plan. The plan should include a strategy to recover and perform system operations at an alternate facility for an extended period. In general, three types of alternate sites are available:

*ff*

Dedicated site owned or operated by the organization. Also called redundant or alternate sites; Reciprocal agreement or memorandum of agreement with an internal or external entity; and Commercially leased facility.

Regardless of the type of alternate site chosen, the facility must be able to support system operations as defined in the contingency plan. The three alternate site types commonly categorized in terms of their operational readiness are cold sites, warm sites, or hot sites. Other variations or combinations of these can be found, but generally all variations retain similar core features found in one of these three site types.

Progressing from basic to advanced, the sites are described below:

Cold Sites are typically facilities with adequate space and infrastructure (electric power, telecommunications connections, and environmental controls) to support information system recovery activities.

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*f*Warm Sites are partially equipped office spaces that contain some or all of the system hardware, software, telecommunications, and power sources.

Hot Sites are facilities appropriately sized to support system requirements and configured with the necessary system hardware, supporting infrastructure, and support personnel.

As discussed above, these three alternate site types are the most common. There are also variations, and hybrid mixtures of features from any one of the three. Each organization should evaluate its core requirements in order to establish the most effective solution.

Two examples of variations to the site types are:

*f*Mobile Sites are self-contained, transportable shells custom-fitted with specific telecommunications and system equipment necessary to meet system requirements.

*f*Mirrored Sites are fully redundant facilities with automated real-time information mirroring.

Mirrored sites are identical to the primary site in all technical respects.

There are obvious cost and ready-time differences among the options. In these examples, the mirrored site is the most expensive choice, but it ensures virtually 100 percent availability. Cold sites are the least expensive to maintain, although they may require substantial time to acquire and install necessary equipment. Partially equipped sites, such as warm sites, fall in the middle of the spectrum. In many cases, mobile sites may be delivered to the desired location within 24 hours, but the time necessary for equipment installation and setup can increase this response time. The selection of fixed-site locations should account for the time and mode of transportation necessary to move personnel and/or equipment there. In addition, the fixed site should be in a

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geographic area that is unlikely to be negatively affected by the same hazard as the organization's primary site.

The following reference(s) were used for this question:

[http://csrc.nist.gov/publications/nistpubs/800-34-rev1/sp800-34-rev1\\_errata-Nov11-2010.pdf](http://csrc.nist.gov/publications/nistpubs/800-34-rev1/sp800-34-rev1_errata-Nov11-2010.pdf)

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### QUESTION 1149

Qualitative loss resulting from the business interruption does NOT usually include:

- A. Loss of revenue
- B. Loss of competitive advantage or market share
- C. Loss of public confidence and credibility
- 3
- D. Loss of market leadership

Answer: A

Explanation: This question is testing your ability to evaluate whether items on the list are Qualitative or Quantitative. All of the items listed were Qualitative except Lost of Revenue which is Quantitative.

Those are mainly two approaches to risk analysis, see a description of each below:

A quantitative risk analysis is used to assign monetary and numeric values to all elements of the risk analysis process. Each element within the analysis (asset value, threat frequency, severity of vulnerability, impact damage, safeguard costs, safeguard effectiveness, uncertainty, and probability items) is quantified and entered into equations to determine total and residual risks. It is more of a scientific or mathematical approach to risk analysis compared to qualitative.

A qualitative risk analysis uses a "softer" approach to the data elements of a risk analysis . It does not quantify that data, which means that it does not assign numeric values to the data so that they can be used in equations.

Qualitative and quantitative impact information should be gathered and then properly analyzed and interpreted. The goal is to see exactly how a business will be affected by different threats. The effects can be economical, operational, or both. Upon completion of the data analysis, it should be reviewed with the most knowledgeable people within the company to ensure that the findings are appropriate and that it describes the real risks and impacts the organization faces. This will help flush out any additional data points not originally obtained and will give a fuller understanding of all the possible business impacts.

Loss criteria must be applied to the individual threats that were identified. The criteria may include the following:

- Loss in reputation and public confidence
- Loss of competitive advantages
- Increase in operational expenses
- Violations of contract agreements
- Violations of legal and regulatory requirements
- Delayed income costs
- Loss in revenue
- Loss in productivity

Reference used for this question:

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Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 909). McGraw-Hill.  
4  
Kindle Edition.

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**QUESTION 1150**

When you update records in multiple locations or you make a copy of the whole database at a remote location as a way to achieve the proper level of fault-tolerance and redundancy, it is known as?

- A. Shadowing
- B. Data mirroring
- C. Backup
- D. Archiving

Answer: A

Explanation: Updating records in multiple locations or copying an entire database to a remote location as a means to ensure the appropriate levels of fault-tolerance and redundancy is known as Database shadowing. Shadowing is the technique in which updates are shadowed in multiple locations. It is like copying the entire database on to a remote location.

Shadow files are an exact live copy of the original active database, allowing you to maintain live duplicates of your production database, which can be brought into production in the event of a hardware failure. They are used for security reasons: should the original database be damaged or incapacitated by hardware problems, the shadow can immediately take over as the primary database. It is therefore important that shadow files do not run on the same server or at least on the same drive as the primary database files.

The following are incorrect answers:

Data mirroring In data storage, disk mirroring is the replication of logical disk volumes onto separate physical hard disks in real time to ensure continuous availability. It is most commonly used in RAID 1. A mirrored volume is a complete logical representation of separate volume copies.

Backups In computing the phrase backup means to copy files to a second medium (a disk or tape) as a precaution in case the first medium fails. One of the cardinal rules in using computers is back up your files regularly. Backups are useful in recovering information or a system in the event of a disaster, else you may be very sorry :-)

Archiving is the storage of data that is not in continual use for historical purposes. It is the process of copying files to a long-term storage medium for backup.

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Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 27614-27626). Auerbach Publications. Kindle Edition.

[http://en.wikipedia.org/wiki/Disk\\_mirroring](http://en.wikipedia.org/wiki/Disk_mirroring)

<http://www.webopedia.com/TERM/A/archive.html>

<http://ibexpert.net/ibe/index.php?n=Doc.DatabaseShadow>

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**QUESTION 1151**

Recovery Site Strategies for the technology environment depend on how much downtime an organization can tolerate before the recovery must be completed. What would you call a strategy where the alternate site is internal, standby ready, with all the technology and equipment necessary to run the applications?

- A. External Hot site
- B. Warm Site
- C. Internal Hot Site
- D. Dual Data Center

Answer: C

**Explanation:** Internal Hot Site—This site is standby ready with all the technology and equipment necessary to run the applications positioned there. The planner will be able to effectively restart an application in a hot site recovery without having to perform any bare metal recovery of servers. If this is an internal solution, then often the organization will run non-time sensitive processes there such as development or test environments, which will be pushed aside for recovery of production when needed. When employing this strategy, it is important that the two environments be kept as close to identical as possible to avoid problems with O/S levels, hardware differences, capacity differences, etc., from preventing or delaying recovery.

**Recovery Site Strategies** Depending on how much downtime an organization has before the technology recovery must be complete, recovery strategies selected for the technology environment could be any one of the following:

**Dual Data Center**—This strategy is employed for applications, which cannot accept any downtime without negatively impacting the organization. The applications are split between two geographically dispersed data centers and either load balanced between the two centers or hot swapped between the two centers. The surviving data center must have enough head room to carry the full production load in either case.

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**External Hot Site**—This strategy has equipment on the floor waiting, but the environment must be rebuilt for the recovery. These are services contracted through a recovery service provider. Again, it is important that the two environments be kept as close to identical as possible to avoid problems with O/S levels, hardware differences, capacity differences, etc., from preventing or delaying recovery. Hot site vendors tend to have the most commonly used hardware and software products to attract the largest number of customers to utilize the site. Unique equipment or software would generally need to be provided by the organization either at time of disaster or stored there ahead of time.

**Warm Site**—A leased or rented facility that is usually partially configured with some equipment, but not the actual computers. It will generally have all the cooling, cabling, and networks in place to accommodate the recovery but the actual servers, mainframe, etc., equipment are delivered to the site at time of disaster.

**Cold Site**—A cold site is a shell or empty data center space with no technology on the floor. All technology must be purchased or acquired at the time of disaster.

Reference(s) used for this question:

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Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 21265-21291). Auerbach Publications. Kindle Edition.

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### QUESTION 1152

What is the most correct choice below when talking about the steps to resume normal operation at the primary site after the green light has been given by the salvage team?

- A. The most critical operations are moved from alternate site to primary site before others
- B. Operation may be carried by a completely different team than disaster recovery team
- C. The least critical functions should be moved back first
- D. You moves items back in the same order as the categories document in your plan or exactly in the same order as you did on your way to the alternate site

Answer: C

Explanation: It's interesting to note that the steps to resume normal processing operations will be different than the steps of the recovery plan; that is, the least critical work should be brought back first to the primary site.

The most important point above in the steps would be to move the least critical items or resources 7

back to the primary site first. This way you can ensure that the site was really well prepared and that all is working fine.

Before that first step would be done, you would get the green light from the salvage team that it is fine to move back to the primary site. The first step after getting the green light would be to move the least critical elements first.

As stated in the Shon Harris book:

The least critical functions should be moved back first, so if there are issues in network configurations or connectivity, or important steps were not carried out, the critical operations of the company are not negatively affected. Why go through the trouble of moving the most critical systems and operations to a safe and stable site, only to return it to a main site that is untested? Let the less critical departments act as the canary. If they survive, then move over the more critical components of the company.

When it is time for the company to move back into its original site or a new site, the company enters the reconstitution phase. A company is not out of an emergency state until it is back in operation at the original primary site or a new site that was constructed to replace the primary site, because the company is always vulnerable while operating in a backup facility.

Many logistical issues need to be considered as to when a company must return from the alternate site to the original site. The following lists a few of these issues:

- Ensuring the safety of employees
- Ensuring an adequate environment is provided (power, facility infrastructure, water, HVAC)
- Ensuring that the necessary equipment and supplies are present and in working order
- Ensuring proper communications and connectivity methods are working
- Properly testing the new environment

Once the coordinator, management, and salvage team sign off on the readiness of the facility, the salvage team should carry out the following steps:

- Back up data from the alternate site and restore it within the new facility.

- Carefully terminate contingency operations.
- Securely transport equipment and personnel to the new facility.

All other choices are not the correct answer.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Location 19389). McGraw-Hill. Kindle Edition.

and

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KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Page 290.

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### QUESTION 1153

Business Continuity and Disaster Recovery Planning (Primarily) addresses the:

- A. Availability of the CIA triad
- B. Confidentiality of the CIA triad
- C. Integrity of the CIA triad
- D. Availability, Confidentiality and Integrity of the CIA triad

Answer: A

Explanation: The Information Technology (IT) department plays a very important role in identifying and protecting the company's internal and external information dependencies. Also, the information technology elements of the BCP should address several vital issue, including:

- \* Ensuring that the company employs sufficient physical security mechanisms to preserve vital network and hardware components. including file and print servers.
- \* Ensuring that the organization uses sufficient logical security methodologies (authentication, authorization, etc.) for sensitive data.

Reference: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, page 279.

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### QUESTION 1154

Which of the following is used to create parity information?

- A. a hamming code
- B. a clustering code
- C. a mirroring code
- D. a striping code

Answer: A

Explanation: RAID Level 2 :- The parity information is created using a hamming code that detects errors and establishes which part of which drive is in error.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 66.

**QUESTION 1155**

Which of the following backup methods makes a complete backup of every file on the server every time it is run?

- A. full backup method.
- B. incremental backup method.
- C. differential backup method.
- D. tape backup method.

Answer: A

Explanation: The Full Backup Method makes a complete backup of every file on the server every time it is run.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 69.

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**QUESTION 1156**

Which of the following is a large hardware/software backup system that uses the RAID technology?

- A. Tape Array.
- B. Scale Array.
- C. Crimson Array
- D. Table Array.

Answer: D

Explanation: A Tape Array is a large hardware/software backup system based on the RAID technology.

There is a misconception that RAID can only be used with Disks.

All large storage vendor from HP, to EMC, to Compaq have Tape Array based on RAID technology they offer.

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This is a VERY common type of storage at an affordable price as well.

So RAID is not exclusively for DISKS. Often time this is referred to as Tape Libraries or simply RAIT.

RAIT (redundant array of independent tapes) is similar to RAID, but uses tape drives instead of disk drives. Tape storage is the lowest-cost option for very large amounts of data, but is very slow compared to disk storage. As in RAID 1 striping, in RAIT, data are striped in parallel to multiple tape drives, with or without a redundant parity drive. This provides the high capacity at low cost typical of tape storage, with higher-than-usual tape data transfer rates and optional data integrity.

References:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 70.

and

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Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 1271). McGraw-Hill. Kindle Edition.

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**QUESTION 1157**

What is the MOST critical piece to disaster recovery and continuity planning?

- A. Security policy
- B. Management support
- C. Availability of backup information processing facilities
- D. Staff training

Answer: B

Explanation: The keyword is ' MOST CRITICAL ' and the correct answer is ' Management Support ' as the management must be convinced of its necessity and that's why a business case must be made. The decision of how a company should recover from any disaster is purely a business decision and should be treated as so.

The other answers are incorrect because :

Security policy is incorrect as it is not the MOST CRITICAL piece.

Availability of backup information processing facilities is incorrect as this comes once the organization has BCP Plans in place and for a BCP Plan , management support must be there.

Staff training comes after the plans are in place with the support from management.

Reference : Shon Harris , AIO v3 , Chapter-9: Business Continuity Planning , Page : 697.

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**QUESTION 1158**

During the testing of the business continuity plan (BCP), which of the following methods of results analysis provides the BEST assurance that the plan is workable?

- A. Measurement of accuracy
- B. Elapsed time for completion of critical tasks
- C. Quantitatively measuring the results of the test
- D. Evaluation of the observed test results

Answer: C

Explanation: It is important to have ways to measure the success of the plan and tests against the stated objectives. Therefore, results must be quantitatively gauged as opposed to an evaluation based only on observation. Quantitatively measuring the results of the test involves a generic statement measuring all the activities performed during BCP, which gives the best assurance of an effective plan. Although choices A and B are also quantitative, they relate to specific areas, or an analysis of results from one viewpoint, namely the accuracy of the results and the elapsed time.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, Chapter 5: Disaster Recovery and Business Continuity (page 269).

**QUESTION 1159**

Which of the following statements regarding an off-site information processing facility is TRUE?

- A. It should have the same amount of physical access restrictions as the primary processing site.
- B. It should be located in proximity to the originating site so that it can quickly be made operational.
- C. It should be easily identified from the outside so in the event of an emergency it can be easily found.
- D. Need not have the same level of environmental monitoring as the originating site since this would be cost prohibitive.

Answer: A

Explanation: It is very important that the offsite has the same restrictions in order to avoid misuse.

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The following answers are incorrect because :

It should be located in proximity to the originating site so that it can quickly be made operational is incorrect as the offsite is also subject to the same disaster as of the primary site.

It should be easily identified from the outside so in the event of an emergency it can be easily found is also incorrect as it should not be easily identified to prevent intentional sabotage.

Need not have the same level of environmental monitoring as the originating site since this would be cost prohibitive is also incorrect as it should be like its primary site.

Reference : Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, chapter 5: Disaster Recovery and Business Continuity (page 265).

**QUESTION 1160**

Notifying the appropriate parties to take action in order to determine the extent of the severity of an incident and to remediate the incident's effects is part of:

- A. Incident Evaluation
- B. Incident Recognition
- C. Incident Protection
- D. Incident Response

Answer: D

Explanation: These are core functions of the incident response process.

"Incident Evaluation" is incorrect. Evaluation of the extent and cause of the incident is a component of the incident response process.

"Incident Recognition" is incorrect. Recognition that an incident has occurred is the precursor to the initiation of the incident response process.

"Incident Protection" is incorrect. This is an almost-right-sounding nonsense answer to distract the unwary.

References:

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CBK, pp. 698 - 703

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**QUESTION 1161**

A server farm consisting of multiple similar servers seen as a single IP address from users interacting with the group of servers is an example of which of the following?

- A. Server clustering
- B. Redundant servers
- C. Multiple servers
- D. Server fault tolerance

Answer: A

Explanation: A "server farm" consisting of many servers providing a similar service is an implementation of server clustering, where a group of independent servers are managed as a single system and provides higher availability, easier manageability and greater scalability. It is similar to redundant servers, commonly known as server fault tolerance, except that all the servers are on-line simultaneously and take part in processing requests. If any server in the cluster crashes, the load is balanced among remaining servers. It does involve multiple servers, but its particularity is that it balances a load among all servers.  
Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 67).

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**QUESTION 1162**

Which of the following is NOT a common backup method?

- A. Full backup method
- B. Daily backup method
- C. Incremental backup method
- D. Differential backup method

Answer: B

Explanation: A daily backup is not a backup method, but defines periodicity at which backups are made. There can be daily full, incremental or differential backups.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 69).

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**QUESTION 1163**

Which common backup method is the fastest on a daily basis?

- A. Full backup method

- B. Incremental backup method
- C. Fast backup method
- D. Differential backup method

Answer: B

Explanation: The incremental backup method only copies files that have been recently changed or added. Only files with their archive bit set are backed up. This method is fast and uses less tape space but has some inherent vulnerabilities, one being that all incremental backups need to be available and restored from the date of the last full backup to the desired date should a restore be needed.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 69).

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#### QUESTION 1164

Which of the following backup methods is most appropriate for off-site archiving?

- A. Incremental backup method
- B. Off-site backup method
- C. Full backup method
- D. Differential backup method

Answer: C

Explanation: The full backup makes a complete backup of every file on the system every time it is run. Since a single backup set is needed to perform a full restore, it is appropriate for off-site archiving.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten  
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Domains of Computer Security, John Wiley & Sons, 2001, Chapter 3: Telecommunications and Network Security (page 69).

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#### QUESTION 1165

Which of the following tasks is NOT usually part of a Business Impact Analysis (BIA)?

- A. Calculate the risk for each different business function.
- B. Identify the company's critical business functions.
- C. Calculate how long these functions can survive without these resources.
- D. Develop a mission statement.

Answer: D

Explanation: The Business Impact Analysis is critical for the development of a business continuity plan (BCP). It identifies risks, critical processes and resources needed in case of recovery and quantifies the impact a disaster will have upon the organization. The development of a mission

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statement is normally performed before the BIA.

A BIA (business impact analysis) is considered a functional analysis, in which a team collects data through interviews and documentary sources; documents business functions, activities, and transactions ; develops a hierarchy of business functions; and finally applies a classification scheme to indicate each individual function's criticality level.

#### BIA Steps

The more detailed and granular steps of a BIA are outlined here:

1. Select individuals to interview for data gathering.
2. Create data-gathering techniques (surveys, questionnaires, qualitative and quantitative approaches).
3. Identify the company's critical business functions.
4. Identify the resources these functions depend upon.
5. Calculate how long these functions can survive without these resources.
6. Identify vulnerabilities and threats to these functions.
7. Calculate the risk for each different business function.
8. Document findings and report them to management.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Location 21076). Auerbach Publications. Kindle Edition.

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and

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 905-910). McGraw-Hill. Kindle Edition.

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#### QUESTION 1166

Which of the following statements pertaining to RAID technologies is incorrect?

- A. RAID-5 has a higher performance in read/write speeds than the other levels.
- B. RAID-3 uses byte-level striping with dedicated parity .
- C. RAID-0 relies solely on striping.
- D. RAID-4 uses dedicated parity.

Answer: A

Explanation: RAID-0, not RAID-5, relying solely on striping, has a higher performance in read/write speeds than the other levels, but it does not provide data redundancy.

Source: SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST), NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems, December 2001 (page 45).

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#### QUESTION 1167

Which of the following is NOT a common category/classification of threat to an IT system?

- A. Human
- B. Natural
- C. Technological

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**D. Hackers**

Answer: D

Explanation: Hackers are classified as a human threat and not a classification by itself. All the other answers are incorrect. Threats result from a variety of factors, although they are classified in three types: Natural (e.g., hurricane, tornado, flood and fire), human (e.g. operator error, sabotage, malicious code) or technological (e.g. equipment failure, software error, telecommunications network outage, electric power failure).

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Reference:

SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST),  
[http://csrc.nist.gov/publications/nistpubs/800-34-rev1/sp800-34-rev1\\_errata-Nov11-2010.pdf](http://csrc.nist.gov/publications/nistpubs/800-34-rev1/sp800-34-rev1_errata-Nov11-2010.pdf), June 2002 (page 6).

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**QUESTION 1168**

Which of the following enables the person responsible for contingency planning to focus risk management efforts and resources in a prioritized manner only on the identified risks?

- A. Risk assessment
- B. Residual risks
- C. Security controls
- D. Business units

Answer: A

Explanation: The risk assessment is critical because it enables the person responsible for contingency planning to focus risk management efforts and resources in a prioritized manner only on the identified risks. The risk management process includes the risk assessment and determination of suitable technical, management, and operational security controls based on the level of threat the risk imposes. Business units should be included in this process.

Source: SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST), NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems, December 2001 (page 7).

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**QUESTION 1169**

A contingency plan should address:

- A. Potential risks.
- B. Residual risks.
- C. Identified risks.
- D. All answers are correct.

Answer: D

Explanation: Because it is rarely possible or cost effective to eliminate all risks, an attempt is

made to reduce risks to an acceptable level through the risk assessment process. This process  
8 allows, from a set of potential risks (whether likely or not), to come up with a set of identified, possible risks.

The implementation of security controls allows reducing the identified risks to a smaller set of residual risks. Because these residual risks represent the complete set of situations that could affect system performance, the scope of the contingency plan may be reduced to address only this decreased risk set.

As a result, the contingency plan can be narrowly focused, conserving resources while ensuring an effective system recovery capability.

Source: SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST), NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems, December 2001 (page 7).

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**QUESTION 1170**

Which of the following focuses on sustaining an organization's business functions during and after a disruption?

- A. Business continuity plan
- B. Business recovery plan
- C. Continuity of operations plan
- D. Disaster recovery plan

Answer: A

Explanation: A business continuity plan (BCP) focuses on sustaining an organization's business functions during and after a disruption. Information systems are considered in the BCP only in terms of their support to the larger business processes. The business recovery plan (BRP) addresses the restoration of business processes after an emergency. The BRP is similar to the BCP, but it typically lacks procedures to ensure continuity of critical processes throughout an emergency or disruption. The continuity of operations plan (COOP) focuses on restoring an organization's essential functions at an alternate site and performing those functions for up to 30 days before returning to normal operations. The disaster recovery plan (DRP) applies to major, usually catastrophic events that deny access to the normal facility for an extended period. A DRP is narrower in scope than an IT contingency plan in that it does not address minor disruptions that do not require relocation.

Source: SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST), NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems, December 2001 (page 8).

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**QUESTION 1171**

Which of the following specifically addresses cyber attacks against an organization's IT systems?

- A. Continuity of support plan
- B. Business continuity plan

- C. Incident response plan
- D. Continuity of operations plan

Answer: C

Explanation: The incident response plan focuses on information security responses to incidents affecting systems and/or networks. It establishes procedures to address cyber attacks against an organization's IT systems. These procedures are designed to enable security personnel to identify, mitigate, and recover from malicious computer incidents, such as unauthorized access to a system or data, denial of service, or unauthorized changes to system hardware or software. The continuity of support plan is the same as an IT contingency plan. It addresses IT system disruptions and establishes procedures for recovering a major application or general support system. It is not business process focused. The business continuity plan addresses business processes and provides procedures for sustaining essential business operations while recovering from a significant disruption. The continuity of operations plan addresses the subset of an organization's missions that are deemed most critical and procedures to sustain these functions at an alternate site for up to 30 days.

Source: SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST), NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems, December 2001 (page 8).

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### QUESTION 1172

Which of the following provides coordinated procedures for minimizing loss of life, injury, and property damage in response to a physical threat?

- A. Business continuity plan
  - B. Incident response plan
  - C. Disaster recovery plan
  - D. Occupant emergency plan
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Answer: D

Explanation: The Occupant Emergency Plan (OEP) provides the response procedures for occupants of a facility in the event of a situation posing a potential threat to the health and safety of personnel, the environment, or property.

Such events would include a fire, hurricane, criminal attack, or a medical emergency. OEPs are developed at the facility level, specific to the geographic location and structural design of the building.

The following are incorrect answers:

The business continuity plan addresses business processes and provides procedures for sustaining essential business operations while recovering from a significant disruption.

The incident response plan focuses on information security responses to incidents affecting systems and/or networks. It establishes procedures to address cyber attacks against an organization's IT systems.

The disaster recovery plan (DRP) applies to major, usually catastrophic events that deny access

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to the normal facility for an extended period.

Reference(s) used for this question:

SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST),  
[http://csrc.nist.gov/publications/nistpubs/800-34-rev1/sp800-34-rev1\\_errata-Nov11-2010.pdf](http://csrc.nist.gov/publications/nistpubs/800-34-rev1/sp800-34-rev1_errata-Nov11-2010.pdf)

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### QUESTION 1173

Which of the following teams should NOT be included in an organization's contingency plan?

- A. Damage assessment team
- B. Hardware salvage team
- C. Tiger team
- D. Legal affairs team

Answer: C

Explanation: According to NIST's Special publication 800-34, a capable recovery strategy will require some or all of the following functional groups: Senior management official, management team, damage assessment team, operating system administration team, systems software team, server recovery team, LAN/WAN recovery team, database recovery team, network operations recovery team, telecommunications team, hardware salvage team, alternate site recovery

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coordination team, original site restoration/salvage coordination team, test team, administrative support team, transportation and relocation team, media relations team, legal affairs team, physical/personal security team, procurements team. Ideally, these teams would be staffed with the personnel responsible for the same or similar operation under normal conditions. A tiger team, originally a U.S. military jargon term, defines a team (of sneakers) whose purpose is to penetrate security, and thus test security measures. Used today for teams performing ethical hacking.

Source: SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST), NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems, December 2001 (page 23).

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### QUESTION 1174

Which of the following statements pertaining to the maintenance of an IT contingency plan is incorrect?

- A. The plan should be reviewed at least once a year for accuracy and completeness.
- B. The Contingency Planning Coordinator should make sure that every employee gets an up-to-date copy of the plan.
- C. Strict version control should be maintained.
- D. Copies of the plan should be provided to recovery personnel for storage offline at home and office.

Answer: B

Explanation: Because the contingency plan contains potentially sensitive operational and personnel information, its distribution should be marked accordingly and controlled. Not all

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employees would obtain a copy, but only those involved in the execution of the plan.  
All other statements are correct.

**NOTE FROM CLEMENT:**

I have received multiple emails stating the explanations contradict the correct answer. It seems many people have a hard time with negative question. In this case the Incorrect choice (the one that is not true) is the correct choice. Be very carefull of such questions, you will get some on the real exam as well.

Reference(s) used for this question:

SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST), NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems

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**QUESTION 1175**

Which of the following is less likely to accompany a contingency plan, either within the plan itself or in the form of an appendix?

- A. Contact information for all personnel.
- B. Vendor contact information, including offsite storage and alternate site.
- C. Equipment and system requirements lists of the hardware, software, firmware and other resources required to support system operations.
- D. The Business Impact Analysis.

Answer: A

Explanation: Why is this the correct answer? Simply because it is WRONG, you would have contact information for your emergency personnel within the plan but NOT for ALL of your personnel. Be careful of words such as ALL.

According to NIST's Special publication 800-34, contingency plan appendices provide key details not contained in the main body of the plan. The appendices should reflect the specific technical, operational, and management contingency requirements of the given system. Contact information for recovery team personnel (not all personnel) and for vendor should be included, as well as detailed system requirements to allow for supporting of system operations. The Business Impact Analysis (BIA) should also be included as an appendix for reference should the plan be activated.

Reference(s) used for this question:

SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST), NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems

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**QUESTION 1176**

Which of the following server contingency solutions offers the highest availability?

- A. System backups
- B. Electronic vaulting/remote journaling
- C. Redundant arrays of independent disks (RAID)
- D. Load balancing/disk replication

Answer: D

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Explanation: Of the offered technologies, load balancing/disk replication offers the highest availability, measured in terms of minutes of lost data or server downtime.

A Network-Attached Storage (NAS) or a Storage Area Network (SAN) solution combined with virtualization would offer an even higher availability.

Source: SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST), NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems, December 2001 (page 49).

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### QUESTION 1177

What assesses potential loss that could be caused by a disaster?

- A. The Business Assessment (BA)
- B. The Business Impact Analysis (BIA)
- C. The Risk Assessment (RA)
- D. The Business Continuity Plan (BCP)

Answer: B

Explanation: The Business Assessment is divided into two components. Risk Assessment (RA) and Business Impact Analysis (BIA). Risk Assessment is designed to evaluate existing exposures from the organization's environment, whereas the BIA assesses potential loss that could be caused by a disaster. The Business Continuity Plan's goal is to reduce the risk of financial loss by improving the ability to recover and restore operations efficiently and effectively.

Source: BARNES, James C. & ROTHSTEIN, Philip J., A Guide to Business Continuity Planning, John Wiley & Sons, 2001 (page 57).

And: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 8: Business Continuity Planning and Disaster Recovery Planning (page 276).

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### QUESTION 1178

Which of the following item would best help an organization to gain a common understanding of functions that are critical to its survival?

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- A. A risk assessment
- B. A business assessment
- C. A disaster recovery plan
- D. A business impact analysis

Answer: D

Explanation: A Business Impact Analysis (BIA) is an assessment of an organization's business functions to develop an understanding of their criticality, recovery time objectives, and resources needed.

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By going through a Business Impact Analysis, the organization will gain a common understanding of functions that are critical to its survival.

A risk assessment is an evaluation of the exposures present in an organization's external and internal environments.

A Business Assessment generally include Business Analysis as a discipline and it has heavy overlap with requirements analysis sometimes also called requirements engineering, but focuses on identifying the changes to an organization that are required for it to achieve strategic goals. These changes include changes to strategies, structures, policies, processes, and information systems.

A disaster recovery plan is the comprehensive statement of consistent actions to be taken before, during and after a disruptive event that causes a significant loss of information systems resources.

Source: BARNES, James C. & ROTHSTEIN, Philip J., A Guide to Business Continuity Planning, John Wiley & Sons, 2001 (page 57).

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### QUESTION 1179

What can be defined as the maximum acceptable length of time that elapses before the unavailability of the system severely affects the organization?

- A. Recovery Point Objectives (RPO)
- B. Recovery Time Objectives (RTO)
- C. Recovery Time Period (RTP)
- D. Critical Recovery Time (CRT)

Answer: B

Explanation: One of the results of a Business Impact Analysis is a determination of each business function's Recovery Time Objectives (RTO). The RTO is the amount of time allowed for 5

the recovery of a business function. If the RTO is exceeded, then severe damage to the organization would result.

The Recovery Point Objectives (RPO) is the point in time in which data must be restored in order to resume processing.

Reference(s) used for this question:

BARNES, James C. & ROTHSTEIN, Philip J., A Guide to Business Continuity Planning, John Wiley & Sons, 2001 (page 68).

and

And: SWANSON, Marianne, & al., National Institute of Standards and Technology (NIST), NIST Special Publication 800-34, Contingency Planning Guide for Information Technology Systems, December 2001 (page 47).

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### QUESTION 1180

Which of the following steps should be one of the first step performed in a Business Impact Analysis (BIA)?

- A. Identify all CRITICAL business units within the organization.
- B. Evaluate the impact of disruptive events.

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- C. Estimate the Recovery Time Objectives (RTO).
  - D. Identify and Prioritize Critical Organization Functions

Answer: D

Explanation: This is the first step in building the Business Continuity program is project initiation and management. During this phase, the following activities will occur:

Obtain senior management support to go forward with the project

Define a project scope, the objectives to be achieved, and the planning assumptions

Estimate the project resources needed to be successful, both human resources and financial resources

Define a timeline and major deliverables of the project In this phase, the program will be managed like a project, and a project manager should be assigned to the BC and DR domain.

The next step in the planning process is to have the planning team perform a BI

A. The BIA will

help the company decide what needs to be recovered, and how quickly. Mission functions are typically designated with terms such as critical, essential, supporting and nonessential to help determine the appropriate prioritization.

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One of the first steps of a BIA is to Identify and Prioritize Critical Organization Functions. All organizational functions and the technology that supports them need to be classified based on their recovery priority. Recovery time frames for organization operations are driven by the consequences of not performing the function. The consequences may be the result of organization lost during the down period; contractual commitments not met resulting in fines or lawsuits, lost goodwill with customers.

All other answers are incorrect.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 21073-21075). Auerbach Publications. Kindle Edition.

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 20697-20710). Auerbach Publications. Kindle Edition.

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## QUESTION 1181

A business continuity plan should list and prioritize the services that need to be brought back after a disaster strikes. Which of the following services is more likely to be of primary concern in the context of what your Disaster Recovery Plan would include?

- A. Marketing/Public relations
- B. Data/Telecomm/IS facilities
- C. IS Operations
- D. Facilities security

Answer: B

Explanation: The main concern when recovering after a disaster is data, telecomm and IS facilities. Other services, in descending priority order are: IS operations, IS support services,

market structure, marketing/public relations, customer service & systems support, market regulation/surveillance, listing, application development, accounting services, facilities, human resources, facilities security, legal and Office of the Secretary, national sales.

Source: BARNES, James C. & ROTHSTEIN, Philip J., A Guide to Business Continuity Planning, John Wiley & Sons, 2001 (page 129).

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### QUESTION 1182

During the salvage of the Local Area Network and Servers, which of the following steps would normally be performed first?

- A. Damage mitigation
- B. Install LAN communications network and servers
- C. Assess damage to LAN and servers
- D. Recover equipment

Answer: C

Explanation: The first activity in every recovery plan is damage assessment, immediately followed by damage mitigation.

This first activity would typically include assessing the damage to all network and server components (including cables, boards, file servers, workstations, printers, network equipment), making a list of all items to be repaired or replaced, selecting appropriate vendors and relaying findings to Emergency Management Team.

Following damage mitigation, equipment can be recovered and LAN communications network and servers can be reinstalled.

Source: BARNES, James C. & ROTHSTEIN, Philip J., A Guide to Business Continuity Planning, John Wiley & Sons, 2001 (page 135).

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### QUESTION 1183

Which of the following rules pertaining to a Business Continuity Plan/Disaster Recovery Plan is incorrect?

- A. In order to facilitate recovery, a single plan should cover all locations.
- B. There should be requirements to form a committee to decide a course of action. These decisions should be made ahead of time and incorporated into the plan.
- C. In its procedures and tasks, the plan should refer to functions, not specific individuals.
- D. Critical vendors should be contacted ahead of time to validate equipment can be obtained in a timely manner.

Answer: A

Explanation: The first documentation rule when it comes to a BCP/DRP is "one plan, one building". Much of the plan revolves around reconstructing a facility and replenishing it with production contents. If more than one facility is involved, then the reader of the plan will find it

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difficult to identify quantities and specifications of replacement resource items. It is possible to have multiple plans for a single building, but those plans must be linked so that the identification and ordering of resource items is centralized. All other statements are correct.

Source: BARNES, James C. & ROTHSTEIN, Philip J., A Guide to Business Continuity Planning, John Wiley & Sons, 2001 (page 162).

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### QUESTION 1184

A Business Continuity Plan should be tested:

- A. Once a month.
- B. At least twice a year.
- C. At least once a year.
- D. At least once every two years.

Answer: C

Explanation: It is recommended that testing does not exceed established frequency limits. For a plan to be effective, all components of the BCP should be tested at least once a year. Also, if there is a major change in the operations of the organization, the plan should be revised and tested not more than three months after the change becomes operational.

Source: BARNES, James C. & ROTHSTEIN, Philip J., A Guide to Business Continuity Planning, John Wiley & Sons, 2001 (page 165).

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### QUESTION 1185

Which of the following statements pertaining to a Criticality Survey is incorrect?

- A. It is implemented to gather input from all personnel that is going to be part of the recovery teams.
- B. The purpose of the survey must be clearly stated.
- C. Management's approval should be obtained before distributing the survey.
- D. Its intent is to find out what services and systems are critical to keeping the organization in business.

Answer: A

Explanation: The Criticality Survey is implemented through a standard questionnaire to gather input from the most knowledgeable people. Not all personnel that is going to be part of recovery

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teams is necessarily able to help in identifying critical functions of the organization.

The intent of such a survey is to identify the services and systems that are critical to the organization.

Having a clearly stated purpose for the survey helps in avoiding misinterpretations.

Management's approval of the survey should be obtained before distributing it.

Source: HARE, Chris, CISSP Study Guide: Business Continuity Planning Domain,

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**QUESTION 1186**

Which disaster recovery plan test involves functional representatives meeting to review the plan in detail?

- A. Simulation test
- B. Checklist test
- C. Parallel test
- D. Structured walk-through test

Answer: D

Explanation: The structured walk-through test occurs when the functional representatives meet to review the plan in detail. This involves a thorough look at each of the plan steps, and the procedures that are invoked at that point in the plan. This ensures that the actual planned activities are accurately described in the plan. The checklist test is a method of testing the plan by distributing copies to each of the functional areas. The simulation test plays out different scenarios. The parallel test is essentially an operational test that is performed without interrupting current processing.

Source: HARE, Chris, CISSP Study Guide: Business Continuity Planning Domain,

**QUESTION 1187**

System reliability is increased by:

- A. A lower MTBF and a lower MTTR.
- B. A higher MTBF and a lower MTTR.
- C. A lower MTBF and a higher MTTR.
- D. A higher MTBF and a higher MTTR.

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Answer: B

Explanation: In general, reliability (systemic def.) is the ability of a person or system to perform and maintain its functions in routine circumstances, as well as hostile or unexpected circumstances.

Mean-time-between failure (MTBF) is the average length of time the hardware is functional without failure.

Mean-time-to-repair is the amount of time it takes to repair and resume normal operation after a failure has occurred.

Having a higher MTBF and a lower MTTR will increase the reliability of a piece of equipment, thus the system's overall reliability.

Source: VALLABHANENI, S. Rao, CISSP Examination Textbooks, Volume 2: Practice, SRV Professional Publications, 2002, Chapter 8, Business Continuity Planning & Disaster Recovery Planning (page 496).

also see:

<http://en.wikipedia.org/wiki/Reliability>

**QUESTION 1188**

The first step in the implementation of the contingency plan is to perform:

- A. A firmware backup
- B. A data backup
- C. An operating systems software backup
- D. An application software backup

Answer: B

Explanation: A data backup is the first step in contingency planning.

Without data, there is nothing to process. "No backup, no recovery".

Backup for hardware should be taken care of next.

Formal arrangements must be made for alternate processing capability in case the need should arise.

Operating systems and application software should be taken care of afterwards.

Source: VALLABHANENI, S. Rao, CISSP Examination Textbooks, Volume 2: Practice, SRV Professional Publications, 2002, Chapter 8, Business Continuity Planning & Disaster Recovery Planning (page 506).

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**QUESTION 1189**

The MOST common threat that impacts a business's ability to function normally is:

- A. Power Outage
- B. Water Damage
- C. Severe Weather
- D. Labor Strike

Answer: A

Explanation: The MOST common threat that impacts a business's ability to function normally is power. Power interruption cause more business interruption than any other type of event.

The second most common threat is Water such as flood, water damage from broken pipe, leaky roof, etc...

Threats will be discovered while doing your Threats and Risk Assessments (TRA).

There are three elements of risks: threats, assets, and mitigating factors (countermeasures, safeguards, controls).

A threat is an event or situation that if it occurred would affect your business and may even prevent it from functioning normally or in some case functioning at all. Evaluation of threats is done by looking at Likelihood and Impact of possible threat. Safeguards, countermeasures, and controls would be used to bring the threat level down to an acceptable level.

Other common events that can impact a company are:

Weather, cable cuts, fires, labor disputes, transportation mishaps, hardware failure, chemical spills, sabotage.

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**References:**

The Official ISC2 Guide to the CISSP CBK, Second Edition, Page 275-276

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**QUESTION 1190**

Failure of a contingency plan is usually:

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- A. A technical failure.
- B. A management failure.
- C. Because of a lack of awareness.
- D. Because of a lack of training.

Answer: B

Explanation: Failure of a contingency plan is usually management failure to exhibit ongoing interest and concern about the BCP/DRP effort, and to provide financial and other resources as needed. Lack of management support will result in a lack of awareness and training.

Source: ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 9: Business Continuity Planning (BCP) and Disaster Recovery Planning (DRP) (page 163).

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**QUESTION 1191**

Which of the following questions is less likely to help in assessing an organization's contingency planning controls?

- A. Is damaged media stored and/or destroyed?
- B. Are the backup storage site and alternate site geographically far enough from the primary site?
- C. Is there an up-to-date copy of the plan stored securely off-site?
- D. Is the location of stored backups identified?

Answer: A

Explanation: It also addresses how to keep an organization's critical functions operating in the event of disruptions, large and small.

Handling of damaged media is an operational task related to regular production and is not specific to contingency planning.

Source: SWANSON, Marianne, NIST Special Publication 800-26, Security Self-Assessment Guide for Information Technology Systems, November 2001 (Pages A-27 to A-28).

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**QUESTION 1192**

A business continuity plan is an example of which of the following?

- A. Corrective control
- B. Detective control
- 3
- C. Preventive control
- D. Compensating control

Answer: A

Explanation: Business Continuity Plans are designed to minimize the damage done by the event, and facilitate rapid restoration of the organization to its full operational capacity. They are for use "after the fact", thus are examples of corrective controls.

Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 8: Business Continuity Planning and Disaster Recovery Planning (page 273).

and

Conrad, Eric; Misenar, Seth; Feldman, Joshua (2012-09-01). CISSP Study Guide (Kindle Location 8069). Elsevier Science (reference). Kindle Edition.

and

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### QUESTION 1193

When preparing a business continuity plan, who of the following is responsible for identifying and prioritizing time-critical systems?

- A. Executive management staff
- B. Senior business unit management
- C. BCP committee
- D. Functional business units

Answer: B

Explanation: Many elements of a BCP will address senior management, such as the statement of importance and priorities, the statement of organizational responsibility, and the statement of urgency and timing. Executive management staff initiates the project, gives final approval and gives ongoing support. The BCP committee directs the planning, implementation, and tests processes whereas functional business units participate in implementation and testing.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 8: Business Continuity Planning and Disaster Recovery Planning (page 275).

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### QUESTION 1194

Which of the following statements pertaining to disaster recovery planning is incorrect?

- A. Every organization must have a disaster recovery plan
- B. A disaster recovery plan contains actions to be taken before, during and after a disruptive event.
- C. The major goal of disaster recovery planning is to provide an organized way to make decisions if a disruptive event occurs.
- D. A disaster recovery plan should cover return from alternate facilities to primary facilities.

Answer: A

Explanation: It is possible that an organization may not need a disaster recovery plan. An organization may not have any critical processing areas or system and they would be able to withstand lengthy interruptions.

Remember that DRP is related to systems needed to support your most critical business functions. The DRP plan covers actions to be taken when a disaster occurs but DRP PLANNING which is the keyword in the question would also include steps that happen before you use the plan such as development of the plan, training, drills, logistics, and a lot more.

To be effective, the plan would certainly cover before, during, and after the disaster actions. It may take you a couple years to develop a plan for a medium size company, there is a lot that has to happen before the plan would be actually used in a real disaster scenario. Plan for the worst and hope for the best.

All other statements are true.

#### NOTE FROM CLEMENT:

Below is a great article on who legally needs a plan which is very much in line with this question. Does EVERY company need a plan? The legal answer is NO. Some companies, industries, will be required according to laws or regulations to have a plan. A blank statement saying: All companies MUST have a plan would not be accurate. The article below is specific to the USA but similar laws will exist in many other countries.

Some companies such as utilities, power, etc... might also need a plan if they have been defined as Critical Infrastructure by the government. The legal side of IT is always very complex and varies in different countries. Always talk to your lawyer to ensure you follow the law of the land :-)

Read the details below:

So Who, Legally, MUST Plan?

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With the caveats above, let's cover a few of the common laws where there is a duty to have a disaster recovery plan. I will try to include the basis for that requirement, where there is an implied mandate to do so, and what the difference is between the two

#### Banks and Financial Institutions MUST Have a Plan

The Federal Financial Institutions Examination Council (Council) was established on March 10, 1979, pursuant to Title X of the Financial Institutions Regulatory and Interest Rate Control Act of 1978 (FIRRA), Public Law 95-630. In 1989, Title XI of the Financial Institutions Reform, Recovery and Enforcement Act of 1989 (FIRREA) established the Examination Council (the Council).

The Council is a formal interagency body empowered to prescribe uniform principles, standards, and report forms for the federal examination of financial institutions by the Board of Governors of the Federal Reserve System (FRB), the Federal Deposit Insurance Corporation (FDIC), the National Credit Union Administration (NCUA), the Office of the Comptroller of the Currency (OCC), and the Office of Thrift Supervision (OTS); and to make recommendations to promote uniformity in the supervision of financial institutions. In other words, every bank, savings and loan, credit union, and other financial institution is governed by the principles adopted by the Council.

In March of 2003, the Council released its Business Continuity Planning handbook designed to provide guidance and examination procedures for examiners in evaluating financial institution and service provider risk-management processes.

#### Stockbrokers MUST Have a Plan

The National Association of Securities Dealers (NASD) has adopted rules that require all its

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members to have business continuity plans. The NASD oversees the activities of more than 5,100 brokerage firms, approximately 130,800 branch offices and more than 658,770 registered securities representatives.

As of June 14, 2004, the rules apply to all NASD member firms. The requirements, which are specified in Rule 3510, begin with the following:

3510. Business Continuity Plans. (a) Each member must create and maintain a written business continuity plan identifying procedures relating to an emergency or significant business disruption. Such procedures must be reasonably designed to enable the member to meet its existing obligations to customers. In addition, such procedures must address the member's existing relationships with other broker-dealers and counter-parties. The business continuity plan must be made available promptly upon request to NASD staff.

**NOTE**

The rules apply to every company that deals in securities, such as brokers, dealers, and their

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representatives, it does NOT apply to the listed companies themselves.

**Electric Utilities WILL Need a Plan**

The disaster recovery function relating to the electric utility grid is presently undergoing a change. Prior to 2005, the Federal Energy Regulatory Commission (FERC) could only coordinate volunteer efforts between utilities. This has changed with the adoption of Title XII of the Energy Policy Act of 2005 (16 U.S.C. 824o). That new law authorizes the FERC to create an Electric Reliability Organization (ERO).

The ERO will have the capability to adopt and enforce reliability standards for "all users, owners, and operators of the bulk power system" in the United States. At this time, FERC is in the process of finalizing the rules for the creation of the ERO. Once the ERO is created, it will begin the process of establishing reliability standards.

It is very safe to assume that the ERO will adopt standards for service restoration and disaster recovery, particularly after such widespread disasters as Hurricane Katrina.

**Telecommunications Utilities SHOULD Have Plans, but MIGHT NOT**

Telecommunications utilities are governed on the federal level by the Federal Communications Commission (FCC) for interstate services and by state Public Utility Commissions (PUCs) for services within the state.

The FCC has created the Network Reliability and Interoperability Council (NRIC). The role of the NRIC is to develop recommendations for the FCC and the telecommunications industry to "insure [sic] optimal reliability, security, interoperability and interconnectivity of, and accessibility to, public communications networks and the internet." The NRIC members are senior representatives of providers and users of telecommunications services and products, including telecommunications carriers, the satellite, cable television, wireless and computer industries, trade associations, labor and consumer representatives, manufacturers, research organizations, and government-related organizations.

There is no explicit provision that we could find that says telecommunications carriers must have a Disaster Recovery Plan. As I have stated frequently in this series of articles on disaster recovery, however, telecommunications facilities are tempting targets for terrorism. I have not changed my mind in that regard and urge caution.

You might also want to consider what the liability of a telephone company is if it does have a disaster that causes loss to your organization. In three words: It's not much. The following is the statement used in most telephone company tariffs with regard to its liability:

The Telephone Company's liability, if any, for its gross negligence or willful misconduct is not

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limited by this tariff. With respect to any other claim or suit, by a customer or any others, for damages arising out of mistakes, omissions, interruptions, delays or errors, or defects in transmission occurring in the course of furnishing services hereunder, the Telephone Company's liability, if any, shall not exceed an amount equivalent to the proportionate charge to the customer for the period of service during which such mistake, omission, interruption, delay, error or defect in transmission or service occurs and continues. (Source, General Exchange Tariff for major carrier)

#### All Health Care Providers WILL Need a Disaster Recovery Plan

HIPAA is an acronym for the Health Insurance Portability and Accountability Act of 1996, Public Law 104-191, which amended the Internal Revenue Service Code of 1986. Also known as the Kennedy-Kassebaum Act, the Act includes a section, Title II, entitled Administrative Simplification, requiring "Improved efficiency in healthcare delivery by standardizing electronic data interchange, and protection of confidentiality and security of health data through setting and enforcing standards."

The legislation called upon the Department of Health and Human Services (HHS) to publish new rules that will ensure security standards protecting the confidentiality and integrity of "individually identifiable health information," past, present, or future.

The final Security Rule was published by HHS on February 20, 2003 and provides for a uniform level of protection of all health information that is housed or transmitted electronically and that pertains to an individual.

The Security Rule requires covered entities to ensure the confidentiality, integrity, and availability of all electronic protected health information (ePHI) that the covered entity creates, receives, maintains, or transmits. It also requires entities to protect against any reasonably anticipated threats or hazards to the security or integrity of ePHI, protect against any reasonably anticipated uses or disclosures of such information that are not permitted or required by the Privacy Rule, and ensure compliance by their workforce.

Required safeguards include application of appropriate policies and procedures, safeguarding physical access to ePHI, and ensuring that technical security measures are in place to protect networks, computers and other electronic devices.

#### Companies with More than 10 Employees

The United States Department of Labor has adopted numerous rules and regulations in regard to workplace safety as part of the Occupational Safety and Health Act. For example, 29 USC 654 specifically requires:

(a) Each employer:

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(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

Other Considerations or Expensive Research Topics for Lawyers (Sorry, Eddie!)

The Foreign Corrupt Practices Act of 1977

Internal Revenue Service (IRS) Law for Protecting Taxpayer Information

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Food and Drug Administration (FDA) Mandated Requirements  
Homeland Security and Terrorist Prevention  
Pandemic (Bird Flu) Prevention  
ISO 9000 Certification  
Requirements for Radio and TV Broadcasters  
Contract Obligations to Customers  
Document Protection and Retention Laws  
Personal Identity Theft...and MORE!

Suffice it to say you will need to check with your legal department for specific requirements in your business and industry!

I would like to thank my good friend, Eddie M. Pope, for his insightful contributions to this article, our upcoming book, and my ever-growing pool of lawyer jokes. If you want more information on the legal aspects of recovery planning, Eddie can be contacted at my company or via email at <mailto:mempope@tellawcomlabs.com>. (Eddie cannot, of course, give you legal advice, but he can point you in the right direction.)

I hope this article helps you better understand the complex realities of the legal reasons why we plan and wish you the best of luck

See original article at: <http://www.informit.com/articles/article.aspx?p=777896>

See another interesting article on the subject at:

<http://www.informit.com/articles/article.aspx?p=677910&seqNum=1>

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References used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 8: Business Continuity Planning and Disaster Recovery Planning (page 281).

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### QUESTION 1195

Which of the following statements do not apply to a hot site?

- A. It is expensive.
- B. There are cases of common overselling of processing capabilities by the service provider.
- C. It provides a false sense of security.
- D. It is accessible on a first come first serve basis. In case of large disaster it might not be accessible.

Answer: C

Explanation: Remember this is a NOT question. Hot sites do not provide a false sense of security since they are the best disaster recovery alternate for backup site that you rent.

A Cold, Warm, and Hot site is always a rental place in the context of the CBK. This is definivily the best choices out of the rental options that exists. It is fully configured and can be activated in a very short period of time.

Cold and Warm sites, not hot sites, provide a false sense of security because you can never fully test your plan.

In reality, using a cold site will most likely make effective recovery impossible or could lead to business closure if it takes more than two weeks for recovery.

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Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 8: Business Continuity Planning and Disaster Recovery Planning (page 284).

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### QUESTION 1196

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What can be defined as a batch process dumping backup data through communications lines to a server at an alternate location?

- A. Remote journaling
- B. Electronic vaulting
- C. Data clustering
- D. Database shadowing

Answer: B

Explanation: Electronic vaulting refers to the transfer of backup data to an off-site location. This is primarily a batch process of dumping backup data through communications lines to a server at an alternate location.

Electronic vaulting is accomplished by backing up system data over a network. The backup location is usually at a separate geographical location known as the vault site. Vaulting can be used as a mirror or a backup mechanism using the standard incremental or differential backup cycle. Changes to the host system are sent to the vault server in real-time when the backup method is implemented as a mirror. If vaulting updates are recorded in real-time, then it will be necessary to perform regular backups at the off-site location to provide recovery services due to inadvertent or malicious alterations to user or system data.

The following are incorrect answers:

Remote journaling refers to the parallel processing of transactions to an alternate site (as opposed to a batch dump process). Journaling is a technique used by database management systems to provide redundancy for their transactions. When a transaction is completed, the database management system duplicates the journal entry at a remote location. The journal provides sufficient detail for the transaction to be replayed on the remote system. This provides for database recovery in the event that the database becomes corrupted or unavailable.

Database shadowing uses the live processing of remote journaling, but creates even more redundancy by duplicating the database sets to multiple servers. There are also additional redundancy options available within application and database software platforms. For example, database shadowing may be used where a database management system updates records in multiple locations. This technique updates an entire copy of the database at a remote location.

Data clustering refers to the classification of data into groups (clusters). Clustering may also be used, although it should not be confused with redundancy. In clustering, two or more “partners” are joined into the cluster and may all provide service at the same time. For example, in an active-active pair, both systems may provide services at any time. In the case of a failure, the remaining partners may continue to provide service but at a decreased capacity.

The following resource(s) were used for this question:

1

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition

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((ISC)2 Press) (Kindle Locations 20403-20407 and 20411-20414 and 20375-20377 and 20280-20283). Auerbach Publications. Kindle Edition.

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**QUESTION 1197**

Which of the following is the most complete disaster recovery plan test type, to be performed after successfully completing the Parallel test?

- A. Full Interruption test
- B. Checklist test
- C. Simulation test
- D. Structured walk-through test

Answer: A

Explanation: The difference between this and the full-interruption test is that the primary production processing of the business does not stop; the test processing runs in parallel to the real processing. This is the most common type of disaster recovery plan testing.

A checklist test is only considered a preliminary step to a real test.

In a structured walk-through test, business unit management representatives meet to walk through the plan, ensuring it accurately reflects the organization's ability to recover successfully, at least on paper.

A simulation test is aimed at testing the ability of the personnel to respond to a simulated disaster, but not recovery process is actually performed.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 8: Business Continuity Planning and Disaster Recovery Planning (page 289).

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**QUESTION 1198**

Which of the following statements pertaining to disaster recovery is incorrect?

- A. A recovery team's primary task is to get the pre-defined critical business functions at the alternate backup processing site.  
2
- B. A salvage team's task is to ensure that the primary site returns to normal processing conditions.
- C. The disaster recovery plan should include how the company will return from the alternate site to the primary site.
- D. When returning to the primary site, the most critical applications should be brought back first.

Answer: D

Explanation: It's interesting to note that the steps to resume normal processing operations will be different than the steps in the recovery plan; that is, the least critical work should be brought back first to the primary site.

My explanation:

at the point where the primary site is ready to receive operations again, less critical systems should be brought back first because one has to make sure that everything will be running

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smoothly at the primary site before returning critical systems, which are already operating normally at the recovery site.

This will limit the possible interruption of processing to a minimum for most critical systems, thus making it the best option.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 8: Business Continuity Planning and Disaster Recovery Planning (page 291).

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**QUESTION 1199**

For which areas of the enterprise are business continuity plans required?

- A. All areas of the enterprise.
- B. The financial and information processing areas of the enterprise.
- C. The operating areas of the enterprise.
- D. The marketing, finance, and information processing areas.

Answer: A

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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**QUESTION 1200**

Which of the following will a Business Impact Analysis NOT identify?

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- A. Areas that would suffer the greatest financial or operational loss in the event of a disaster.
- B. Systems critical to the survival of the enterprise.
- C. The names of individuals to be contacted during a disaster.
- D. The outage time that can be tolerated by the enterprise as a result of a disaster.

Answer: C

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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**QUESTION 1201**

What is a hot-site facility?

- A. A site with pre-installed computers, raised flooring, air conditioning, telecommunications and networking equipment, and UPS.
- B. A site in which space is reserved with pre-installed wiring and raised floors.
- C. A site with raised flooring, air conditioning, telecommunications, and networking equipment, and UPS.
- D. A site with ready made work space with telecommunications equipment, LANs, PCs, and terminals for work groups.

Answer: A

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Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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**QUESTION 1202**

Which of the following best describes remote journaling?

- A. Send hourly tapes containing transactions off-site.
- B. Send daily tapes containing transactions off-site.
- C. Real-time capture of transactions to multiple storage devices.
- D. Real time transmission of copies of the entries in the journal of transactions to an alternate site.

Answer: D

Explanation: Remote Journaling is a technology to facilitate sending copies of the journal of transaction entries from a production system to a secondary system in realtime. The remote nature of such a connection is predicated upon having local journaling already established. Local journaling on the production side allows each change that ensues for a journal-eligible object e.g., database physical file, SQL table, data area, data queue, byte stream file residing within the IFS)

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to be recorded and logged. It's these local images that flow to the remote system. Once there, the journal entries serve a variety of purposes, from feeding a high availability software replay program or data warehouse to offering an offline, realtime vault of the most recent database changes.

Reference(s) used for this question:

The Essential Guide to Remote Journaling by IBM  
and

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.  
and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 8: Business Continuity Planning and Disaster Recovery Planning (page 286).

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**QUESTION 1203**

All of the following can be considered essential business functions that should be identified when creating a Business Impact Analysis (BIA) except one. Which of the following would not be considered an essential element of the BIA but an important topic to include within the BCP plan:

- A. IT Network Support
- B. Accounting
- C. Public Relations
- D. Purchasing

Answer: C

Explanation: Public Relations, although important to a company, is not listed as an essential business function that should be identified and have loss criteria developed for.

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All other entries are considered essential and should be identified and have loss criteria developed.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 9: Disaster Recovery and Business continuity (page 598).

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### QUESTION 1204

Of the following, which is NOT a specific loss criteria that should be considered while developing a

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BIA?

- A. Loss of skilled workers knowledge
- B. Loss in revenue
- C. Loss in profits
- D. Loss in reputation

Answer: A

Explanation: Although a loss of skilled workers knowledge would cause the company a great loss, it is not identified as a specific loss criteria. It would fall under one of the three other criteria listed as distractors.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 9: Disaster Recovery and Business continuity (page 598).

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### QUESTION 1205

Of the reasons why a Disaster Recovery plan gets outdated, which of the following is not true?

- A. Personnel turnover
- B. Large plans can take a lot of work to maintain
- C. Continuous auditing makes a Disaster Recovery plan irrelevant
- D. Infrastructure and environment changes

Answer: C

Explanation: Although auditing is a part of corporate security, it in no way supercedes the requirements for a disaster recovery plan. All others can be blamed for a plan going out of date.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 9: Disaster Recovery and Business continuity (page 609).

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### QUESTION 1206

Which backup type run at regular intervals would take the least time to complete?

- A. Full Backup
- B. Differential Backup
- C. Incremental Backup
- D. Disk Mirroring

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Answer: C

Explanation: Incremental backups only backup changed data (changes archive bit to not backup again if not changed).

Although the incremental backup is fastest to backup, it is usually more time consuming for the restore process.

In some cases, the window available for backup may not be long enough to backup all the data on the system during each backup. In that case, differential or incremental backups may be more appropriate.

In an incremental backup, only the files that changed since the last backup will be backed up.

In a differential backup, only the files that changed since the last full backup will be backed up.

In general, differentials require more space than incremental backups while incremental backups are faster to perform. On the other hand, restoring data from incremental backups requires more time than differential backups. To restore from incremental backups, the last full backup and all of the incremental backups performed are combined. In contrast, restoring from a differential backup requires only the last full backup and the latest differential.

The following are incorrect answers:

Differential backups backup all data since the last full backup (does not reset archive bit)

Full backups backup all selected data, regardless of archive bit, and resets the archive bit.

Disk mirroring is not considered as a backup type.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 20385-20390). Auerbach Publications. Kindle Edition.  
and

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 9: Disaster Recovery and Business continuity (page 618).

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## QUESTION 1207

What is electronic vaulting?

- A. Information is backed up to tape on a hourly basis and is stored in a on-site vault.
- B. Information is backed up to tape on a daily basis and is stored in a on-site vault.
- 7
- C. Transferring electronic journals or transaction logs to an off-site storage facility
- D. A transfer of bulk information to a remote central backup facility.

Answer: D

Explanation: Electronic vaulting is defined as "a method of transferring bulk information to off-site facilities for backup purposes". Remote Journaling is the same concept as electronic vaulting, but has to do with journals and transaction logs, not the actual files.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 9: Disaster Recovery and Business continuity (page 619).

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**QUESTION 1208**

After a company is out of an emergency state, what should be moved back to the original site first?

- A. Executives
- B. Least critical components
- C. IT support staff
- D. Most critical components

Answer: B

Explanation: This will expose any weaknesses in the plan and ensure the primary site has been properly repaired before moving back. Moving critical assets first may induce a second disaster if the primary site has not been repaired properly.

The first group to go back would test items such as connectivity, HVAC, power, water, improper procedures, and/or steps that has been overlooked or not done properly. By moving these first, and fixing any problems identified, the critical operations of the company are not negatively affected.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 9: Disaster Recovery and Business continuity (page 621).

**QUESTION 1209**

How often should tests and disaster recovery drills be performed?

- A. At least once a quarter
- 8
- B. At least once every 6 months
- C. At least once a year
- D. At least once every 2 years

Answer: C

Explanation: Tests and disaster recovery drills should be performed at least once a year. The company should have no confidence in an untested plan. Since systems and processes can change, frequent testing will aid in ensuring a plan will succeed.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 9: Disaster Recovery and Business continuity (page 621).

**QUESTION 1210**

A business impact assessment is one element in business continuity planning. What are the three primary goals of a BIA?

- A. Data processing continuity planning, data recovery plan maintenance, and testing the disaster recovery plan.
- B. Scope and plan initiation, business continuity plan development, and plan approval and implementation.

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- C. Facility requirements planning, facility security management, and administrative personnel controls.
  - D. Criticality prioritization, downtime estimation, and resource requirements.

Answer: D

Explanation: Criticality prioritization, downtime estimation, and resource requirements are the three primary goals of a BI

A. Data processing continuity planning, data recovery plan maintenance, and testing the disaster recovery plan are steps in the DRP process. Scope and plan initiation, business continuity plan development, and plan approval and implementation are the other 3 elements of BCP. Facility requirements planning, facility security management, and administrative personnel controls are elements of administrative controls in Physical Security.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Gold Edition, John Wiley & Sons, 2002, Chapter 8: Business Continuity Planning and Disaster Recovery Planning (page 382-383).

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### QUESTION 1211

Business Continuity Planning (BCP) is not defined as a preparation that facilitates:  
9

- A. the rapid recovery of mission-critical business operations
- B. the continuation of critical business functions
- C. the monitoring of threat activity for adjustment of technical controls
- D. the reduction of the impact of a disaster

Answer: C

Explanation: Although important, The monitoring of threat activity for adjustment of technical controls is not facilitated by a Business Continuity Planning

The following answers are incorrect:

All of the other choices are facilitated by a BCP:

the continuation of critical business functions

the rapid recovery of mission-critical business operations

the reduction of the impact of a disaster

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### QUESTION 1212

During a test of a disaster recovery plan the IT systems are concurrently set up at the alternate site. The results are compared to the results of regular processing at the original site. What kind of testing has taken place?

- A. Simulation
- B. Parallel
- C. Checklist
- D. Full interruption

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Answer: B

Explanation: The five types of BCP testing are:

Checklist—Copies of the plan are sent to different department managers and business unit managers for review. This is a simple test and should be used in conjunction with other tests.

Structured Walk-through—Team members and other individuals responsible for recovery meet and walk through the plan step-by-step to identify errors or assumptions.

Simulation—This is a simulation of an actual emergency. Members of the response team act in the same way as if there was a real emergency.

Parallel—This is similar to simulation testing, but the primary site is uninterrupted and critical systems are run in parallel at the alternative and primary sites. The systems are then compared to ensure all systems are in sync.

Full interruption—This test involves all facets of the company in a response to an emergency. It  
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mimics a real disaster where all steps are performed to test the plan. Systems are shut down at the primary site and all individuals who would be involved in a real emergency, including internal and external organizations, participate in the test. This test is the most detailed, time-consuming, and expensive all of these.

The following answers were all incorrect:

Simulation

Checklist

Full interuption

The following reference(s) were/was used to create this question:

Chapter 9: Business Continuity and Disaster Recovery CISSP Certification All-in-One Exam Guide, 4th Edition, Shon Harris

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### QUESTION 1213

During a business impact analysis it is concluded that a system has maximum tolerable downtime of 2 hours. What would this system be classified as?

- A. Important
- B. Urgent
- C. Critical
- D. Vital

Answer: C

Explanation: Here are some examples of MTD values suggested by Shon Harris:

NonEssential 30 Days

Normal 7 Days

Important 72 Hours

Urgent 24 Hours

Critical Minutes to hours

The following answers were all incorrect:

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Important

Urgent  
Vital

The following reference(s) were/was used to create this question:

Chapter 9: Business Continuity and Disaster Recovery

CISSP Certification All-in-One Exam Guide, 4th Edition, Shon Harris

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**QUESTION 1214**

Business Impact Analysis (BIA) is about

- A. Technology
- B. Supporting the mission of the organization
- C. Due Care
- D. Risk Assessment

Answer: B

Explanation: Business impact analysis is not about technology ; it is about supporting the mission of the organization.

The following answers are incorrect:

Technology

Due Care

Risk Assessment

The following reference(s) were/was used to create this question:

Information Security Management Handbook , Sixth Edition by Tipton & Al page 321

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**QUESTION 1215**

What is the MOST important step in business continuity planning?

- A. Risk Assessment
- B. Due Care
- C. Business Impact Analysis (BIA)
- D. Due Diligence

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Answer: C

Explanation: The BIA is the first step after the initiation of the project. It is one of the most important step. This is where you identify and prioritize your information systems and components critical to supporting the organization's mission/business processes.

1. Step one is Initiation of the project where management would be involved and a business continuity policy would be put in place.

2. You then conduct the business impact analysis (BIA). The BIA helps identify and prioritize information systems and components critical to supporting the organization's mission/business processes.

3. Identify preventive controls. Measures taken to reduce the effects of system disruptions can increase system availability and reduce contingency life cycle costs.

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4. Create contingency strategies. Thorough recovery strategies ensure that the system may be recovered quickly and effectively following a disruption.
  5. Develop an information system contingency plan. The contingency plan should contain detailed guidance and procedures for restoring a damaged system unique to the system's security impact level and recovery requirements.
  6. Ensure plan testing, training, and exercises. Testing validates recovery capabilities, whereas training prepares recovery personnel for plan activation and exercising the plan identifies planning gaps; combined, the activities improve plan effectiveness and overall organization preparedness.
  6. Ensure plan maintenance. The plan should be a living document that is updated regularly to remain current with system enhancements and organizational changes.

The following answers are incorrect:

Risk assessment is the determination of quantitative or qualitative value of risk related to a concrete situation and a recognized threat (also called hazard). Quantitative risk assessment requires calculations of two components of risk (R):, the magnitude of the potential loss (L), and the probability (p) that the loss will occur. Acceptable risk is a risk that is understood and tolerated usually because the cost or difficulty of implementing an effective countermeasure for the associated vulnerability exceeds the expectation of loss.

Due Care, the conduct that a reasonable person will exercise in a particular situation, in looking out for the safety of others. If one uses due care then an injured party cannot prove negligence. This is one of those nebulous standards by which negligence is tested. Each juror has to determine what a "reasonable" person would do.

Due Diligence, Information security due diligence is often undertaken during the information technology procurement process to ensure risks are known and managed, and during mergers and acquisitions due diligence reviews to identify and assess the business risks.

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The following reference(s) were/was used to create this question:

Information Security Management Handbook Sixth Edition by Tipton et Al page 321

and

[http://en.wikipedia.org/wiki/Risk\\_assessment](http://en.wikipedia.org/wiki/Risk_assessment)

and

<http://legal-dictionary.thefreedictionary.com/due+care>

and

[http://csrc.nist.gov/publications/nistpubs/800-34-rev1/sp800-34-rev1\\_errata-Nov11-2010.pdf](http://csrc.nist.gov/publications/nistpubs/800-34-rev1/sp800-34-rev1_errata-Nov11-2010.pdf)

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## QUESTION 1216

You have been tasked with developing a Business Continuity Plan/Disaster Recovery (BCP/DR) plan. After several months of researching the various areas of the organization, you are ready to present the plan to Senior Management.

During the presentation meeting, the plan that you have dutifully created is not received positively. Senior Management is not convinced that they need to enact your plan, nor are they prepared to invest any money in the plan.

What is the BEST reason, as to why Senior Management is not willing to enact your plan?

- A. The business case was not initially made and thus did not secure their support.
- B. They were not included in any of the Risk Assessment meetings.
- C. They were not included in any of the Business Impact Assessment meetings.

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D. A Business Impact Assessment was not performed.

Answer: A

Explanation: The following answers are incorrect:

- They were not included in any of the Risk Assesment meetings.
- They were not included in any of the Business Impact Assessment meetings.
- A Business Impact Assessment was not performed.

From the official Guide:

"Before the project can even start, it must have total senior management support. Without that support, this project will fail. To convince leadership that the organization needs to build an enterprise-wide BC and DR plan, the planner must sell the importance of the program to the  
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leadership. Senior leadership in any organization has two major goals: grow the business and protect the brand. Business continuity and DR have little to do with growing the business and everything to do with protecting the brand. It is still a hard sell because unless the organization actually has a disaster; the value of the time, money and people resources to build the plan are going to be suspect because it takes away from goal number one, grow the business....

To convince leadership of the need to build a viable DR and BCP, the planner needs to help them understand the risk they are accepting by not having one and the cost to the corporation if a disaster were to occur. The risks to the corporation are found in three areas; financial (how much money the corporation stands to lose), reputational (how badly the corporation will be perceived by its customers and its shareholders), and regulatory (fines or penalties incurred, lawsuits filed against them). There is also the potential that the leaders of the organization could be held personally liable, financially and even criminally, if it is determined that they did not use due care to adequately protect the corporation."

Exam tip: Don't be suprised to see some of these 'soft' questions on the exam. It's important that you take in some of the business side of the chapters than just the technical sides.

Tip from Mike:

Way too often, senior management will come down and instruct us that they need a Distaster Recovery plan. Do not make the mistake of assuming that it means you will have their support once the plan is created. While the answer of a BIA was not performed seems right, unless the business case was made sucessfully to the point where you secured their unequivical support (preferrably in writing), your plan will not be accepted the way you would hope.

There is a structure in the way these things need to occur and a big part of it is to secure Senior Managements support. When you are initially tasked, that is the perfect time to sit down with them and ask what their anticipated goals are. It is fine to guide them to the general areas that they should be looking at, but in the end the direction MUST come from them. It is during that time period that you should inform them of the different steps that need to occur; BIA, Risk Assessment (quantitative vs qualititave).

Insist on performing a BIA, even if it is scaled down to meet their goals. If they don't understand why you would do a BIA and assesment, explain to them that you don't want to waste precious resources (time and money) on areas that don't need to protected further. That your goal is the same as theirs, "protecting the brand".

The BIA will force them to look at the potential losses from one of their main tenets "Protect the Brand". Only after they agree to the results of the BIA can you be certain that the business case

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has been made and you will most likely have their support.

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Be prepared to wear your business hat, as you will need to present hard numbers to make your case.

The following reference(s) were/was used to create this question:

Tipton, Harold F. (2010-04-20). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press), Chapter 8 Business Continuity and Disaster Recovery Planning, Pages 1092-1093

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### QUESTION 1217

How often should a Business Continuity Plan be reviewed?

- A. At least once a month
- B. At least every six months
- C. At least once a year
- D. At least Quarterly

Answer: C

Explanation: As stated in SP 800-34 Rev. 1:

To be effective, the plan must be maintained in a ready state that accurately reflects system requirements, procedures, organizational structure, and policies. During the Operation/Maintenance phase of the SDLC, information systems undergo frequent changes because of shifting business needs, technology upgrades, or new internal or external policies. As a general rule, the plan should be reviewed for accuracy and completeness at an organizationdefined frequency (at least once a year for the purpose of the exam) or whenever significant changes occur to any element of the plan. Certain elements, such as contact lists, will require more frequent reviews.

Remember, there could be two good answers as specified above. Either once a year or whenever significant changes occur to the plan. You will of course get only one of the two presented within your exam.

Reference(s) used for this question:

NIST SP 800-34 Revision 1

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### QUESTION 1218

Mark's manager has tasked him with researching an intrusion detection system for a new dispatching center. Mark identifies the top five products and compares their ratings. Which of the following is the evaluation criteria most in use today for these types of purposes?

- A. ITSEC
- B. Common Criteria
- C. Red Book
- D. Orange Book

Answer: B

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Explanation: The Common Criteria for Information Technology Security Evaluation (abbreviated as Common Criteria or CC) is an international standard (ISO/IEC 15408) for computer security certification. It is currently in version 3.1 revision 4.

Common Criteria is a framework in which computer system users can specify their security functional and assurance requirements (SFRs and SARs respectively) through the use of Protection Profiles (PPs), vendors can then implement and/or make claims about the security attributes of their products, and testing laboratories can evaluate the products to determine if they actually meet the claims. In other words, Common Criteria provides assurance that the process of specification, implementation and evaluation of a computer security product has been conducted in a rigorous and standard and repeatable manner at a level that is commensurate with the target environment for use.

Common Criteria is used as the basis for a Government driven certification scheme and typically evaluations are conducted for the use of Federal Government agencies and critical infrastructure. The following answers are incorrect:

All of the other choices were incorrect and not common scheme being used today.

CC originated out of three standards:

ITSEC – The European standard, developed in the early 1990s by France, Germany, the Netherlands and the UK. It too was a unification of earlier work, such as the two UK approaches (the CESG UK Evaluation Scheme aimed at the defence/intelligence market and the DTI Green Book aimed at commercial use), and was adopted by some other countries, e.g. Australia.

CTCPEC – The Canadian standard followed from the US DoD standard, but avoided several problems and was used jointly by evaluators from both the U.S. and Canada. The CTCPEC standard was first published in May 1993.

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TCSEC – The United States Department of Defense DoD 5200.28 Std, called the Orange Book and parts of the Rainbow Series. The Orange Book originated from Computer Security work including the Ware Report, done by the National Security Agency and the National Bureau of Standards (the NBS eventually became NIST) in the late 1970s and early 1980s. The central thesis of the Orange Book follows from the work done by Dave Bell and Len LaPadula for a set of protection mechanisms.

CC was produced by unifying these pre-existing standards, predominantly so that companies selling computer products for the government market (mainly for Defence or Intelligence use) would only need to have them evaluated against one set of standards. The CC was developed by the governments of Canada, France, Germany, the Netherlands, the UK, and the U.S.

The following reference(s) were/was used to create this question:

[http://en.wikipedia.org/wiki/Common\\_Criteria](http://en.wikipedia.org/wiki/Common_Criteria)

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## QUESTION 1219

When planning for disaster recovery it is important to know a chain of command should one or more people become missing, incapacitated or otherwise not available to lead the organization. Which of the following terms BEST describes this process?

- A. Succession Planning
- B. Continuity of Operations
- C. Business Impact Analysis
- D. Business Continuity Planning

Answer: A

Explanation: Succession Planning or "Chain of Command" in military terms is a list of people we would use in the event the leader becomes unavailable for whatever reason.

It is important to have this as part of a CONOPS - Continuity of Operations plan if the organization is going to effectively recover from a disaster, loss of key people or other impact to the business.

Knowing who is the next in charge can help an organization more quickly and recover to normalcy after the loss.

The following answers are incorrect:

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- Continuity of Operations: Sorry, this isn't correct because it is a broader process than succession planning. Continuity of operations or CONOPS is a larger project including succession planning.

- Business Impact Analysis: Again, like CONOPS, BIA is a broader project including succession planning. BIA focuses on the effects of something on business processes and helps planning around them.

- Business Continuity Planning: Like the other answers, CONOPS, BIA and BCP are broad projects aimed at sustaining a set of business processes that sustain the organization and how to prepare to recover in the event of disaster or other impacts.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Location 19464). Auerbach Publications. Kindle Edition.

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### QUESTION 1220

Of the three types of alternate sites: hot, warm or cold, which is BEST described by the following facility description?

- Configured and functional facility
- Available with a few hours
- Requires constant maintenance
- Is expensive to maintain

- A. Hot Site
- B. Warm Site
- C. Cold Site
- D. Remote Site

Answer: A

Explanation: There are three types of alternate sites which disaster recovery planners consider:

Hot, warm and cold and they offer varying degrees of preparedness prior to their use.

Hot sites are the most ready and cold sites need the most support to bring them up to speed as a site you can occupy after an emergency.

If your business earns millions a day in revenue then you would want a hot site ready to go if a

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disaster occurs. The main goal is to resume business operations as soon as possible to return to full operating capacity.

The following answers are incorrect:

- Warm Site: Close answer but it is incorrect because it can take days to configure a warm site for use but it is less expensive to maintain than a hot site.
- Cold Site: Sorry, a cold site is most often an empty building with basic facilities like A/DC, power and takes days to configure for use. They're useful if you become aware of an impending need to move operations.
- Remote Site: This isn't a common term associated with alternate site planning.

The following reference(s) was used to create this question:

2013. Official Security+ Curriculum.

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### QUESTION 1221

Which of the following plan provides procedures for sustaining essential business operations while recovering from significant disruption?

- A. Business Continuity Plan
- B. Occupant Emergency Plan
- C. Cyber Incident Response Plan
- D. Disaster Recovery Plan

Answer: A

Explanation: Business Continuity Plan (BCP) provides procedures for sustaining mission/business operations while recovering from a significant disruption.

The BCP focuses on sustaining an organization's mission/business processes during and after a disruption. An example of a mission/business process may be an organization's payroll process or customer service process. A BCP may be written for mission/business processes within a single business unit or may address the entire organization's processes. The BCP may also be scoped to address only the functions deemed to be priorities. A BCP may be used for long-term recovery in conjunction with the COOP plan, allowing for additional functions to come online as resources or time allow. Because mission/business processes use information systems (ISs), the business continuity planner must coordinate with information system owners to ensure that the BCP expectations and IS capabilities are matched.

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For your exam you should know the information below:

Plan Purpose Scope Plan Relationship

Business Continuity

Plan (BCP) Provides procedures for sustaining mission/business operations while recovering from a significant disruption. Addresses mission/business processes at a lower or expanded level from COOP

MEFs. Mission/business process focused plan that may be activated in coordination with a COOP plan to sustain non-MEFs.

Continuity of Operations Plan (COOP) Provides procedures and guidance to sustain an organization's MEFs at an alternate site for up to 30 days; mandated by federal directives

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Addresses MEFs at a facility; information systems are addressed based only on their support of the mission

essential functions. MEF focused plan that

may also activate several business unit-level BCPs, ISCPs, or DRPs, as appropriate.

Crisis

Communications Plan Provides procedures for disseminating internal and external communications;

means to provide critical status information and control rumors. Addresses communications with personnel and the public; not information system-focused. Incident-based plan often activated with a COOP or BCP, but may be used alone during a public exposure event.

Critical Infrastructure

Protection (CIP) Plan Provides policies and procedures for protection of national critical infrastructure

components, as defined in the National Infrastructure Protection Plan. Addresses critical infrastructure components

that are supported or

operated by an agency or organization. Risk management plan that supports COOP

plans for organizations with critical infrastructure and key resource assets.

Cyber Incident

Response Plan Provides procedures for mitigating and correcting a cyber attack, such as a virus, worm, or Trojan horse. Addresses mitigation and isolation of affected systems, cleanup, and minimizing loss

of information. Information system- focused plan that may activate an ISCP or DRP,

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depending on the extent of the attack.

Disaster Recovery

Plan (DRP) Provides procedures for relocating information

systems operations to an alternate location. Activated after major system disruptions with longterm effects. Information system- focused plan that

activates one or more

ISCPs for recovery of individual systems.

Information

System Contingency

Plan (ISCP) Provides procedures and capabilities for recovering an information system.

Addresses single information

system recovery at the

current or, if appropriate alternate location. Information system- focused plan that may be activated independent from other plans or as

part of a larger recovery effort coordinated with a

DRP, COOP, and/or

**BCP**

Occupant Emergency

Plan (OEP) Provides coordinated

procedures for minimizing loss of life or injury and protecting property damage in response to a physical threat. Focuses on personnel and property particular to the specific facility; not mission/business process or information system-based. Incident-based plan that is initiated immediately

after an event, preceding a COOP or DRP activation.

Business Recovery Plan Provides procedure for recovering business operations immediately following a disaster Address business process; not IT-focused;IT address based only on its support for business.

The following answers are incorrect:

Occupant Emergency Plan - Provides coordinated procedures for minimizing loss of life or injury and protecting property damage in response to a physical threat.

Cyber Incident Response Plan - Provides procedures for mitigating and correcting a cyber-attack, such as a virus, worm, or Trojan horse

Disaster Recovery Plan - Provides procedures for relocating information systems operations to an alternate location.

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The following reference(s) were/was used to create this question:

CISA review manual 2014 page number 123

NIST SP 800-34

(Legal, Regulations, Investigations and Compliance)

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**QUESTION 1222**

Which of the following groups represents the leading source of computer crime losses?

- A. Hackers
- B. Industrial saboteurs
- C. Foreign intelligence officers
- D. Employees

Answer: D

Explanation: There are some conflicting figures as to which group is a bigger threat hackers or employees. Employees are still considered to be the leading source of computer crime losses.

Employees often have an easier time gaining access to systems or source code than outsiders or other means of creating computer crimes.

A word of caution is necessary: although the media has tended to portray the threat of cybercrime as existing almost exclusively from the outside, external to a company, reality paints a much different picture. Often the greatest risk of cybercrime comes from the inside, namely, criminal insiders. Information security professionals must be particularly sensitive to the phenomena of the criminal or dangerous insider, as these individuals usually operate under the radar, inside of the primarily outward/external facing security controls, thus significantly increasing the impact of their crimes while leaving few, if any, audit trails to follow and evidence for prosecution.

Some of the large scale crimes committed against banks lately have shown that Internal Threats are

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the worst and they are more common than one would think. The definition of what a hacker is can vary greatly from one country to another but in some of the states in the USA a hacker is defined as Someone who is using resources in a way that is not authorized. A recent case in Ohio involved an internal employee who was spending most of his day on dating website looking for the love of his life. The employee was taken to court for hacking the company resources.

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The following answers are incorrect:

hackers. Is incorrect because while hackers represent a very large problem and both the frequency of attacks and overall losses have grown hackers are considered to be a small segment of combined computer fraudsters.

industrial saboteurs. Is incorrect because industrial saboteurs tend to go after trade secrets. While the loss to the organization can be great, they still fall short when compared to the losses created by employees. Often it is an employee that was involved in industrial sabotage.

foreign intelligence officers. Is incorrect because the losses tend to be national secrets. You really can't put a cost on this and the number of frequency and occurrences of this is less than that of employee related losses.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 22327-22331). Auerbach Publications. Kindle Edition.

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## QUESTION 1223

Which of the following is biggest factor that makes Computer Crimes possible?

- A. The fraudster obtaining advanced training & special knowledge.
- B. Victim carelessness.
- C. Collusion with others in information processing.
- D. System design flaws.

Answer: B

Explanation: The biggest factor that makes Computer Crimes possible is Victim Carelessness.

Awareness and education can reduce the chance of someone becoming a victim.

The types and frequency of Computer Crimes are increasing at a rapid rate. Computer Crime was once mainly the result of insiders or disgruntled employees. Now just about everybody has access to the internet, professional criminals are taking advantage of this.

Specialized skills are no longer needed and a search on the internet can provide a fraudster with a plethora of tools that can be used to perpetuate fraud.

All too often carelessness leads to someone being a victim. People often use simple passwords or

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write them down in plain sight where they can be found by fraudsters. People throwing away papers loaded with account numbers, social security numbers, or other types of non-public personal information. There are phishing e-mail attempts where the fraudster tries to redirect a potential victim to a bogus site that resembles a legitimate site in an attempt to get the users' login ID and password, or other credentials. There is also social engineering. Awareness and training can help reduce the chance of someone becoming a victim.

The following answers are incorrect:

The fraudster obtaining advanced training and special knowledge. Is incorrect because training and special knowledge is not required. There are many tools widely available to fraudsters.

Collusion with others in information processing. Is incorrect because as more and more people use computers in their daily lives, it is no longer necessary to have someone on the inside be a party to fraud attempts.

System design flaws. Is incorrect because while System design flaws are sometimes a factor in Computer Crimes more often than not it is victim carelessness that leads to Computer Crimes.

References:

OIG CBK Legal, Regulations, Compliance and Investigations (pages 695 - 697)

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**QUESTION 1224**

Under United States law, an investigator's notebook may be used in court in which of the following scenarios?

- A. When the investigator is unwilling to testify.
- B. When other forms of physical evidence are not available.
- C. To refresh the investigator's memory while testifying.
- D. If the defense has no objections.

Answer: C

Explanation: An investigator's notebook cannot be used as evidence in court. It can only be used by the investigator to refresh his memory during a proceeding, but cannot be submitted as evidence in any form.

The following answers are incorrect:

When the investigator is unwilling to testify. Is incorrect because the notebook cannot be submitted as evidence in any form.

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When other forms of physical evidence are not available. Is incorrect because the notebook cannot be submitted as evidence in any form.

If the defense has no objections. Is incorrect because the notebook cannot be submitted as evidence in any form.

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**QUESTION 1225**

In addition to the Legal Department, with what company function must the collection of physical evidence be coordinated if an employee is suspected?

- A. Human Resources
- B. Industrial Security
- C. Public Relations
- D. External Audit Group

Answer: A

Explanation: If an employee is suspected of causing an incident, the human resources department may be involved—for example, in assisting with disciplinary proceedings.

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Legal Department. The legal experts should review incident response plans, policies, and procedures to ensure their compliance with law and Federal guidance, including the right to privacy. In addition, the guidance of the general counsel or legal department should be sought if there is reason to believe that an incident may have legal ramifications, including evidence collection, prosecution of a suspect, or a lawsuit, or if there may be a need for a memorandum of understanding (MOU) or other binding agreements involving liability limitations for information sharing.

Public Affairs, Public Relations, and Media Relations. Depending on the nature and impact of an incident, a need may exist to inform the media and, by extension, the public.

The Incident response team members could include:

Management

Information Security

Legal / Human Resources

Public Relations

Communications

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Physical Security

Network Security

Network and System Administrators

Network and System Security Administrators

Internal Audit

Events versus Incidents

An event is any observable occurrence in a system or network. Events include a user connecting to a file share, a server receiving a request for a web page, a user sending email, and a firewall blocking a connection attempt. Adverse events are events with a negative consequence, such as system crashes, packet floods, unauthorized use of system privileges, unauthorized access to sensitive data, and execution of malware that destroys data. This guide addresses only adverse events that are computer security- related, not those caused by natural disasters, power failures, etc.

A computer security incident is a violation or imminent threat of violation of computer security policies, acceptable use policies, or standard security practices.

Examples of incidents are:

An attacker commands a botnet to send high volumes of connection requests to a web server, causing it to crash.

Users are tricked into opening a “quarterly report” sent via email that is actually malware; running the tool has infected their computers and established connections with an external host.

An attacker obtains sensitive data and threatens that the details will be released publicly if the organization does not pay a designated sum of money.

A user provides or exposes sensitive information to others through peer-to-peer file sharing services.

The following answers are incorrect:

Industrial Security. Is incorrect because it is not the best answer, the human resource department must be involved with the collection of physical evidence if an employee is suspected.

public relations. Is incorrect because it is not the best answer. It would be an important element to minimize public image damage but not the best choice for this question.

External Audit Group. Is incorrect because it is not the best answer, the human resource

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department must be involved with the collection of physical evidence if an employee is suspected.

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Reference(s) used for this question:

NIST Special Publication 800-61

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### QUESTION 1226

To be admissible in court, computer evidence must be which of the following?

- A. Relevant
- B. Decrypted
- C. Edited
- D. Incriminating

Answer: A

Explanation: Before any evidence can be admissible in court, the evidence has to be relevant, material to the issue, and it must be presented in compliance with the rules of evidence. This holds true for computer evidence as well.

While there are no absolute means to ensure that evidence will be allowed and helpful in a court of law, information security professionals should understand the basic rules of evidence. Evidence should be relevant, authentic, accurate, complete, and convincing. Evidence gathering should emphasize these criteria.

As stated in CISSP for Dummies :

Because computer-generated evidence can sometimes be easily manipulated, altered , or tampered with, and because it's not easily and commonly understood, this type of evidence is usually considered suspect in a court of law. In order to be admissible, evidence must be Relevant: It must tend to prove or disprove facts that are relevant and material to the case.

Reliable: It must be reasonably proven that what is presented as evidence is what was originally collected and that the evidence itself is reliable. This is accomplished, in part, through proper evidence handling and the chain of custody. (We discuss this in the upcoming section “Chain of custody and the evidence life cycle.”)

Legally permissible: It must be obtained through legal means. Evidence that's not legally permissible may include evidence obtained through the following means:

Illegal search and seizure: Law enforcement personnel must obtain a prior court order; however,

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non-law enforcement personnel, such as a supervisor or system administrator, may be able to conduct an authorized search under some circumstances.

Illegal wiretaps or phone taps: Anyone conducting wiretaps or phone taps must obtain a prior court order.

Entrapment or enticement: Entrapment encourages someone to commit a crime that the individual may have had no intention of committing. Conversely, enticement lures someone toward certain evidence (a honey pot, if you will) after that individual has already committed a crime. Enticement is not necessarily illegal but does raise certain ethical arguments and may not be admissible in court.

Coercion: Coerced testimony or confessions are not legally permissible.

Unauthorized or improper monitoring: Active monitoring must be properly authorized and

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conducted in a standard manner; users must be notified that they may be subject to monitoring.  
The following answers are incorrect:

decrypted. Is incorrect because evidence has to be relevant, material to the issue, and it must be presented in compliance with the rules of evidence.

edited. Is incorrect because evidence has to be relevant, material to the issue, and it must be presented in compliance with the rules of evidence. Edited evidence violates the rules of evidence.  
incriminating. Is incorrect because evidence has to be relevant, material to the issue, and it must be presented in compliance with the rules of evidence.

Reference(s) used for this question:

CISSP Study Guide (Conrad, Misenar, Feldman) Elsevier. 2012. Page 423

and

Mc Graw Hill, Shon Harris CISSP All In One (AIO), 6th Edition , Pages 1051-1056

and

CISSP for Dummies , Peter Gregory

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### QUESTION 1227

The typical computer fraudsters are usually persons with which of the following characteristics?

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- A. They have had previous contact with law enforcement
- B. They conspire with others
- C. They hold a position of trust
- D. They deviate from the accepted norms of society

Answer: C

Explanation: The

Answer: They hold a position of trust. Most computer fraud is caused by insiders or disgruntled employees.

These people, as employees, are trusted to perform their duties honestly and not take advantage of the trust placed in them.

The following answers are incorrect:

They have had previous contact with law enforcement. Is incorrect because most often it is a person that holds a position of trust and this answer implies they have a criminal background. This type of individual is typically not in a position of trust within an organization.

They conspire with others. Is incorrect because they typically work alone, often as a form of retribution over a perceived injustice done to them.

They deviate from the accepted norms of society. Is incorrect because while the nature of fraudsters deviate from the norm, the fraudsters often hold a position of trust within the organization.

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### QUESTION 1228

Once evidence is seized, a law enforcement officer should emphasize which of the following?

- A. Chain of command
- B. Chain of custody

- C. Chain of control
- D. Chain of communications

Answer: B

Explanation: All people that handle the evidence from the time the crime was committed through the final disposition must be identified. This is to ensure that the evidence can be used and has not been tampered with.

The following answers are incorrect:

- 0 chain of command. Is incorrect because chain of command is the order of authority and does not apply to evidence.
- chain of control. Is incorrect because it is a distractor.
- chain of communications. Is incorrect because it is a distractor.

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### QUESTION 1229

The ISC2 Code of Ethics does not include which of the following behaviors for a CISSP:

- A. Honesty
- B. Ethical behavior
- C. Legality
- D. Control

Answer: D

Explanation: Control is not a behavior characteristic described in the Code of Ethics.

See a high level extract of the code below. I strongly suggest you visit the link below to get the full details of the code. You will be required to accept and agree to the code of ethics in order to become a CISSP.

[https://www.isc2.org/uploadedFiles/\(ISC\)2\\_Public\\_Content/Code\\_of\\_ethics/ISC2-Code-of-Ethics.pdf](https://www.isc2.org/uploadedFiles/(ISC)2_Public_Content/Code_of_ethics/ISC2-Code-of-Ethics.pdf)

Summary of the Code:

All information systems security professionals who are certified by (ISC)<sup>2</sup> recognize that such certification is a privilege that must be both earned and maintained. In support of this principle, all (ISC)<sup>2</sup> members are required to commit to fully support this Code of Ethics (the "Code"). (ISC)<sup>2</sup> members who intentionally or knowingly violate any provision of the Code will be subject to action by a peer review panel, which may result in the revocation of certification. (ISC)<sup>2</sup> members are obligated to follow the ethics complaint procedure upon observing any action by an (ISC)<sup>2</sup> member that breach the Code. Failure to do so may be considered a breach of the Code pursuant to Canon IV.

There are only four mandatory canons in the Code. By necessity, such high-level guidance is not intended to be a substitute for the ethical judgment of the professional.

Code of Ethics Preamble:

1

The safety and welfare of society and the common good, duty to our principals, and to each other, requires that we adhere, and be seen to adhere, to the highest ethical standards of behavior.

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Therefore, strict adherence to this Code is a condition of certification.

Code of Ethics Canons:

Protect society, the common good, necessary public trust and confidence, and the infrastructure.

Act honorably, honestly, justly, responsibly, and legally.

Provide diligent and competent service to principals.

Advance and protect the profession.

The following answers are incorrect:

morality Is incorrect because Morality is a behavior characteristic described in the Code of Ethics.

Act honorably, honestly, justly, responsibly, and legally.

ethicality Is incorrect because Ethicality is a behavior characteristic described in the Code of Ethics. Act honorably, honestly, justly, responsibly, and legally.

legal. Is incorrect because Legality is a behavior characteristic described in the Code of Ethics. Act honorably, honestly, justly, responsibly, and legally.

Reference(s) used for this question:

ISC2 Code of Ethics at <https://www.isc2.org/ethics/Default.aspx>

and

[https://www.isc2.org/uploadedFiles/\(ISC\)2\\_Public\\_Content/Code\\_of\\_ethics/ISC2-Code-of-Ethics.pdf](https://www.isc2.org/uploadedFiles/(ISC)2_Public_Content/Code_of_ethics/ISC2-Code-of-Ethics.pdf)

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## QUESTION 1230

Which of the following cannot be undertaken in conjunction or while computer incident handling is ongoing?

- A. System development activity
- B. Help-desk function
- C. System Imaging
- D. Risk management process

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Answer: A

Explanation: If Incident Handling is underway an incident has potentially been identified. At that point all use of the system should stop because the system can no longer be trusted and any changes could contaminate the evidence. This would include all System Development Activity. Every organization should have plans and procedures in place that deals with Incident Handling. Employees should be instructed what steps are to be taken as soon as an incident occurs and how to report it. It is important that all parties involved are aware of these steps to protect not only any possible evidence but also to prevent any additional harm.

It is quite possible that the fraudster has planted malicious code that could cause destruction or even a Trojan Horse with a back door into the system. As soon as an incident has been identified the system can no longer be trusted and all use of the system should cease.

Shon Harris in her latest book mentions:

Although we commonly use the terms “event” and “incident” interchangeably, there are subtle differences between the two. An event is a negative occurrence that can be observed, verified, and documented, whereas an incident is a series of events that negatively affects the company and/ or impacts its security posture. This is why we call reacting to these issues “incident

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response” (or “incident handling”), because something is negatively affecting the company and causing a security breach.

Many types of incidents (virus, insider attack, terrorist attacks, and so on) exist, and sometimes it is just human error. Indeed, many incident response individuals have received a frantic call in the middle of the night because a system is acting “weird.” The reasons could be that a deployed patch broke something, someone misconfigured a device, or the administrator just learned a new scripting language and rolled out some code that caused mayhem and confusion.

When a company endures a computer crime, it should leave the environment and evidence unaltered and contact whomever has been delegated to investigate these types of situations. Someone who is unfamiliar with the proper process of collecting data and evidence from a crime scene could instead destroy that evidence, and thus all hope of prosecuting individuals, and achieving a conviction would be lost.

Companies should have procedures for many issues in computer security such as enforcement procedures, disaster recovery and continuity procedures, and backup procedures. It is also necessary to have a procedure for dealing with computer incidents because they have become an increasingly important issue of today’s information security departments. This is a direct result of attacks against networks and information systems increasing annually. Even though we don’t have specific numbers due to a lack of universal reporting and reporting in general, it is clear that the

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volume of attacks is increasing.

Just think about all the spam, phishing scams, malware, distributed denial-of-service, and other attacks you see on your own network and hear about in the news. Unfortunately, many companies are at a loss as to who to call or what to do right after they have been the victim of a cybercrime. Therefore, all companies should have an incident response policy that indicates who has the authority to initiate an incident response, with supporting procedures set up before an incident takes place.

This policy should be managed by the legal department and security department. They need to work together to make sure the technical security issues are covered and the legal issues that surround criminal activities are properly dealt with. The incident response policy should be clear and concise. For example, it should indicate if systems can be taken offline to try to save evidence or if systems have to continue functioning at the risk of destroying evidence. Each system and functionality should have a priority assigned to it. For instance, if the file server is infected, it should be removed from the network, but not shut down. However, if the mail server is infected, it should not be removed from the network or shut down because of the priority the company attributes to the mail server over the file server. Tradeoffs and decisions will have to be made, but it is better to think through these issues before the situation occurs, because better logic is usually possible before a crisis, when there’s less emotion and chaos.

The Australian Computer Emergency Response Team’s General Guidelines for Computer Forensics:

- Keep the handling and corruption of original data to a minimum.
- Document all actions and explain changes.
- Follow the Five Rules for Evidence (Admissible, Authentic, Complete, Accurate, Convincing).
- Bring in more experienced help when handling and/ or analyzing the evidence is beyond your knowledge, skills, or abilities.
- Adhere to your organization’s security policy and obtain written permission to conduct a forensics investigation.

- 
- Capture as accurate an image of the system( s) as possible while working quickly.
  - Be ready to testify in a court of law.
  - Make certain your actions are repeatable.
  - Prioritize your actions, beginning with volatile and proceeding to persistent evidence.
  - Do not run any programs on the system( s) that are potential evidence.
  - Act ethically and in good faith while conducting a forensics investigation, and do not attempt to do any harm.

The following answers are incorrect:

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help-desk function. Is incorrect because during an incident, employees need to be able to communicate with a central source. It is most likely that would be the help-desk. Also the helpdesk would need to be able to communicate with the employees to keep them informed.

system imaging. Is incorrect because once an incident has occurred you should perform a capture of evidence starting with the most volatile data and imaging would be done using bit for bit copy of storage medias to protect the evidence.

risk management process. Is incorrect because incident handling is part of risk management, and should continue.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 21468-21476). McGraw-Hill. Kindle Edition.

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 21096-21121). McGraw-Hill. Kindle Edition.

and

NIST Computer Security incident handling <http://csrc.nist.gov/publications/nistpubs/800-12/800-12-html/chapter12.html>

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### QUESTION 1231

Which of the following is from the Internet Architecture Board (IAB) Ethics and the Internet (RFC 1087)?

- A. Access to and use of the Internet is a privilege and should be treated as such by all users of the systems.
- B. Users should execute responsibilities in a manner consistent with the highest standards of their profession.
- C. There must not be personal data record-keeping systems whose very existence is secret.
- D. There must be a way for a person to prevent information about them, which was obtained for one purpose, from being used or made available for another purpose without their consent.

Answer: A

Explanation: The IAB strongly endorses the view of the Division Advisory Panel of the National Science Foundation Division of Network, Communications Research and Infrastructure which, in paraphrase, characterized as unethical and unacceptable any activity which purposely:

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- (a) seeks to gain unauthorized access to the resources of the Internet,

- 
- (b) disrupts the intended use of the Internet,
  - (c) wastes resources (people, capacity, computer) through such actions,
  - (d) destroys the integrity of computer-based information, and/or
  - (e) compromises the privacy of users.

The Internet exists in the general research milieu. Portions of it continue to be used to support research and experimentation on networking. Because experimentation on the Internet has the potential to affect all of its components and users, researchers have the responsibility to exercise great caution in the conduct of their work.

Negligence in the conduct of Internet-wide experiments is both irresponsible and unacceptable. The IAB plans to take whatever actions it can, in concert with Federal agencies and other interested parties, to identify and to set up technical and procedural mechanisms to make the Internet more resistant to disruption.

In the final analysis, the health and well-being of the Internet is the responsibility of its users who must, uniformly, guard against abuses which disrupt the system and threaten its long-term viability.

**NOTE FROM CLEMENT:**

For the purpose of the exam, ensure you are very familiar with the ISC2 code of ethics. There will be a few questions on the exam related to it and you must also sign and agree to the code in order to take the exam. The code of ethics consist of 4 high level cannons. Do ensure you know the order of the 4 cannons, the first one listed is the most important.

See an extract of the code below:

**Code**

All information systems security professionals who are certified by (ISC)<sup>2</sup> recognize that such certification is a privilege that must be both earned and maintained. In support of this principle, all (ISC)<sup>2</sup> members are required to commit to fully support this Code of Ethics (the "Code"). (ISC)<sup>2</sup> members who intentionally or knowingly violate any provision of the Code will be subject to action by a peer review panel, which may result in the revocation of certification. (ISC)<sup>2</sup> members are obligated to follow the ethics complaint procedure upon observing any action by an (ISC)<sup>2</sup> member that breach the Code. Failure to do so may be considered a breach of the Code pursuant to Canon IV.

There are only four mandatory canons in the Code. By necessity, such high-level guidance is not intended to be a substitute for the ethical judgment of the professional.

**Code of Ethics Preamble:**

6

The safety and welfare of society and the common good, duty to our principals, and to each other, requires that we adhere, and be seen to adhere, to the highest ethical standards of behavior.

Therefore, strict adherence to this Code is a condition of certification.

**Code of Ethics Canons:**

Protect society, the common good, necessary public trust and confidence, and the infrastructure.

Act honorably, honestly, justly, responsibly, and legally.

Provide diligent and competent service to principals.

Advance and protect the profession.

The following are incorrect answers:

- Users should execute responsibilities in a manner consistent with the highest standards of their profession is incorrect because it is from the (ISC)<sup>2</sup> code of ethics.

- There must not be personal data record-keeping systems whose very existence is secret is

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incorrect because it is from the U.S. Department of Health, Education, and Welfare Code of Fair Information Practices.

- There must be a way for a person to prevent information about them, which was obtained for one purpose, from being used or made available for another purpose without their consent is incorrect because it is from the U.S. Department of Health, Education, and Welfare Code of Fair Information Practices.

Reference(s) used for this question:

[https://www.isc2.org/uploadedFiles/%28ISC%292\\_Public\\_Content/Code\\_of\\_ethics/ISC2-Code-of-Ethics.pdf](https://www.isc2.org/uploadedFiles/%28ISC%292_Public_Content/Code_of_ethics/ISC2-Code-of-Ethics.pdf)

and

<http://tools.ietf.org/html/rfc1087>

and

[http://simson.net/ref/2004/csg357/handouts/01\\_fips.pdf](http://simson.net/ref/2004/csg357/handouts/01_fips.pdf)

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### QUESTION 1232

Which of the following is NOT defined in the Internet Architecture Board (IAB) Ethics and the Internet (RFC 1087) as unacceptable and unethical activity?

7

- A. uses a computer to steal
- B. destroys the integrity of computer-based information
- C. wastes resources such as people, capacity and computers through such actions
- D. involves negligence in the conduct of Internet-wide experiments

Answer: A

Explanation: It is a commandment from the Computer Ethics Institute (CEI).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, pages 316-317.

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### QUESTION 1233

Which one of the following is a key agreement protocol used to enable two entities to agree and generate a session key (secret key used for one session) over an insecure medium without any prior secrets or communications between the entities? The negotiated key will subsequently be used for message encryption using Symmetric Cryptography.

- A. RSA
- B. PKI
- C. Diffie\_Hellmann
- D. 3DES

Answer: C

Explanation: The Diffie-Hellman key agreement protocol (also called exponential key agreement) was developed by Diffie and Hellman [DH76] in 1976 and published in the ground-breaking paper "New Directions in Cryptography." The protocol allows two users to exchange a secret key over an

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insecure medium without any prior secrets.

The protocol has two system parameters  $p$  and  $g$ . They are both public and may be used by all the users in a system. Parameter  $p$  is a prime number and parameter  $g$  (usually called a generator) is an integer less than  $p$ , with the following property: for every number  $n$  between 1 and  $p-1$  inclusive, there is a power  $k$  of  $g$  such that  $n = g^k \bmod p$ .

Suppose Alice and Bob want to agree on a shared secret key using the Diffie-Hellman key agreement protocol. They proceed as follows: First, Alice generates a random private value  $a$  and Bob generates a random private value  $b$ . Both  $a$  and  $b$  are drawn from the set of integers. Then they derive their public values using parameters  $p$  and  $g$  and their private values. Alice's public value is  $g^a \bmod p$  and Bob's public value is  $g^b \bmod p$ . They then exchange their public values. Finally, Alice computes  $g^{ab} = (g^b)^a \bmod p$ , and Bob computes  $g^{ab} = (g^a)^b \bmod p$ . Since  $g^{ab} = g^{ba} = k$ , Alice and Bob now have a shared secret key  $k$ .

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The protocol depends on the discrete logarithm problem for its security. It assumes that it is computationally infeasible to calculate the shared secret key  $k = g^{ab} \bmod p$  given the two public values  $g^a \bmod p$  and  $g^b \bmod p$  when the prime  $p$  is sufficiently large. Maurer [Mau94] has shown that breaking the Diffie-Hellman protocol is equivalent to computing discrete logarithms under certain assumptions.

The Diffie-Hellman key exchange is vulnerable to a man-in-the-middle attack. In this attack, an opponent Carol intercepts Alice's public value and sends her own public value to Bob. When Bob transmits his public value, Carol substitutes it with her own and sends it to Alice. Carol and Alice thus agree on one shared key and Carol and Bob agree on another shared key. After this exchange, Carol simply decrypts any messages sent out by Alice or Bob, and then reads and possibly modifies them before re-encrypting with the appropriate key and transmitting them to the other party. This vulnerability is present because Diffie-Hellman key exchange does not authenticate the participants. Possible solutions include the use of digital signatures and other protocol variants.

The authenticated Diffie-Hellman key agreement protocol, or Station-to-Station (STS) protocol, was developed by Diffie, van Oorschot, and Wiener in 1992 [DVW92] to defeat the man-in-the-middle attack on the Diffie-Hellman key agreement protocol. The immunity is achieved by allowing the two parties to authenticate themselves to each other by the use of digital signatures (see question 2.2.2) and public-key certificates (see question 4.1.3.10).

Roughly speaking, the basic idea is as follows. Prior to execution of the protocol, the two parties Alice and Bob each obtain a public/private key pair and a certificate for the public key. During the protocol, Alice computes a signature on certain messages, covering the public value  $g^a \bmod p$ . Bob proceeds in a similar way. Even though Carol is still able to intercept messages between Alice and Bob, she cannot forge signatures without Alice's private key and Bob's private key. Hence, the enhanced protocol defeats the man-in-the-middle attack.

In recent years, the original Diffie-Hellman protocol has been understood to be an example of a much more general cryptographic technique, the common element being the derivation of a shared secret value (that is, key) from one party's public key and another party's private key. The parties' key pairs may be generated anew at each run of the protocol, as in the original Diffie-Hellman protocol. The public keys may be certified, so that the parties can be authenticated and there may be a combination of these attributes. The draft ANSI X9.42 (see question 5.3.1) illustrates some of these combinations, and a recent paper by Blake-Wilson, Johnson, and Menezes provides some relevant security proofs.

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**References:**

TIPTON, et. al., Official (ISC)2 Guide to the CISSP CBK 2007 edition, page 257.

9

And

RSA laboratoires web site: <http://www.rsa.com/rsalabs/node.asp?id=2248> :

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**QUESTION 1234**

In the process of gathering evidence from a computer attack, a system administrator took a series of actions which are listed below. Can you identify which one of these actions has compromised the whole evidence collection process?

- A. Using a write blocker
- B. Made a full-disk image
- C. Created a message digest for log files
- D. Displayed the contents of a folder

Answer: D

Explanation: Displaying the directory contents of a folder can alter the last access time on each listed file.

Using a write blocker is wrong because using a write blocker ensure that you cannot modify the data on the host and it prevent the host from writing to its hard drives.

Made a full-disk image is wrong because making a full-disk image can preserve all data on a hard disk, including deleted files and file fragments.

Created a message digest for log files is wrong because creating a message digest for log files. A message digest is a cryptographic checksum that can demonstrate that the integrity of a file has not been compromised (e.g. changes to the content of a log file)

Domain: **LEGAL, REGULATIONS, COMPLIANCE AND INVESTIGATIONS**

**References:**

AIO 3rd Edition, page 783-784

NIST 800-61 Computer Security Incident Handling guide page 3-18 to 3-20

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**QUESTION 1235**

Which of the following tools is NOT likely to be used by a hacker?

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- A. Nessus
- B. Saint
- C. Tripwire
- D. Nmap

Answer: C

Explanation: It is a data integrity assurance software aimed at detecting and reporting accidental or malicious changes to data.

The following answers are incorrect :

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Nessus is incorrect as it is a vulnerability scanner used by hackers in discovering vulnerabilities in a system.

Saint is also incorrect as it is also a network vulnerability scanner likely to be used by hackers.

Nmap is also incorrect as it is a port scanner for network exploration and likely to be used by hackers.

Reference :

Tripwire : <http://www.tripwire.com>

Nessus : <http://www.nessus.org>

Saint : <http://www.saintcorporation.com/saint>

Nmap : <http://insecure.org/nmap>

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### QUESTION 1236

Which of the following computer crime is MORE often associated with INSIDERS?

- A. IP spoofing
- B. Password sniffing
- C. Data diddling
- D. Denial of service (DOS)

Answer: C

Explanation: It refers to the alteration of the existing data , most often seen before it is entered into an application.This type of crime is extremely common and can be prevented by using appropriate access controls and proper segregation of duties. It will more likely be perpetrated by insiders, who have access to data before it is processed.

The other answers are incorrect because :

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IP Spoofing is not correct as the questions asks about the crime associated with the insiders. Spoofing is generally accomplished from the outside.

Password sniffing is also not the BEST answer as it requires a lot of technical knowledge in understanding the encryption and decryption process.

Denial of service (DOS) is also incorrect as most Denial of service attacks occur over the internet.

Reference : Shon Harris , AIO v3 , Chapter-10 : Law , Investigation & Ethics , Page : 758-760.

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### QUESTION 1237

What do the ILOVEYOU and Melissa virus attacks have in common?

- A. They are both denial-of-service (DOS) attacks.
- B. They have nothing in common.
- C. They are both masquerading attacks.
- D. They are both social engineering attacks.

Answer: C

Explanation: While a masquerading attack can be considered a type of social engineering, the Melissa and ILOVEYOU viruses are examples of masquerading attacks, even if it may cause

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some kind of denial of service due to the web server being flooded with messages. In this case, the receiver confidently opens a message coming from a trusted individual, only to find that the message was sent using the trusted party's identity.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 10: Law, Investigation, and Ethics (page 650).

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### QUESTION 1238

Crackers today are MOST often motivated by their desire to:

- A. Help the community in securing their networks.
- B. Seeing how far their skills will take them.
- C. Getting recognition for their actions.
- D. Gaining Money or Financial Gains.

Answer: D

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Explanation: A few years ago the best choice for this question would have been seeing how far their skills can take them. Today this has changed greatly, most crimes committed are financially motivated.

Profit is the most widespread motive behind all cybercrimes and, indeed, most crimes- everyone wants to make money. Hacking for money or for free services includes a smorgasbord of crimes such as embezzlement, corporate espionage and being a "hacker for hire". Scams are easier to undertake but the likelihood of success is much lower. Money-seekers come from any lifestyle but those with persuasive skills make better con artists in the same way as those who are exceptionally tech-savvy make better "hacks for hire".

"White hats" are the security specialists (as opposed to Black Hats) interested in helping the community in securing their networks. They will test systems and network with the owner authorization.

A Black Hat is someone who uses his skills for offensive purpose. They do not seek authorization before they attempt to comprise the security mechanisms in place.

"Grey Hats" are people who sometimes work as a White hat and other times they will work as a "Black Hat", they have not made up their mind yet as to which side they prefer to be.

The following are incorrect answers:

All the other choices could be possible reasons but the best one today is really for financial gains.

References used for this question:

<http://library.thinkquest.org/04oct/00460/crimeMotives.html>

and

<http://www.informit.com/articles/article.aspx?p=1160835>

and

<http://www.aic.gov.au/documents/1/B/A/%7B1BA0F612-613A-494D-B6C5-06938FE8BB53%7Dhtcb006.pdf>

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### QUESTION 1239

Which of the following statements regarding trade secrets is FALSE?

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- A. For a company to have a resource qualify as a trade secret, it must provide the company with some type of competitive value or advantage.
  - B. The Trade Secret Law normally protects the expression of the idea of the resource.
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- C. Many companies require their employees to sign nondisclosure agreements regarding the protection of their trade secrets.
  - D. A resource can be protected by law if it is not generally known and if it requires special skill, ingenuity, and/or expenditure of money and effort to develop it.

Answer: B

Explanation: It does not protect the expression of the idea of the resource , but specific resources.

The other answers are incorrect because :

For a company to have a resource qualify as a trade secret, it must provide the company with some type of competitive value or advantage is incorrect as it is a feature of a trade secret. Many companies require their employees to sign nondisclosure agreements regarding the protection of their trade secrets is also incorrect as it is one of the ways to protect the trade secrets of a company.

A resource can be protected by law if it is not generally known and if it requires special skill, ingenuity, and/or expenditure of money and effort to develop it is also incorrect as it is also a feature of a trade secret.

Reference : Shon Harris AIO v3 , Chapter 10: Law, Investigation, and Ethics , Page : 720-721

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### QUESTION 1240

What is the PRIMARY goal of incident handling?

- A. Successfully retrieve all evidence that can be used to prosecute
- B. Improve the company's ability to be prepared for threats and disasters
- C. Improve the company's disaster recovery plan
- D. Contain and repair any damage caused by an event.

Answer: D

Explanation: This is the PRIMARY goal of an incident handling process.

The other answers are incorrect because :

Successfully retrieve all evidence that can be used to prosecute is more often used in identifying weaknesses than in prosecuting.

Improve the company's ability to be prepared for threats and disasters is more appropriate for a  
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disaster recovery plan.

Improve the company's disaster recovery plan is also more appropriate for disaster recovery plan.

Reference : Shon Harris AIO v3 , Chapter - 10 : Law, Investigation, and Ethics , Page : 727-728

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### QUESTION 1241

Which of the following would be LESS likely to prevent an employee from reporting an incident?

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- A. They are afraid of being pulled into something they don't want to be involved with.
  - B. The process of reporting incidents is centralized.
  - C. They are afraid of being accused of something they didn't do.
  - D. They are unaware of the company's security policies and procedures.

Answer: B

Explanation: The reporting process should be centralized else employees won't bother.

The other answers are incorrect because :

They are afraid of being pulled into something they don't want to be involved with is incorrect as most of the employees fear of this and this would prevent them to report an incident.

They are afraid of being accused of something they didn't do is also incorrect as this also prevents them to report an incident.

They are unaware of the company's security policies and procedures is also incorrect as mentioned above.

Reference : Shon Harris AIO v3 , Ch-10 : Laws , Investigatio & Ethics , Page : 675.

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### **QUESTION 1242**

Which of the following outlined how senior management are responsible for the computer and information security decisions that they make and what actually took place within their organizations?

- A. The Computer Security Act of 1987.
- B. The Federal Sentencing Guidelines of 1991.
- C. The Economic Espionage Act of 1996.
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- D. The Computer Fraud and Abuse Act of 1986.

Answer: B

Explanation: In 1991, U.S. Federal Sentencing Guidelines were developed to provide judges with courses of action in dealing with white collar crimes. These guidelines provided ways that companies and law enforcement should prevent, detect and report computer crimes. It also outlined how senior management are responsible for the computer and information security decisions that they make and what actually took place within their organizations.

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### **QUESTION 1243**

What is the PRIMARY reason to maintain the chain of custody on evidence that has been collected?

- A. To ensure that no evidence is lost.
- B. To ensure that all possible evidence is gathered.
- C. To ensure that it will be admissible in court
- D. To ensure that incidents were handled with due care and due diligence.

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Answer: C

Explanation: This is the PRIMARY reason for the chain of custody of evidence. Evidence must be controlled every step of the way. If it is not, the evidence can be tampered with and ruled inadmissible. The Chain of Custody will include a detailed record of:

Who obtained the evidence

What was the evidence

Where and when the evidence was obtained

Who secured the evidence

Who had control or possession of the evidence

The following answers are incorrect because :

To ensure that no evidence is lost is incorrect as it is not the PRIMARY reason.

To ensure that all possible evidence is gathered is also incorrect as it is not the PRIMARY reason.

To ensure that incidents were handled with due care and due diligence is also incorrect as it is also not the PRIMARY reason.

The chain of custody is a history that shows how evidence was collected, analyzed, transported, and preserved in order to establish that it is sufficiently trustworthy to be presented as evidence in

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court. Because electronic evidence can be easily modified, a clearly defined chain of custody demonstrates that the evidence is trustworthy which would make it admissible in court.

Reference : Shon Harris AIO v3 , Chapter-10: Law, Investigation, and Ethics , Page : 727

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### QUESTION 1244

Which of the following logical access exposures INVOLVES CHANGING data before, or as it is entered into the computer?

- A. Data diddling
- B. Salami techniques
- C. Trojan horses
- D. Viruses

Answer: A

Explanation: It involves changing data before , or as it is entered into the computer or in other words , it refers to the alteration of the existing data.

The other answers are incorrect because :

Salami techniques : A salami attack is the one in which an attacker commits several small crimes with the hope that the overall larger crime will go unnoticed.

Trojan horses : A Trojan Horse is a program that is disguised as another program.

Viruses :A Virus is a small application , or a string of code , that infects applications.

Reference : Shon Harris , AIO v3

Chapter - 11 : Application and System Development , Page : 875-880

Chapter - 10 : Law , Investigation and Ethics , Page : 758-759

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### QUESTION 1245

Which of the following is an example of an active attack?

- A. Traffic analysis
- B. Scanning
- C. Eavesdropping
- D. Wiretapping

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Answer: B

Explanation: Scanning is definitively a very active attack. The attacker will make use of a scanner to perform the attack, the scanner will send a very large quantity of packets to the target in order to illicit responses that allows the attacker to find information about the operating system, vulnerabilities, misconfiguration and more. The packets being sent are sometimes attempting to identify if a known vulnerability exist on the remote hosts.

A passive attack is usually done in the footprinting phase of an attack. While doing your passive reconnaissance you never send a single packet to the destination target. You gather information from public databases such as the DNS servers, public information through search engines, financial information from finance web sites, and technical infomation from mailing list archive or job posting for example.

An attack can be active or passive.

An "active attack" attempts to alter system resources or affect their operation.

A "passive attack" attempts to learn or make use of information from the system but does not affect system resources. (E.g., see: wiretapping.)

The following are all incorrect answers because they are all passive attacks:

Traffic Analysis - Is the process of intercepting and examining messages in order to deduce information from patterns in communication. It can be performed even when the messages are encrypted and cannot be decrypted. In general, the greater the number of messages observed, or even intercepted and stored, the more can be inferred from the traffic. Traffic analysis can be performed in the context of military intelligence or counter-intelligence, and is a concern in computer security.

Eavesdropping - Eavesdropping is another security risk posed to networks. Because of the way some networks are built, anything that gets sent out is broadcast to everyone. Under normal circumstances, only the computer that the data was meant for will process that information.

However, hackers can set up programs on their computers called "sniffers" that capture all data being broadcast over the network. By carefully examining the data, hackers can often reconstruct real data that was never meant for them. Some of the most damaging things that get sniffed include passwords and credit card information.

In the cryptographic context, Eavesdropping and sniffing data as it passes over a network are considered passive attacks because the attacker is not affecting the protocol, algorithm, key, message, or any parts of the encryption system. Passive attacks are hard to detect, so in most cases methods are put in place to try to prevent them rather than to detect and stop them. Altering messages, modifying system files, and masquerading as another individual are acts that are considered active attacks because the attacker is actually doing something instead of sitting back

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and gathering data. Passive attacks are usually used to gain information prior to carrying out an active attack."

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Wiretapping - Wiretapping refers to listening in on electronic communications on telephones, computers, and other devices. Many governments use it as a law enforcement tool, and it is also used in fields like corporate espionage to gain access to privileged information. Depending on where in the world one is, wiretapping may be tightly controlled with laws that are designed to protect privacy rights, or it may be a widely accepted practice with little or no protections for citizens. Several advocacy organizations have been established to help civilians understand these laws in their areas, and to fight illegal wiretapping.

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 6th Edition, Cryptography, Page 865  
and

[http://en.wikipedia.org/wiki/Attack\\_%28computing%29](http://en.wikipedia.org/wiki/Attack_%28computing%29)

and

<http://www.wisegeek.com/what-is-wiretapping.htm>

and

<https://pangea.stanford.edu/computing/resources/network/security/risks.php>

and

[http://en.wikipedia.org/wiki/Traffic\\_analysis](http://en.wikipedia.org/wiki/Traffic_analysis)

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### QUESTION 1246

The criteria for evaluating the legal requirements for implementing safeguards is to evaluate the cost (C) of instituting the protection versus the estimated loss (L) resulting from the exploitation of the corresponding vulnerability. Therefore, a legal liability may exists when:

- A.  $(C < L)$  or C is less than L
- B.  $(C < L - (\text{residual risk}))$  or C is less than L minus residual risk
- C.  $(C > L)$  or C is greater than L
- D.  $(C > L - (\text{residual risk}))$  or C is greater than L minus residual risk

Answer: A

Explanation: If the cost is lower than the estimated loss ( $C < L$ ), then legal liability may exists if you fail to implement the proper safeguards.

Government laws and regulations require companies to employ reasonable security measures to reduce private harms such as identity theft due to unauthorized access. The U.S. Gramm-Leach-9

Bliley Act (GLBA) Safeguards Rule and the broader European Directive 95/46/EC, Article 17, both require that companies employ reasonable or appropriate administrative and technical security measures to protect consumer information.

The GLBA is a U.S. Federal law enacted by U.S. Congress in 1998 to allow consolidation among commercial banks. The GLBA Safeguards Rule is U.S. Federal regulation created in reaction to the GLBA and enforced by the U.S.

Federal Trade Commission (FTC). The Safeguards Rule requires companies to implement a security plan to protect the confidentiality and integrity of consumer personal information and requires the designation of an individual responsible for compliance.

Because these laws and regulations govern consumer personal information, they can lead to new requirements for information systems for which companies are responsible to comply.

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The act of compliance includes demonstrating due diligence, which is defined as “reasonable efforts that persons make to satisfy legal requirements or discharge their legal obligations”.

Reasonableness in software systems includes industry standards and may allow for imperfection. Lawyers representing firms and other organizations, regulators, system administrators and engineers all face considerable challenge in determining what constitutes “reasonable” security measures for several reasons, including:

1. Compliance changes with the emergence of new security vulnerabilities due to innovations in information technology;
2. Compliance requires knowledge of specific security measures, however publicly available best practices typically include general goals and only address broad categories of vulnerability; and
3. Compliance is a best-effort practice, because improving security is costly and companies must prioritize security spending commensurate with risk of non-compliance. In general, the costs of improved security are certain, but the improvement in security depends on unknown variables and probabilities outside the control of companies.

The following reference(s) were used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 315.

and

<http://www.cs.cmu.edu/~breaux/publications/tdbreaux-cose10.pdf>

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## QUESTION 1247

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What is called an exception to the search warrant requirement that allows an officer to conduct a search without having the warrant in-hand if probable cause is present and destruction of the evidence is deemed imminent?

- A. Evidence Circumstance Doctrine
- B. Exigent Circumstance Doctrine
- C. Evidence of Admissibility Doctrine
- D. Exigent Probable Doctrine

Answer: B

Explanation: An Exigent Circumstance is an unusual and time-sensitive circumstance that justifies conduct that might not be permissible or lawful in other circumstances.

For example, exigent circumstances may justify actions by law enforcement officers acting without a warrant such as a mortal danger to a young child. Examples of other exigent circumstances include protecting evidence or property from imminent destruction.

In *US v Martinez*, Justice Thomas of the United States Court of Appeal used these words:

"As a general rule, we define exigent circumstances as those circumstances that would cause a reasonable person to believe that entry was necessary to prevent physical harm to the officers or other persons, the destruction of relevant evidence, the escape of the suspect, or some other consequence improperly frustrating legitimate law enforcement efforts."

In *Alvarado*, Justice Blackburn of the Court of Appeals of Georgia referred to exigent circumstances in the context of a drug bust:

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"The exigent circumstance doctrine provides that when probable cause has been established to believe that evidence will be removed or destroyed before a warrant can be obtained, a warrantless search and seizure can be justified. As many courts have noted, the need for the exigent circumstance doctrine is particularly compelling in narcotics cases, because contraband and records can be easily and quickly destroyed while a search is progressing. Police officers relying on this exception must demonstrate an objectively reasonable basis for deciding that immediate action is required."

All of the other answers were only detractors made up and not legal terms.

Reference(s) used for this question:

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 313.

and

<http://www.duhaime.org/LegalDictionary/E/ExigentCircumstances.aspx>

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### QUESTION 1248

A copy of evidence or oral description of its contents; which is not as reliable as best evidence is what type of evidence?

- A. Direct evidence
- B. Circumstantial evidence
- C. Hearsay evidence
- D. Secondary evidence

Answer: D

Explanation: Secondary evidence is a copy of evidence or oral description of its contents; not as reliable as best evidence

Here are other types of evidence:

Best evidence — original or primary evidence rather than a copy of duplicate of the evidence

Direct evidence — proves or disproves a specific act through oral testimony based on information gathered through the witness's five senses

Conclusive evidence — incontrovertible; overrides all other evidence

Opinions — two types: Expert — may offer an opinion based on personal expertise and facts,

Non-expert — may testify only as to facts

Circumstantial evidence — inference of information from other, immediate, relevant facts

Corroborative evidence — supporting evidence used to help prove an idea or point; used as a supplementary tool to help prove a primary piece of evidence

Hearsay evidence (3rdparty) — oral or written evidence that is presented in court that is second hand and has no firsthand proof of accuracy or reliability

(i) Usually not admissible in court

(ii) Computer generated records and other business records are in hearsay category

(iii) Certain exceptions to hearsay rule:

(1) Made during the regular conduct of business and authenticated by witnesses familiar with their use

(2) Relied upon in the regular course of business

(3) Made by a person with knowledge of records

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(4) Made by a person with information transmitted by a person with knowledge

(5) Made at or near the time of occurrence of the act being investigated

(6) In the custody of the witness on a regular basis

Reference:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 310.

and

CISSP for Dummies, Peter Gregory, page 270-271

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### QUESTION 1249

Which of the following proves or disproves a specific act through oral testimony based on information gathered through the witness's five senses?

- A. Direct evidence.
- B. Circumstantial evidence.
- C. Conclusive evidence.
- D. Corroborative evidence.

Answer: A

Explanation: Direct evidence can prove a fact all by itself and does not need backup information to refer to. When using direct evidence, presumptions are not required. One example of direct evidence is the testimony of a witness who saw a crime take place. Although this oral evidence would be secondary in nature, meaning a case could not rest on just it alone, it is also direct evidence, meaning the lawyer does not necessarily need to provide other evidence to back it up. Direct evidence often is based on information gathered from a witness's five senses.

The following answers are incorrect:

Circumstantial evidence. Is incorrect because Circumstantial evidence can prove an intermediate fact that can then be used to deduce or assume the existence of another fact.

Conclusive evidence. Is incorrect because Conclusive evidence is irrefutable and cannot be contradicted. Conclusive evidence is very strong all by itself and does not require corroboration.

Corroborative evidence. Is incorrect because Corroborative evidence is supporting evidence used to help prove an idea or point. It cannot stand on its own, but is used as a supplementary tool to help prove a primary piece of evidence.

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### QUESTION 1250

This is a common security issue that is extremely hard to control in large environments. It occurs when a user has more computer rights, permissions, and access than what is required for the tasks the user needs to fulfill. What best describes this scenario?

- A. Excessive Rights
- B. Excessive Access
- C. Excessive Permissions

## D. Excessive Privileges

Answer: D

Explanation: Even thou all 4 terms are very close to each other, the best choice is Excessive Privileges which would include the other three choices presented.

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, Page 645.

and

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### QUESTION 1251

Phreakers are hackers who specialize in telephone fraud. What type of telephone fraud/attack makes use of a device that generates tones to simulate inserting coins in pay phones, thus fooling the system into completing free calls?

- A. Red Boxes
- B. Blue Boxes
- C. White Boxes
- D. Black Boxes

Answer: A

Explanation: A red box is a phreaking device that generates tones to simulate inserting coins in pay phones, thus fooling the system into completing free calls. In the US, a dime is represented by two tones, a nickel by one, and a quarter by a set of 5 tones. Any device capable of playing back recorded sounds can potentially be used as a red box. Commonly used devices include modified 4

Radio Shack tone dialers, personal MP3 players, and audio-recording greeting cards.

#### BLUE BOX

An early phreaking tool, the blue box is an electronic device that simulates a telephone operator's dialing console. It functions by replicating the tones used to switch long-distance calls and using them to route the user's own call, bypassing the normal switching mechanism. The most typical use of a blue box was to place free telephone calls - inversely, the Black Box enabled one to receive calls which were free to the caller. The blue box no longer works in most western nations, as modern switching systems are now digital and no longer use the in-band signaling which the blue box emulates. Instead, signaling occurs on an out-of-band channel which cannot be accessed from the line the caller is using (called Common Channel Interoffice Signaling (CCIS)).

#### BLACK BOX

The black box (as distinguished from blue boxes and red boxes), sometimes called an Agnew (see Spiro (device) for the origin of the nickname), was a device built by phone phreaks during the 1960s and 1970s in order to defeat long distance phone call toll charges, and specifically to block the supervision signal sent by the receiving telephone handset when the call was answered at the receiving end of the call.

The act of picking up the handset of a telephone causes a load to be put on the telephone line, so that the DC voltage on the line drops below the approximately 45 volts present when the phone is

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disconnected. The black box consisted of a large capacitor which was inserted in series with the telephone, thereby blocking DC current but allowing AC current (i.e., ringing signal and also audio signal) to pass. When the black box was switched into the telephone line, the handset could be picked up without the telephone system knowing and starting the billing process.

In other words, the box fooled the phone company into thinking no one had answered at the receiving end, and therefore billing was never started on the call.

#### WHITE BOX

The white box is simply a portable Touch-Tone Keypad.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, Page 654.

[http://en.wikipedia.org/wiki/Red\\_box\\_\(phreaking\)](http://en.wikipedia.org/wiki/Red_box_(phreaking))

[http://en.wikipedia.org/wiki/Blue\\_box](http://en.wikipedia.org/wiki/Blue_box)

[http://www.bombshock.com/archive/Phreaking\\_and\\_Phone\\_Systems/Box\\_Plans/](http://www.bombshock.com/archive/Phreaking_and_Phone_Systems/Box_Plans/)  
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#### QUESTION 1252

When companies come together to work in an integrated manner such as extranets, special care must be taken to ensure that each party promises to provide the necessary level of protection, liability and responsibility. These aspects should be defined in the contracts that each party signs. What describes this type of liability?

- A. Cascade liabilities
- B. Downstream liabilities
- C. Down-flow liabilities
- D. Down-set liabilities

Answer: B

Explanation: Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, Page 659.

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#### QUESTION 1253

This type of supporting evidence is used to help prove an idea or a point, however It cannot stand on its own, it is used as a supplementary tool to help prove a primary piece of evidence. What is the name of this type of evidence?

- A. Circumstantial evidence
- B. Corroborative evidence
- C. Opinion evidence
- D. Secondary evidence

Answer: B

Explanation: This type of supporting evidence is used to help prove an idea or a point, however It cannot stand on its own, it is used as a supplementary tool to help prove a primary piece of evidence. Corroborative evidence takes many forms.

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In a rape case for example, this could consist of torn clothing, soiled bed sheets, 911 emergency calls tapes, and prompt complaint witnesses.

There are many types of evidence that exist. Below you have explanations of some of the most common types:

#### Physical Evidence

Physical evidence is any evidence introduced in a trial in the form of a physical object, intended to

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prove a fact in issue based on its demonstrable physical characteristics. Physical evidence can conceivably include all or part of any object.

In a murder trial for example (or a civil trial for assault), the physical evidence might include DNA left by the attacker on the victim's body, the body itself, the weapon used, pieces of carpet spattered with blood, or casts of footprints or tire prints found at the scene of the crime.

#### Real Evidence

Real evidence is a type of physical evidence and consists of objects that were involved in a case or actually played a part in the incident or transaction in question.

Examples include the written contract, the defective part or defective product, the murder weapon, the gloves used by an alleged murderer. Trace evidence, such as fingerprints and firearm residue, is a species of real evidence. Real evidence is usually reported upon by an expert witness with appropriate qualifications to give an opinion. This normally means a forensic scientist or one qualified in forensic engineering.

Admission of real evidence requires authentication, a showing of relevance, and a showing that the object is in "the same or substantially the same condition" now as it was on the relevant date. An object of real evidence is authenticated through the senses of witnesses or by circumstantial evidence called chain of custody.

#### Documentary

Documentary evidence is any evidence introduced at a trial in the form of documents. Although this term is most widely understood to mean writings on paper (such as an invoice, a contract or a will), the term actually include any media by which information can be preserved. Photographs, tape recordings, films, and printed emails are all forms of documentary evidence.

#### Documentary versus physical evidence

A piece of evidence is not documentary evidence if it is presented for some purpose other than the examination of the contents of the document. For example, if a blood-spattered letter is introduced solely to show that the defendant stabbed the author of the letter from behind as it was being written, then the evidence is physical evidence, not documentary evidence. However, a film of the murder taking place would be documentary evidence (just as a written description of the event from an eyewitness). If the content of that same letter is then introduced to show the motive for the murder, then the evidence would be both physical and documentary.

#### Documentary Evidence Authentication

Documentary evidence is subject to specific forms of authentication, usually through the testimony of an eyewitness to the execution of the document, or to the testimony of a witness able to identify the handwriting of the purported author. Documentary evidence is also subject to the best evidence rule, which requires that the original document be produced unless there is a good

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reason not to do so.

The role of the expert witness

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Where physical evidence is of a complexity that makes it difficult for the average person to understand its significance, an expert witness may be called to explain to the jury the proper interpretation of the evidence at hand.

#### Digital Evidence or Electronic Evidence

Digital evidence or electronic evidence is any probative information stored or transmitted in digital form that a party to a court case may use at trial.

The use of digital evidence has increased in the past few decades as courts have allowed the use of e-mails, digital photographs, ATM transaction logs, word processing documents, instant message histories, files saved from accounting programs, spreadsheets, internet browser histories, databases, the contents of computer memory, computer backups, computer printouts, Global Positioning System tracks, logs from a hotel's electronic door locks, and digital video or audio files.

While many courts in the United States have applied the Federal Rules of Evidence to digital evidence in the same way as more traditional documents, courts have noted very important differences. As compared to the more traditional evidence, courts have noted that digital evidence tends to be more voluminous, more difficult to destroy, easily modified, easily duplicated, potentially more expressive, and more readily available. As such, some courts have sometimes treated digital evidence differently for purposes of authentication, hearsay, the best evidence rule, and privilege. In December 2006, strict new rules were enacted within the Federal Rules of Civil Procedure requiring the preservation and disclosure of electronically stored evidence.

#### Demonstrative Evidence

Demonstrative evidence is evidence in the form of a representation of an object. This is, as opposed to, real evidence, testimony, or other forms of evidence used at trial.

Examples of demonstrative evidence include photos, x-rays, videotapes, movies, sound recordings, diagrams, forensic animation, maps, drawings, graphs, animation, simulations, and models. It is useful for assisting a finder of fact (fact-finder) in establishing context among the facts presented in a case. To be admissible, a demonstrative exhibit must "fairly and accurately" represent the real object at the relevant time.

#### Chain of custody

Chain of custody refers to the chronological documentation, and/or paper trail, showing the seizure, custody, control, transfer, analysis, and disposition of evidence, physical or electronic. Because evidence can be used in court to convict persons of crimes, it must be handled in a

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scrupulously careful manner to avoid later allegations of tampering or misconduct which can compromise the case of the prosecution toward acquittal or to overturning a guilty verdict upon appeal.

The idea behind recording the chain of custody is to establish that the alleged evidence is fact related to the alleged crime - rather than, for example, having been planted fraudulently to make someone appear guilty.

Establishing the chain of custody is especially important when the evidence consists of fungible goods. In practice, this most often applies to illegal drugs which have been seized by law enforcement personnel. In such cases, the defendant at times disclaims any knowledge of possession of the controlled substance in question.

Accordingly, the chain of custody documentation and testimony is presented by the prosecution to establish that the substance in evidence was in fact in the possession of the defendant.

An identifiable person must always have the physical custody of a piece of evidence. In practice,

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this means that a police officer or detective will take charge of a piece of evidence, document its collection, and hand it over to an evidence clerk for storage in a secure place. These transactions, and every succeeding transaction between the collection of the evidence and its appearance in court, should be completely documented chronologically in order to withstand legal challenges to the authenticity of the evidence. Documentation should include the conditions under which the evidence is gathered, the identity of all evidence handlers, duration of evidence custody, security conditions while handling or storing the evidence, and the manner in which evidence is transferred to subsequent custodians each time such a transfer occurs (along with the signatures of persons involved at each step).

#### Example

An example of "Chain of Custody" would be the recovery of a bloody knife at a murder scene: Officer Andrew collects the knife and places it into a container, then gives it to forensics technician Bill. Forensics technician Bill takes the knife to the lab and collects fingerprints and other evidence from the knife. Bill then gives the knife and all evidence gathered from the knife to evidence clerk Charlene. Charlene then stores the evidence until it is needed, documenting everyone who has accessed the original evidence (the knife, and original copies of the lifted fingerprints).

The Chain of Custody requires that from the moment the evidence is collected, every transfer of evidence from person to person be documented and that it be provable that nobody else could have accessed that evidence. It is best to keep the number of transfers as low as possible.

In the courtroom, if the defendant questions the Chain of Custody of the evidence it can be proven  
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that the knife in the evidence room is the same knife found at the crime scene. However, if there are discrepancies and it cannot be proven who had the knife at a particular point in time, then the Chain of Custody is broken and the defendant can ask to have the resulting evidence declared inadmissible.

"Chain of custody" is also used in most chemical sampling situations to maintain the integrity of the sample by providing documentation of the control, transfer, and analysis of samples. Chain of custody is especially important in environmental work where sampling can identify the existence of contamination and can be used to identify the responsible party.

#### REFERENCES:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition (ISC)2 Press) (Kindle Locations 23173-23185). Auerbach Publications. Kindle Edition.

[http://en.wikipedia.org/wiki/Documentary\\_evidence](http://en.wikipedia.org/wiki/Documentary_evidence)

[http://en.wikipedia.org/wiki/Physical\\_evidence](http://en.wikipedia.org/wiki/Physical_evidence)

[http://en.wikipedia.org/wiki/Digital\\_evidence](http://en.wikipedia.org/wiki/Digital_evidence)

[http://en.wikipedia.org/wiki/Demonstrative\\_evidence](http://en.wikipedia.org/wiki/Demonstrative_evidence)

[http://en.wikipedia.org/wiki/Real\\_evidence](http://en.wikipedia.org/wiki/Real_evidence)

[http://en.wikipedia.org/wiki/Chain\\_of\\_custody](http://en.wikipedia.org/wiki/Chain_of_custody)

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#### QUESTION 1254

Under intellectual property law what would you call information that companies keep secret to give them an advantage over their competitors?

- A. Copyright
- B. Patent
- C. Trademark

## D. Trade Secrets

Answer: D

Explanation: edison bulb PATENTS provide rights for up to 20 years for inventions in three broad categories:

Drawing of a machine clog. Utility patents protect useful processes, machines, articles of manufacture, and compositions of matter. Some examples: fiber optics, computer hardware, medications.

Drawing of a light bulb. Design patents guard the unauthorized use of new, original, and ornamental designs for articles of manufacture. The look of an athletic shoe, a bicycle helmet, the Star Wars characters are all protected by design patents.

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Drawing of a plant. Plant patents are the way we protect invented or discovered, asexually reproduced plant varieties. Hybrid tea roses, Silver Queen corn, Better Boy tomatoes are all types of plant patents.

Drawing of Registered Trademark symbol a capital R inside a circle. TRADEMARKS protect words, names, symbols, sounds, or colors that distinguish goods and services. Trademarks, unlike patents, can be renewed forever as long as they are being used in business. The roar of the MGM lion, the pink of the Owens-Corning insulation, and the shape of a Coca-Cola bottle are familiar trademarks.

The Copyright Symbol, a Capital C inside a circle. COPYRIGHTS protect works of authorship, such as writings, music, and works of art that have been tangibly expressed. The Library of Congress registers copyrights which last the life of the author plus 50 years. Gone With The Wind (the book and the film), Beatles recordings, and video games are all works that are copyrighted.

Drawing of 3 Molecules attached by small rods.

TRADE SECRETS are information that companies keep secret to give them an advantage over their competitors. The formula for Coca-Cola is the most famous trade secret.

REFERENCE:

United States Patent and Trademark Office at:

<http://www.uspto.gov/web/offices/ac/ahrpa/opa/museum/1intell.htm>  
and

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001,  
Page 664.

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## QUESTION 1255

Which category of law is also referenced as a Tort law?

- A. Civil law
- B. Criminal law
- C. Administrative law
- D. Public law

Answer: A

Explanation: Civil law, also called tort, deals with wrongs against individuals or companies that

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result in damages or loss. A civil lawsuit would result in financial restitution and/or community service instead of jail sentences. When someone sues another person in civil court, the jury

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decides upon liability instead of innocence or guilt. If the jury determines that the defendant is liable, some monetary retribution will have to be paid by the defendant.

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### QUESTION 1256

What category of law deals with regulatory standards that regulate performance and conduct?

Government agencies create these standards, which are usually applied to companies and individuals within those companies?

- A. Standards law.
- B. Conduct law.
- C. Compliance law.
- D. Administrative law.

Answer: D

Explanation: Administrative/regulatory law deals with regulatory standards that regulate performance and conduct. Government agencies create these standards, which are usually applied to companies and individuals within those companies.

The rest of the answers are incorrect because they are distractors.

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### QUESTION 1257

The copyright law ("original works of authorship") protects the right of the owner in all of the following except?

- A. The public distribution of the idea
- B. Reproduction of the idea
- C. The idea itself
- D. Display of the idea

Answer: C

Explanation: A copyright covers the expression of ideas rather than the ideas themselves; it usually protects artistic property such as writing, recordings, databases, and computer programs. In most countries, once the work or property is completed or is in a tangible form, the copyright protection is automatically assumed.

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Copyright protection is weaker than patent protection, but the duration of protection is considerably longer (e.g., a minimum of 50 years after the creator's death or 70 years under U.S. copyright protection).

Although individual countries may have slight variations in their domestic copyright laws, as long as the country is a member of the international Berne Convention 4, the protection afforded will be at least at a minimum level, as dictated by the convention; unfortunately, not all countries are members.

In the United States, copyright law protects the right of an author to control the public distribution, reproduction, display, and adaptation of his original work. The law covers many categories of work: pictorial, graphic, musical, dramatic, literary, pantomime, motion picture, sculptural, sound recording, and architectural. Copyright law does not cover the specific resource, as does trade secret law. It protects the expression of the idea of the resource instead of the resource itself. A copyright is usually used to protect an author's writings, an artist's drawings, a programmer's source code, or specific rhythms and structures of a musician's creation. Computer programs and manuals are just two examples of items protected under the Federal Copyright Act. The item is covered under copyright law once the program or manual has been written. Although including a warning and the copyright symbol (©) is not required, doing so is encouraged so others cannot claim innocence after copying another's work. The protection does not extend to any method of operations, process, concept, or procedure, but it does protect against unauthorized copying and distribution of a protected work. It protects the form of expression rather than the subject matter.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 22391-22397). Auerbach Publications. Kindle Edition.

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 1000). McGraw-Hill. Kindle Edition.

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### QUESTION 1258

To understand the 'whys' in crime, many times it is necessary to understand MOM. Which of the following is not a component of MOM?

- A. Opportunities
- B. Methods
- C. Motivation
- D. Means

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Answer: B

Explanation: To understand the whys in crime, many times it is necessary to understand the Motivations, Opportunities, and Means (MOM). Motivations are the who and why of a crime. Opportunities are the where and when of a crime, and Means pertains to the capabilities a criminal would need to be successful. Methods is not a component of MOM.

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### QUESTION 1259

In the statement below, fill in the blank:

Law enforcement agencies must get a warrant to search and seize an individual's property, as stated in the \_\_\_\_\_ Amendment.

- A. First.
- B. Second.
- C. Third.
- D. Fourth.

Answer: D

Explanation: The Fourth Amendment does not apply to a seizure or an arrest by private citizens. Search and seizure activities can get tricky depending on what is being searched for and where. For example, American citizens are protected by the Fourth Amendment against unlawful search and seizure, so law enforcement agencies must have probable cause and request a search warrant from a judge or court before conducting such a search.

The actual search can only take place in the areas outlined by the warrant. The Fourth Amendment does not apply to actions by private citizens unless they are acting as police agents. So, for example, if Kristy's boss warned all employees that the management could remove files from their computers at any time, and her boss was not a police officer or acting as a police agent, she could not successfully claim that her Fourth Amendment rights were violated. Kristy's boss may have violated some specific privacy laws, but he did not violate Kristy's Fourth Amendment rights.

In some circumstances, a law enforcement agent may seize evidence that is not included in the warrant, such as if the suspect tries to destroy the evidence. In other words, if there is an impending possibility that evidence might be destroyed, law enforcement may quickly seize the evidence to prevent its destruction. This is referred to as exigent circumstances, and a judge will

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later decide whether the seizure was proper and legal before allowing the evidence to be admitted. For example, if a police officer had a search warrant that allowed him to search a suspect's living room but no other rooms, and then he saw the suspect dumping cocaine down the toilet, the police officer could seize the cocaine even though it was in a room not covered under his search warrant. After evidence is gathered, the chain of custody needs to be enacted and enforced to make sure the evidence's integrity is not compromised.

All other choices were only detractors.

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 1057). McGraw-Hill. Kindle Edition.

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### QUESTION 1260

Within the legal domain what rule is concerned with the legality of how the evidence was gathered?

- A. Exclusionary rule
- B. Best evidence rule
- C. Hearsay rule
- D. Investigation rule

Answer: A

Explanation: The exclusionary rule mentions that evidence must be gathered legally or it can't be used.

The principle based on federal Constitutional Law that evidence illegally seized by law enforcement officers in violation of a suspect's right to be free from unreasonable searches and

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seizures cannot be used against the suspect in a criminal prosecution. The exclusionary rule is designed to exclude evidence obtained in violation of a criminal defendant's Fourth Amendment rights. The Fourth Amendment protects against unreasonable searches and seizures by law enforcement personnel. If the search of a criminal suspect is unreasonable, the evidence obtained in the search will be excluded from trial.

The exclusionary rule is a court-made rule. This means that it was created not in statutes passed by legislative bodies but rather by the U.S. Supreme Court. The exclusionary rule applies in federal courts by virtue of the Fourth Amendment. The Court has ruled that it applies in state courts although the due process clause of the Fourteenth Amendment.(The Bill of Rights—the first ten amendments—applies to actions by the federal government. The Fourteenth Amendment, the

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Court has held, makes most of the protections in the Bill of Rights applicable to actions by the states.)

The exclusionary rule has been in existence since the early 1900s. Before the rule was fashioned, any evidence was admissible in a criminal trial if the judge found the evidence to be relevant. The manner in which the evidence had been seized was not an issue. This began to change in 1914, when the U.S. Supreme Court devised a way to enforce the Fourth Amendment. In *Weeks v. United States*, 232 U.S. 383, 34 S. Ct. 341, 58 L. Ed. 652 (1914), a federal agent had conducted a warrantless search for evidence of gambling at the home of Fremont Weeks. The evidence seized in the search was used at trial, and Weeks was convicted. On appeal, the Court held that the Fourth Amendment barred the use of evidence secured through a warrantless search. Weeks's conviction was reversed, and thus was born the exclusionary rule.

The best evidence rule concerns limiting potential for alteration. The best evidence rule is a common law rule of evidence which can be traced back at least as far as the 18th century. In *Omychund v Barker* (1745) 1 Atk, 21, 49; 26 ER 15, 33, Lord Harwicke stated that no evidence was admissible unless it was "the best that the nature of the case will allow". The general rule is that secondary evidence, such as a copy or facsimile, will be not admissible if an original document exists, and is not unavailable due to destruction or other circumstances indicating unavailability.

The rationale for the best evidence rule can be understood from the context in which it arose: in the eighteenth century a copy was usually made by hand by a clerk (or even a litigant). The best evidence rule was predicated on the assumption that, if the original was not produced, there was a significant chance of error or fraud in relying on such a copy.

The hearsay rule concerns computer-generated evidence, which is considered second-hand evidence.

Hearsay is information gathered by one person from another concerning some event, condition, or thing of which the first person had no direct experience. When submitted as evidence, such statements are called hearsay evidence. As a legal term, "hearsay" can also have the narrower meaning of the use of such information as evidence to prove the truth of what is asserted. Such use of "hearsay evidence" in court is generally not allowed. This prohibition is called the hearsay rule.

For example, a witness says "Susan told me Tom was in town". Since the witness did not see Tom in town, the statement would be hearsay evidence to the fact that Tom was in town, and not admissible. However, it would be admissible as evidence that Susan said Tom was in town, and on the issue of her knowledge of whether he was in town.

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Hearsay evidence has many exception rules. For the purpose of the exam you must be familiar with the business records exception rule to the Hearsay Evidence. The business records created during the ordinary course of business are considered reliable and can usually be brought in under this exception if the proper foundation is laid when the records are introduced into evidence. Depending on which jurisdiction the case is in, either the records custodian or someone with knowledge of the records must lay a foundation for the records. Logs that are collected as part of a document business process being carried at regular interval would fall under this exception. They could be presented in court and not be considered Hearsay.

Investigation rule is a detractor.

Source: ROTHKE, Ben, CISSP CBK Review presentation on domain 9.

and

The FREE Online Law Dictionary at: <http://legaldictionary.thefreedictionary.com/Exclusionary+Rule>

and

Wikipedia has a nice article on this subject at: [http://en.wikipedia.org/wiki/Exclusionary\\_rule](http://en.wikipedia.org/wiki/Exclusionary_rule)

and

[http://en.wikipedia.org/wiki/Hearsay\\_in\\_United\\_States\\_law#Hearsay\\_exceptions](http://en.wikipedia.org/wiki/Hearsay_in_United_States_law#Hearsay_exceptions)

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### QUESTION 1261

Computer-generated evidence is considered:

- A. Best evidence
- B. Second hand evidence
- C. Demonstrative evidence
- D. Direct evidence

Answer: B

Explanation: Computer-generated evidence normally falls under the category of hearsay evidence, or second-hand evidence, because it cannot be proven accurate and reliable. Under the U.S. Federal Rules of Evidence, hearsay evidence is generally not admissible in court. Best evidence is original or primary evidence rather than a copy or duplicate of the evidence. It does not apply to computer-generated evidence. Direct evidence is oral testimony by witness. Demonstrative evidence are used to aid the jury (models, illustrations, charts).

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 9: Law, Investigation, and

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Ethics (page 310).

And: ROTHKE, Ben, CISSP CBK Review presentation on domain 9.

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### QUESTION 1262

Which of the following would be MOST important to guarantee that the computer evidence will be admissible in court?

- A. It must prove a fact that is immaterial to the case.
- B. Its reliability must be proven.

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- C. The process for producing it must be documented and repeatable.
  - D. The chain of custody of the evidence must show who collected, secured, controlled, handled, transported the evidence, and that it was not tampered with.

Answer: D

Explanation: The

Answer: The chain of custody of the evidence must show who collected, secured, controlled, handled, and transported the evidence, and that it was not tampered with. It has to be material, relevant and reliable, and the chain of custody must be maintained, it is unlikely that it will be admissible in court if it has been tampered with.

The following answers are incorrect:

It must prove a fact that is immaterial to the case. Is incorrect because evidence must be relevant. If it is immaterial then it is not relevant.

Its reliability must be proven. Is incorrect because it is not the best answer. While evidence must be relevant if the chain of custody cannot be verified, then the evidence could lose its credibility because there is no proof that the evidence was not tampered with. So, the correct answer above is the BEST answer.

The process for producing it must be documented and repeatable. Is incorrect because just because the process is documented and repeatable does not mean that it will be the same. This amounts to Corroborative Evidence that may help to support a case.

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### QUESTION 1263

Keeping in mind that these are objectives that are provided for information only within the CBK as 8

they only apply to the committee and not to the individuals. Which of the following statements pertaining to the (ISC)2 Code of Ethics is incorrect?

- A. All information systems security professionals who are certified by (ISC)2 recognize that such a certification is a privilege that must be both earned and maintained.
- B. All information systems security professionals who are certified by (ISC)2 shall provide diligent and competent service to principals.
- C. All information systems security professionals who are certified by (ISC)2 shall forbid behavior such as associating or appearing to associate with criminals or criminal behavior.
- D. All information systems security professionals who are certified by (ISC)2 shall promote the understanding and acceptance of prudent information security measures.

Answer: C

Explanation: Now this is a tricky one. I know I am going to get comments on this one but here it goes.

First, get your copy of (ISC)2 Code of Ethics. The Code of Ethics Canons are the following:

Protect society, the commonwealth, and the infrastructure

Act honorably, honestly, justly, responsibly, and legally

Provide diligent and competent service to principals

Advance and protect the profession.

Now the Code has a section called Objectives for guidance.

These additional objectives, given in furtherance of the goals, are advisory, not mandatory, and are intended to help the professional in identifying and resolving the inevitable ethical dilemmas that will confront him/her.

The Code mentions: "In arriving at the following guidance, the committee is mindful of its responsibility to ... discourage such behavior as ... Associating or appearing to associate with criminals or criminal behavior.

However these objectives are provided for information only; the professional is not required or expected to agree with them.". These are explicit responsibilities of the committee, not of the professional him/herself.

Source: (ISC)2 Code of Ethics. Available at <http://www.isc2.org>.

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### QUESTION 1264

Which of the following statements is not listed within the 4 canons of the (ISC)2 Code of Ethics?

- A. All information systems security professionals who are certified by (ISC)2 shall observe all contracts and agreements, express or implied.
- B. All information systems security professionals who are certified by (ISC)2 shall render only those services for which they are fully competent and qualified.
- C. All information systems security professionals who are certified by (ISC)2 shall promote and preserve public trust and confidence in information and systems.
- D. All information systems security professionals who are certified by (ISC)2 shall think about the social consequences of the program they write.

Answer: D

Explanation: "Thou shall think about the social consequences of the program you are writing or the system you are designing." is the ninth commandment of the Computer Ethics Institute and is not part of the (ISC)2 Code of Ethics.

#### Code of Ethics Preamble

Safety of the commonwealth, duty to our principals (employers, contractors, people we work for), and to each other requires that we adhere, and be seen to adhere, to the highest ethical standards of behavior. Therefore, strict adherence to this Code is a condition of certification.

#### Code of Ethics Canons:

There are 4 high level canons within the ISC2 code of ethics, below you have the details of what apply to each of them.

##### 1. Protect society, the commonwealth, and the infrastructure

Promote and preserve public trust and confidence in information and systems

Promote the understanding and acceptance of prudent information security measures

Preserve and strengthen the integrity of the public infrastructure

Discourage unsafe practice

##### 2. Act honorably, honestly, justly, responsibly, and legally

Tell the truth; make all stakeholders aware of your actions on a timely basis

Observe all contracts and agreements, express or implied

Treat all members fairly. In resolving conflicts, consider public safety and duties to principals,

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individuals, and the profession in that order

Give prudent advice; avoid raising unnecessary alarm or giving unwarranted comfort

Take care to be truthful, objective, cautious, and within your competence

When resolving differing laws in different jurisdictions, give preference to the laws of the jurisdiction in which you render your service

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3. Provide diligent and competent service to principals

Preserve the value of their systems, applications, and information

Respect their trust and the privileges that they grant you

Avoid conflicts of interest or the appearance thereof

Render only those services for which you are fully competent and qualified

4. Advance and protect the profession

Sponsor for professional advancement those best qualified. All other things equal, prefer those who are certified and who adhere to these canons. Avoid professional association with those whose practices or reputation might diminish the profession

Take care not to injure the reputation of other professionals through malice or indifference

Maintain your competence; keep your skills and knowledge current. Give generously of your time and knowledge in training others

Reference used for this question: (ISC)2 Code of Ethics. Available at:

[https://www.isc2.org/uploadedFiles/%28ISC%292\\_Public\\_Content/Code\\_of\\_ethics/ISC2-Code-of-Ethics.pdf](https://www.isc2.org/uploadedFiles/%28ISC%292_Public_Content/Code_of_ethics/ISC2-Code-of-Ethics.pdf)

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## QUESTION 1265

Regarding codes of ethics covered within the ISC2 CBK, within which of them is the phrase "Discourage unsafe practice" found?

- A. Computer Ethics Institute commandments
- B. (ISC)2 Code of Ethics
- C. Internet Activities Board's Ethics and the Internet (RFC1087)
- D. CIAC Guidelines

Answer: B

Explanation: This can be found under the section Protect society, the commonwealth, and the infrastructure of the (ISC)2 Code of Ethics.

You MUST be intimately familiar with the ISC2 code of ethics before you get to your exam. There will be a few questions on the exam related to the Code of Ethics for sure.

See extract below:

Code of Ethics Canons:

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Protect society, the commonwealth, and the infrastructure.

- Promote and preserve public trust and confidence in information and systems.
- Promote the understanding and acceptance of prudent information security measures.
- Preserve and strengthen the integrity of the public infrastructure.
- Discourage unsafe practice.

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Act honorably, honestly, justly, responsibly, and legally.

- Tell the truth; make all stakeholders aware of your actions on a timely basis.
- Observe all contracts and agreements, express or implied.
- Treat all members fairly. In resolving conflicts, consider public safety and duties to principals, individuals, and the profession in that order.
- Give prudent advice; avoid raising unnecessary alarm or giving unwarranted comfort. Take care to be truthful, objective, cautious, and within your competence.
- When resolving differing laws in different jurisdictions, give preference to the laws of the jurisdiction in which you render your service.

Provide diligent and competent service to principals.

- Preserve the value of their systems, applications, and information.
- Respect their trust and the privileges that they grant you.
- Avoid conflicts of interest or the appearance thereof.
- Render only those services for which you are fully competent and qualified.

Advance and protect the profession.

- Sponsor for professional advancement those best qualified. All other things equal, prefer those who are certified and who adhere to these canons. Avoid professional association with those whose practices or reputation might diminish the profession.
- Take care not to injure the reputation of other professionals through malice or indifference.
- Maintain your competence; keep your skills and knowledge current. Give generously of your time and knowledge in training others.

Reference(s) used for this question:

(ISC)2 Code of Ethics. Available at <http://www.isc2.org>.

The exact URL for the PDF containing the code of Ethics is:

[https://www.isc2.org/uploadedFiles/\(ISC\)2\\_Public\\_Content/Code\\_of\\_Ethics/ISC2-Code-of-Ethics.pdf](https://www.isc2.org/uploadedFiles/(ISC)2_Public_Content/Code_of_Ethics/ISC2-Code-of-Ethics.pdf)

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## QUESTION 1266

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Which of the following European Union (EU) principles pertaining to the protection of information on private individuals is incorrect?

- A. Data collected by an organization can be used for any purpose and for as long as necessary, as long as it is never communicated outside of the organization by which it was collected.
- B. Individuals have the right to correct errors contained in their personal data.
- C. Transmission of personal information to locations where "equivalent" personal data protection cannot be assured is prohibited.
- D. Records kept on an individual should be accurate and up to date.

Answer: A

Explanation: Data should be used only for the purposes for which it was collected, and it should be used only for a reasonable period of time.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 9: Law, Investigation, and Ethics (page 302).

**QUESTION 1267**

Which of the following is NOT a Generally Accepted System Security Principle (GASSP)?

- A. Computer security supports the mission of the organization
- B. Computer security should be cost-effective
- C. The conception of computer viruses and worms is unethical.
- D. Systems owners have security responsibilities outside their organization.

Answer: C

Explanation: The Generally Accepted System Security Principles (GASSP) are security-oriented principles and do not specifically cover viruses or worms. However it is not a best practice to create and distribute worms :-)

GAISP is based on a solid consensus-building process that is central to the success of this approach. Principles at all levels are developed by information security practitioners who fully understand the underlying issues of the documented practices and their application in the real world. Then, these principles will be reviewed and vetted by

skilled information security experts and authorities who will ensure that each principle is:

- Accurate, complete, and consistent
- Compliant with its stated objective

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- Technically reasonable
- Well-presented, grammatically and editorially correct
- Conforms to applicable standards and guideline

The principles are:

1. Computer security supports the mission of the organization
2. Computer security is an integral element of sound management
3. Computer security should be cost-effective
4. Systems owners have security responsibilities outside their own organization
5. Computer security responsibilities and accountability should be made explicit
6. Computer security requires a comprehensive and integrated approach
7. Computer security should be periodically reassessed
8. Computer security is constrained by societal factors

NOTE:

The GAISP are no longer supported or active. NIST is now producing standards for the US government. However there are still remnant of GAISP on the exam and as you can see the list is most certainly applicable today on the ethics side.

The GAISP is also known as NIST SP 800-14, see the following link:

<http://csrc.nist.gov/publications/nistpubs/800-14/800-14.pdf>

References used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 9: Law, Investigation, and Ethics (page 302).

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and

GAISP Version 3.0, <http://all.net/books/standards/GAISP-v30.pdf>

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**QUESTION 1268**

Which of the following would best describe secondary evidence?

- A. Oral testimony by a non-expert witness
- B. Oral testimony by an expert witness
- C. A copy of a piece of evidence
- D. Evidence that proves a specific act

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Answer: C

Explanation: Secondary evidence is defined as a copy of evidence or oral description of its contents. It is considered not as reliable as best evidence. Evidence that proves or disproves a specific act through oral testimony based on information gathered through the witness's five senses is considered direct evidence. The fact that testimony is given by an expert only affects the witness's ability to offer an opinion instead of only testifying of the facts.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 9: Law, Investigation, and Ethics (page 310).

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**QUESTION 1269**

Why would a memory dump be admissible as evidence in court?

- A. Because it is used to demonstrate the truth of the contents.
- B. Because it is used to identify the state of the system.
- C. Because the state of the memory cannot be used as evidence.
- D. Because of the exclusionary rule.

Answer: B

Explanation: A memory dump can be admitted as evidence if it acts merely as a statement of fact. A system dump is not considered hearsay because it is used to identify the state of the system, not the truth of the contents. The exclusionary rule mentions that evidence must be gathered legally or it can't be used. This choice is a distracter.

Source: ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 10: Law, Investigation, and Ethics (page 187).

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**QUESTION 1270**

Which type of attack would a competitive intelligence attack best classify as?

- A. Business attack
- B. Intelligence attack
- C. Financial attack

## D. Grudge attack

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Answer: A

Explanation: Business attacks concern information loss through competitive intelligence gathering and computer-related attacks. These attacks can be very costly due to the loss of trade secrets and reputation.

Intelligence attacks are aimed at sensitive military and law enforcement files containing military data and investigation reports.

Financial attacks are concerned with frauds to banks and large corporations.

Grudge attacks are targeted at individuals and companies who have done something that the attacker doesn't like.

The CISSP for Dummies book has nice coverage of the different types of attacks, here is an extract:

### Terrorism Attacks

Terrorism exists at many levels on the Internet. In April 2001, during a period of tense relations between China and the U.S. (resulting from the crash landing of a U.S. Navy reconnaissance plane on Hainan Island), Chinese hackers ( cyberterrorists ) launched a major effort to disrupt critical U.S. infrastructure, which included U.S. government and military systems.

Following the terrorist attacks against the U.S. on September 11, 2001, the general public became painfully aware of the extent of terrorism on the Internet. Terrorist organizations and cells are using online capabilities to coordinate attacks, transfer funds, harm international commerce, disrupt critical systems, disseminate propaganda, and gain useful information about developing techniques and instruments of terror, including nuclear , biological, and chemical weapons.

### Military and intelligence attacks

Military and intelligence attacks are perpetrated by criminals, traitors, or foreign intelligence agents seeking classified law enforcement or military information. Such attacks may also be carried out by governments during times of war and conflict.

### Financial attacks

Banks, large corporations, and e-commerce sites are the targets of financial attacks, all of which are motivated by greed. Financial attacks may seek to steal or embezzle funds, gain access to online financial information, extort individuals or businesses, or obtain the personal credit card numbers of customers.

### Business attacks

Businesses are becoming the targets of more and more computer and Internet attacks. These

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attacks include competitive intelligence gathering, denial of service, and other computer- related attacks. Businesses are often targeted for several reasons including

Lack of expertise: Despite heightened security awareness, a shortage of qualified security professionals still exists, particularly in private enterprise.

Lack of resources: Businesses often lack the resources to prevent, or even detect, attacks against their systems.

Lack of reporting or prosecution : Because of public relations concerns and the inability to prosecute computer criminals due to either a lack of evidence or a lack of properly handled evidence, the majority of business attacks still go unreported.

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The cost to businesses can be significant, including loss of trade secrets or proprietary information, loss of revenue, and loss of reputation.

#### Grudge attacks

Grudge attacks are targeted at individuals or businesses and are motivated by a desire to take revenge against a person or organization. A disgruntled employee, for example, may steal trade secrets, delete valuable data, or plant a logic bomb in a critical system or application.

Fortunately, these attacks (at least in the case of a disgruntled employee) can be easier to prevent or prosecute than many other types of attacks because:

The attacker is often known to the victim.

The attack has a visible impact that produces a viable evidence trail.

Most businesses (already sensitive to the possibility of wrongful termination suits) have well-established termination procedures

#### “Fun” attacks

“Fun” attacks are perpetrated by thrill seekers and script kiddies who are motivated by curiosity or excitement. Although these attackers may not intend to do any harm or use any of the information that they access, they’re still dangerous and their activities are still illegal.

These attacks can also be relatively easy to detect and prosecute. Because the perpetrators are often script kiddies or otherwise inexperienced hackers, they may not know how to cover their tracks effectively.

Also, because no real harm is normally done nor intended against the system, it may be tempting (although ill advised) for a business to prosecute the individual and put a positive public relations spin on the incident. You’ve seen the film *War Games*: “We quickly detected the attack, prevented any harm to our network, and prosecuted the responsible individual; our security is unbreakable!”

Such action, however, will likely motivate others to launch a more serious and concerted grudge

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attack against the business.

Many computer criminals in this category only seek notoriety. Although it’s one thing to brag to a small circle of friends about defacing a public Web site, the wily hacker who appears on CNN reaches the next level of hacker celebrity-dom. These twisted individuals want to be caught to revel in their 15 minutes of fame.

#### References:

ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 10: Law, Investigation, and Ethics (page 187)

and

CISSP Professional Study Guide by James Michael Stewart, Ed Tittel, Mike Chapple, page 607-609

and

CISSP for Dummies, Miller L. H. and Gregory P. H. ISBN: 0470537914, page 309-311

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### QUESTION 1271

Due care is not related to:

- A. Good faith
- B. Prudent man
- C. Profit
- D. Best interest

Answer: C

Explanation: Officers and directors of a company are expected to act carefully in fulfilling their tasks. A director shall act in good faith, with the care an ordinarily prudent person in a like position would exercise under similar circumstances and in a manner he reasonably believes is in the best interest of the enterprise. The notion of profit would tend to go against the due care principle.

Source: ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 10: Law, Investigation, and Ethics (page 186).

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### QUESTION 1272

Which of the following is not a form of passive attack?

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- A. Scavenging
- B. Data diddling
- C. Shoulder surfing
- D. Sniffing

Answer: B

Explanation:

Details:

Data diddling involves alteration of existing data and is extremely common. It is one of the easiest types of crimes to prevent by using access and accounting controls, supervision, auditing, separation of duties, and authorization limits. It is a form of active attack. All other choices are examples of passive attacks, only affecting confidentiality.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, Chapter 10: Law, Investigation, and Ethics (page 645).

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### QUESTION 1273

When a possible intrusion into your organization's information system has been detected, which of the following actions should be performed first?

- A. Eliminate all means of intruder access.
- B. Contain the intrusion.
- C. Determine to what extent systems and data are compromised.
- D. Communicate with relevant parties.

Answer: C

Explanation: Once an intrusion into your organization's information system has been detected, the first action that needs to be performed is determining to what extent systems and data are compromised (if they really are), and then take action.

This is the good old saying: "Do not cry wolf until you know there is a wolf for sure" Sometimes it smells like a wolf, it looks like a wolf, but it may not be a wolf. Technical problems or bad hardware

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might cause problems that looks like an intrusion even thou it might not be. You must make sure that a crime has in fact been committed before implementing your reaction plan.

Information, as collected and interpreted through analysis, is key to your decisions and actions while executing response procedures. This first analysis will provide information such as what attacks were used, what systems and data were accessed by the intruder, what the intruder did after obtaining access and what the intruder is currently doing (if the intrusion has not been contained).

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The next step is to communicate with relevant parties who need to be made aware of the intrusion in a timely manner so they can fulfil their responsibilities.

Step three is concerned with collecting and protecting all information about the compromised systems and causes of the intrusion. It must be carefully collected, labelled, catalogued, and securely stored.

Containing the intrusion, where tactical actions are performed to stop the intruder's access, limit the extent of the intrusion, and prevent the intruder from causing further damage, comes next.

Since it is more a long-term goal, eliminating all means of intruder access can only be achieved last, by implementing an ongoing security improvement process.

Reference used for this question:

ALLEN, Julia H., The CertKingdom to System and Network Security Practices, Addison-Wesley, 2001, Chapter 7: Responding to Intrusions (pages 271-289).

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### QUESTION 1274

When first analyzing an intrusion that has just been detected and confirming that it is a true positive, which of the following actions should be done as a first step if you wish to prosecute the attacker in court?

- A. Back up the compromised systems.
- B. Identify the attacks used to gain access.
- C. Capture and record system information.
- D. Isolate the compromised systems.

Answer: C

Explanation: When an intrusion has been detected and confirmed, if you wish to prosecute the attacker in court, the following actions should be performed in the following order:

Capture and record system information and evidence that may be lost, modified, or not captured during the execution of a backup procedure. Start with the most volatile memory areas first.

Make at least two full backups of the compromised systems, using hardware-write-protectable or write-once media. A first backup may be used to re-install the compromised system for further analysis and the second one should be preserved in a secure location to preserve the chain of custody of evidence.

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Isolate the compromised systems.

Search for signs of intrusions on other systems.

Examine logs in order to gather more information and better identify other systems to which the intruder might have gained access.

Search through logs of compromised systems for information that would reveal the kind of attacks used to gain access.

Identify what the intruder did, for example by analyzing various log files, comparing checksums of known, trusted files to those on the compromised machine and by using other intrusion analysis tools.

Regardless of the exact steps being followed, if you wish to prosecute in a court of law it means you MUST capture the evidence as a first step before it could be lost or contaminated. You always start with the most volatile evidence first.

**NOTE:**

I have received feedback saying that some other steps may be done such as Disconnecting the system from the network or shutting down the system. This is true. However, those are not choices listed within the 4 choices attached to this question, you MUST avoid changing the question. You must stick to the four choices presented and pick which one is the best out of the four presented.

In real life, Forensic is not always black or white. There are many shades of grey. In real life you would have to consult your system policy (if you have one), get your Computer Incident team involved, and talk to your forensic expert and then decide what is the best course of action.

Reference(s) Used for this question:

[http://www.newyorkcomputerforensics.com/learn/forensics\\_process.php](http://www.newyorkcomputerforensics.com/learn/forensics_process.php)  
and

ALLEN, Julia H., The CertKingdom to System and Network Security Practices, Addison-Wesley, 2001, Chapter 7: Responding to Intrusions (pages 273-277).

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## **QUESTION 1275**

In order to be able to successfully prosecute an intruder:

- A. A point of contact should be designated to be responsible for communicating with law enforcement and other external agencies.
- B. A proper chain of custody of evidence has to be preserved.
- C. Collection of evidence has to be done following predefined procedures.  
1
- D. Whenever possible, analyze a replica of the compromised resource, not the original, thereby avoiding inadvertently tamping with evidence.

Answer: B

Explanation:

Details:

If you intend on prosecuting an intruder, evidence has to be collected in a lawful manner and, most importantly, protected through a secure chain-of-custody procedure that tracks who has been involved in handling the evidence and where it has been stored. All other choices are all important points, but not the best answer, since no prosecution is possible without a proper, provable chain of custody of evidence.

Source: ALLEN, Julia H., The CertKingdom to System and Network Security Practices, Addison-Wesley, 2001, Chapter 7: Responding to Intrusions (pages 282-285).

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**QUESTION 1276**

When referring to a computer crime investigation, which of the following would be the MOST important step required in order to preserve and maintain a proper chain of custody of evidence:

- A. Evidence has to be collected in accordance with all laws and all legal regulations.
- B. Law enforcement officials should be contacted for advice on how and when to collect critical information.
- C. Verifiable documentation indicating the who, what, when, where, and how the evidence was handled should be available.
- D. Log files containing information regarding an intrusion are retained for at least as long as normal business records, and longer in the case of an ongoing investigation.

Answer: C

Explanation: Two concepts that are at the heart of dealing effectively with digital/electronic evidence, or any evidence for that matter, are the chain of custody and authenticity/integrity. The chain of custody refers to the who, what, when, where, and how the evidence was handled—from its identification through its entire life cycle, which ends with destruction or permanent archiving.

Any break in this chain can cast doubt on the integrity of the evidence and on the professionalism of those directly involved in either the investigation or the collection and handling of the evidence. The chain of custody requires following a formal process that is well documented and forms part of a standard operating procedure that is used in all cases, no exceptions.

The following are incorrect answers:

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Evidence has to be collected in accordance with all laws and legal regulations. Evidence would have to be collected in accordance with applicable laws and regulations but not necessarily with ALL laws and regulations. Only laws and regulations that applies would be followed.

Law enforcement officials should be contacted for advice on how and when to collect critical information. It seems you failed to do your homework, once you have an incident it is a bit late to do this. Proper crime investigation as well as incident response is all about being prepared ahead of time. Obviously, you are improvising if you need to call law enforcement to find out what to do. It is a great way of contaminating your evidence by mistake if you don't have a well documented processs with clear procedures that needs to be followed.

Log files containing information regarding an intrusion are retained for at least as long as normal business records, and longer in the case of an ongoing investigation. Specific legal requirements exists for log retention and they are not the same as normal business records. Laws such as Basel, HIPPA, SOX, and others has specific requirements.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 23465-23470). Auerbach Publications. Kindle Edition.  
and

ALLEN, Julia H., The CertKingdom to System and Network Security Practices, Addison-Wesley, 2001, Chapter 7: Responding to Intrusions (pages 282-285).

**QUESTION 1277**

When should a post-mortem review meeting be held after an intrusion has been properly taken care of?

- A. Within the first three months after the investigation of the intrusion is completed.
- B. Within the first week after prosecution of intruders have taken place, whether successful or not.
- C. Within the first month after the investigation of the intrusion is completed.
- D. Within the first week of completing the investigation of the intrusion.

Answer: D

Explanation: A post-mortem review meeting should be held with all involved parties within three to five working days of completing the investigation of the intrusion. Otherwise, participants are likely to forget critical information. Even if it enabled an organization to validate the correctness of its chain of custody of evidence, it would not make sense to wait until prosecution is complete

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because it would take too much time and many cases of intrusion never get to court anyway.

Source: ALLEN, Julia H., The CertKingdom to System and Network Security Practices, Addison-Wesley, 2001, Chapter 7: Responding to Intrusions (page 297).

**QUESTION 1278**

If an organization were to monitor their employees' e-mail, it should not:

- A. Monitor only a limited number of employees.
- B. Inform all employees that e-mail is being monitored.
- C. Explain who can read the e-mail and how long it is backed up.
- D. Explain what is considered an acceptable use of the e-mail system.

Answer: A

Explanation: Monitoring has to be conducted in a lawful manner and applied in a consistent fashion; thus should be applied uniformly to all employees, not only to a small number.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 9: Law, Investigation, and Ethics (page 304).

**QUESTION 1279**

If an employee's computer has been used by a fraudulent employee to commit a crime, the hard disk may be seized as evidence and once the investigation is complete it would follow the normal steps of the Evidence Life Cycle. In such case, the Evidence life cycle would not include which of the following steps listed below?

- A. Acquisition collection and identification
- B. Analysis
- C. Storage, preservation, and transportation
- D. Destruction

Answer: D

Explanation: Unless the evidence is illegal then it should be returned to owner, not destroyed. The Evidence Life Cycle starts with the discovery and collection of the evidence. It progresses through the following series of states until it is finally returned to the victim or owner:

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- Acquisition collection and identification
- Analysis
- Storage, preservation, and transportation
- Presented in court
- Returned to victim (owner)

The Second edition of the ISC2 book says on page 529-530:

Identifying evidence: Correctly identifying the crime scene, evidence, and potential containers of evidence.

Collecting or acquiring evidence: Adhering to the criminalistic principles and ensuring that the contamination and the destruction of the scene are kept to a minimum. Using sound, repeatable, collection techniques that allow for the demonstration of the accuracy and integrity of evidence, or copies of evidence.

Examining or analyzing the evidence: Using sound scientific methods to determine the characteristics of the evidence, conducting comparison for individuation of evidence, and conducting event reconstruction.

Presentation of findings: Interpreting the output from the examination and analysis based on findings of fact and articulating these in a format appropriate for the intended audience (e.g., court brief, executive memo, report).

Note on returning the evidence to the Owner/Victim

The final destination of most types of evidence is back with its original owner. Some types of evidence, such as

drugs or drug paraphernalia (i.e., contraband), are destroyed after the trial.

Any evidence gathered during a search, although maintained by law enforcement, is legally under the control of the courts. And although a seized item may be yours and may even have your name on it, it might not be returned to you unless the suspect signs a release or after a hearing by the court. Unfortunately, many victims do not want to go to trial; they just want to get their property back.

Many investigations merely need the information on a disk to prove or disprove a fact in question; thus, there is no need to seize the entire system. Once a schematic of the system is drawn or photographed, the hard disk can be removed and then transported to a forensic lab for copying.

Mirror copies of the suspect disk are obtained using forensic software and then one of those copies can be returned to the victim so that business operations can resume.

Reference(s) used for this question:

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KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 9: Law, Investigation, and Ethics (page 309).

and

The Official Study Book, Second Edition, Page 529-230

**QUESTION 1280**

Which of the following is a problem regarding computer investigation issues?

- A. Information is tangible.
- B. Evidence is easy to gather.
- C. Computer-generated records are only considered secondary evidence, thus are not as reliable as best evidence.
- D. In many instances, an expert or specialist is not required.

Answer: C

Explanation: Because computer-generated records normally fall under the category of hearsay evidence because they cannot be proven accurate and reliable this can be a problem.

Under the U.S. Federal Rules of Evidence, hearsay evidence is generally not admissible in court. This inadmissibility is known as the hearsay rule, although there are some exceptions for how, when, by whom and in what circumstances data was collected.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 9: Law, Investigation, and Ethics (page 310).

**IMPORTANT NOTE:**

For the purpose of the exam it is very important to remember the Business Record exemption to the Hearsay Rule. For example: if you create log files and review them on a regular basis as part of a business process, such files would be admissible in court and they would not be considered hearsay because they were made in the course of regular business and it is part of regular course of business to create such record.

Here is another quote from the HISIM book:

**Business Record Exemption to the Hearsay Rule**

Federal Rules of Evidence 803(6) allow a court to admit a report or other business document

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made at or near the time by or from information transmitted by a person with knowledge, if kept in the course of regularly conducted business activity, and if it was the regular practice of that business activity to make the [report or document], all as shown by testimony of the custodian or other qualified witness, unless the source of information or the method or circumstances of preparation indicate lack of trustworthiness.

To meet Rule 803(6) the witness must:

- Have custody of the records in question on a regular basis.
- Rely on those records in the regular course of business.
- Know that they were prepared in the regular course of business.

Audit trails meet the criteria if they are produced in the normal course of business. The process to produce the output will have to be proven to be reliable. If computer-generated evidence is used and admissible, the court may order disclosure of the details of the computer, logs, and maintenance records in respect to the system generating the printout, and then the defense may use that material to attack the reliability of the evidence. If the audit trails are not used or reviewed — at least the exceptions (e.g., failed log-on attempts) — in the regular course of business, they do not meet the criteria for admissibility.

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Federal Rules of Evidence 1001(3) provide another exception to the hearsay rule. This rule allows a memory or disk dump to be admitted as evidence, even though it is not done in the regular course of business. This dump merely acts as statement of fact. System dumps (in binary or hexadecimal) are not hearsay because they are not being offered to prove the truth of the contents, but only the state of the computer.

#### BUSINESS RECORDS LAW EXAMPLE:

The business records law was enacted in 1931 (PA No. 56). For a document to be admissible under the statute, the proponent must show: (1) the document was made in the regular course of business; (2) it was the regular course of business to make the record; and (3) the record was made when the act, transaction, or event occurred, or shortly thereafter (State v. Vennard, 159 Conn. 385, 397 (1970); Mucci v. LeMonte, 157 Conn. 566, 570 (1969)). The failure to establish any one of these essential elements renders the document inadmissible under the statute (McCahill v. Town and Country Associates, Ltd., 185 Conn. 37 (1981); State v. Peary, 176 Conn. 170 (1978); Welles v. Fish Transport Co., 123 Conn. 49 (1937)).

The statute expressly provides that the person who made the business entry does not have to be unavailable as a witness and the proponent does not have to call as a witness the person who made the record or show the person to be unavailable (State v. Jeustiniano, 172 Conn. 275 (1977)).

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The person offering the business records as evidence does not have to independently prove the trustworthiness of the record. But, there is no presumption that the record is accurate; the record's accuracy and weight are issues for the trier of fact (State v. Waterman, 7 Conn. App. 326 (1986); Handbook of Connecticut Evidence, Second Edition, § 11. 14. 3).

#### Reference:

[http://search.cga.state.ct.us/dtsearch\\_lpa.asp?cmd=getdoc&DocId=16833&Index=I%3A%5Czindex%5C1995&HitCount=0&hits=&hc=0&req=&Item=712](http://search.cga.state.ct.us/dtsearch_lpa.asp?cmd=getdoc&DocId=16833&Index=I%3A%5Czindex%5C1995&HitCount=0&hits=&hc=0&req=&Item=712)

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#### QUESTION 1281

What is defined as inference of information from other, intermediate, relevant facts?

- A. Secondary evidence
- B. Conclusive evidence
- C. Hearsay evidence
- D. Circumstantial evidence

Answer: D

Explanation: Circumstantial evidence is defined as inference of information from other, intermediate, relevant facts. Secondary evidence is a copy of evidence or oral description of its contents. Conclusive evidence is incontrovertible and overrides all other evidence and hearsay evidence is evidence that is not based on personal, first-hand knowledge of the witness, but was obtained from another source. Computer-generated records normally fall under the category of hearsay evidence.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 9: Law, Investigation, and Ethics (page 310).

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**QUESTION 1282**

Under the Business Exemption Rule to the hearsay evidence, which of the following exceptions would have no bearing on the inadmissibility of audit logs and audit trails in a court of law?

- A. Records are collected during the regular conduct of business.
- B. Records are collected by senior or executive management.
- C. Records are collected at or near the time of occurrence of the act being investigated to generate automated reports.
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- D. You can prove no one could have changed the records/data/logs that were collected.

Answer: B

Explanation: Hearsay evidence is not normally admissible in court unless it has firsthand evidence that can be used to prove the evidence's accuracy, trustworthiness, and reliability like a business person who generated the computer logs and collected them.

It is important that this person generates and collects logs as a normal part of his business and not just this one time for court. It has to be a documented process that is carried out daily.

The value of evidence depends upon the genuineness and competence of the source; therefore, since record collection is not an activity likely to be performed by senior or executive management, records collected by senior or executive management are not likely to be admissible in court.

Hearsay evidence is usually not admissible in court unless it meets the Business Records Exemption rule to the Hearsay evidence.

- In certain instances computer records fall outside of the hearsay rule (e.g., business records exemption)
- Information relates to regular business activities
- Automatically computer generated data
- No human intervention
- Prove system was operating correctly
- Prove no one changed the data

If you have a documented business process and you make use of intrusion detection tools, log analysis tools, and you produce daily reports of activities, then the computer generated data might be admissible in court and would not be considered Hearsay Evidence.

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 10: Law, Investigation, and Ethics (page 676).

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**QUESTION 1283**

Which of the following is the BEST way to detect software license violations?

- A. Implementing a corporate policy on copyright infringements and software use.
- B. Requiring that all PCs be diskless workstations.
- 9
- C. Installing metering software on the LAN so applications can be accessed through the metered software.

- 
- D. Regularly scanning PCs in use to ensure that unauthorized copies of software have not been loaded on the PC.

Answer: D

Explanation: The best way to prevent and detect software license violations is to regularly scan used PCs, either from the LAN or directly, to ensure that unauthorized copies of software have not been loaded on the PC.

Other options are not detective.

A corporate policy is not necessarily enforced and followed by all employees.

Software can be installed from other means than floppies or CD-ROMs (from a LAN or even downloaded from the Internet) and software metering only concerns applications that are registered.

Source: Information Systems Audit and Control Association, Certified Information Systems Auditor 2002 review manual, Chapter 3: Technical Infrastructure and Operational Practices (page 108).

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### QUESTION 1284

Which of the following categories of hackers poses the greatest threat?

- A. Disgruntled employees
- B. Student hackers
- C. Criminal hackers
- D. Corporate spies

Answer: A

Explanation: According to the authors, hackers fall in these categories, in increasing threat order: security experts, students, underemployed adults, criminal hackers, corporate spies and disgruntled employees.

Disgruntled employees are the most dangerous security problem of all because they are most likely to have a good knowledge of the organization's IT systems and security measures.

Source: STREBE, Matthew and PERKINS, Charles, Firewalls 24seven, Sybex 2000, Chapter 2: Hackers.

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### QUESTION 1285

Which of the following best defines a Computer Security Incident Response Team (CSIRT)?

- A. An organization that provides a secure channel for receiving reports about suspected security incidents.
- B. An organization that ensures that security incidents are reported to the authorities.
- C. An organization that coordinates and supports the response to security incidents.
- D. An organization that disseminates incident-related information to its constituency and other involved parties.

Answer: C

Explanation: RFC 2828 (Internet Security Glossary) defines a Computer Security Incident Response Team (CSIRT) as an organization that coordinates and supports the response to security incidents that involves sites within a defined constituency. This is the proper definition for the CSIRT. To be considered a CSIRT, an organization must provide a secure channel for receiving reports about suspected security incidents, provide assistance to members of its constituency in handling the incidents and disseminate incident-related information to its constituency and other involved parties. Security-related incidents do not necessarily have to be reported to the authorities.

Source: SHIREY, Robert W., RFC2828: Internet Security Glossary, may 2000.

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### QUESTION 1286

Under the principle of culpable negligence, executives can be held liable for losses that result from computer system breaches if:

- A. The company is not a multi-national company.
- B. They have not exercised due care protecting computing resources.
- C. They have failed to properly insure computer resources against loss.
- D. The company does not prosecute the hacker that caused the breach.

Answer: B

Explanation: Culpable negligence is defined as: Recklessly acting without reasonable caution and putting another person at risk of injury or death (or failing to do something with the same consequences)

Where a suspected security breach has been caused (through wilful intent or culpable negligence)

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disciplinary action may be sought in line with the appropriate misconduct guidelines for internal employees.

By not exercising Due Care and taking the proper actions, the executives would be liable for losses a company has suffered.

Reference(s) used for this question:

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

and

<http://www.thefreedictionary.com/culpable+negligence>

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### QUESTION 1287

The deliberate planting of apparent flaws in a system for the purpose of detecting attempted penetrations or confusing an intruder about which flaws to exploit is called:

- A. alteration
- B. investigation
- C. entrapment
- D. enticement.

Answer: D

Explanation: Enticement deals with someone that is breaking the law. Entrapment encourages someone to commit a crime that the individual may or many have had no intention of committing. Enticement is not necessarily illegal but does raise ethical arguments and may not be admissible in court. Enticement lures someone toward some evidence (a honeypot would be a great example) after that individual has already committed a crime.

Entrapment is when you persuade someone to commit a crime when the person otherwise had no intention to commit a crime. Entrapment is committed by a law enforcement player where you get tricked into committing a crime for which you would later on get arrested without knowing you rare committing such a scrime. It is illegal and unethical as well.

All other choices were not applicable and only detractors.

References:

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

and

CISSP Study Guide (Conrad, Misenar, Feldman). Elsevier. 2010. p. 428

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and

<http://www.dummies.com/how-to/content/security-certification-computer-forensics-and-inci.html>

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### QUESTION 1288

Which element must computer evidence have to be admissible in court?

- A. It must be relevant.
- B. It must be annotated.
- C. It must be printed.
- D. It must contain source code.

Answer: A

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 1289

The Internet Architecture Board (IAB) characterizes which of the following as unethical behavior for Internet users?

- A. Writing computer viruses.
- B. Monitoring data traffic.
- C. Wasting computer resources.
- D. Concealing unauthorized accesses.

Answer: C

Explanation: The question is specifically about the IAB. This is why the best answer is the best answer. However there is nothing legal or ethical with any of the other choices presented. They would be covered under other Code of Ethics.

Another very important Code of Ethics you must be familiar with for the purpose of the exam is the

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ISC2 Code Of Ethics. You can read the full version of the ISC2 code of ethics at:  
[http://www.isc2.org/uploadedFiles/%28ISC%292\\_Public\\_Content/Code\\_of\\_ethics/ISC2-Code-of-Ethics.pdf](http://www.isc2.org/uploadedFiles/%28ISC%292_Public_Content/Code_of_ethics/ISC2-Code-of-Ethics.pdf)

The 4 high level canons listed within the ISC2 Code of Ethics are listed in order of importance  
3

within the document above. You should know the order of the 4 canons for the purpose of the exam.

#### Internet Architecture Board

The Internet Architecture Board (IAB) is the coordinating committee for Internet design, engineering, and management. It is an independent committee of researchers and professionals with a technical interest in the health and evolution of the Internet.

IAB has two principal subsidiary task forces:

The Internet Engineering Task Force (IETF) and

The Internet Research Task Force (IRTF).

The IAB issues ethics-related statements concerning the use of the Internet. It considers the Internet to be a resource that depends upon availability and accessibility to be useful to a wide range of people. It is mainly concerned with irresponsible acts on the Internet that could threaten its existence or negatively affect others. It sees the Internet as a great gift and works hard to protect it for all who depend upon it. IAB sees the use of the Internet as a privilege, which should be treated as such and used with respect.

The IAB considers the following acts as unethical and unacceptable behavior:

Purposely seeking to gain unauthorized access to Internet resources

Disrupting the intended use of the Internet

Wasting resources (people, capacity, and computers) through purposeful actions

Destroying the integrity of computer-based information

Compromising the privacy of others

Conducting Internet-wide experiments in a negligent manner

#### The (ISC)2Code of Ethics

All information systems security professionals who are certified by (ISC)2 recognize that such certification is a privilege that must be both earned and maintained. In support of this principle, all Certified Information Systems Security Professionals (CISSPs) commit to fully support this Code of Ethics. CISSPs who intentionally or knowingly violate any provision of the Code will be subject to action by a peer review panel, which may result in the revocation of certification.

#### Code of Ethics Preamble:

Safety of the commonwealth, duty to our principals, and to each other requires that we adhere, and be seen to adhere, to the highest ethical standards of behavior.

Therefore, strict adherence to this code is a condition of certification.

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#### Code of Ethics Canons:

Protect society, the commonwealth, and the infrastructure.

Act honorably, honestly, justly, responsibly, and legally.

Provide diligent and competent service to principals.

Advance and protect the profession.

#### The Code of Ethics

Protect society, the commonwealth, and the infrastructure

Promote and preserve public trust and confidence in information and systems.

Promote the understanding and acceptance of prudent information security measures.

Preserve and strengthen the integrity of the public infrastructure.

Discourage unsafe practice.

Act honorably, honestly, justly, responsibly, and legally

Tell the truth; make all stakeholders aware of your actions on a timely basis.

Observe all contracts and agreements, express or implied.

Treat all constituents fairly. In resolving conflicts, consider public safety and duties to principals, individuals, and the profession in that order.

Give prudent advice; avoid raising unnecessary alarm or giving unwarranted comfort. Take care to be truthful, objective, cautious, and within your competence.

When resolving differing laws in different jurisdictions, give preference to the laws of the jurisdiction in which you render your service.

Provide diligent and competent service to principals

Preserve the value of their systems, applications, and information.

Respect their trust and the privileges that they grant you.

Avoid conflicts of interest or the appearance thereof.

Render only those services for which you are fully competent and qualified.

Advance and protect the profession

Sponsor for professional advancement those best qualified. All other things equal, prefer those who are certified and who adhere to these canons. Avoid professional association with those whose practices or reputation might diminish the profession.

Take care not to injure the reputation of other professionals through malice or indifference.

Maintain your competence; keep your skills and knowledge current. Give generously of your time and knowledge in training others.

The following reference(s) were used for this question:

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

and

5

Fundamentals of Information Security

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**QUESTION 1290**

A security analyst asks you to look at the traffic he has gathered, and you find several Push flags within the capture. It seems the packets are sent to an unknown Internet Address (IP) that is not in your network from one of your own IP addresses which is a financial database that is critical and must remain up and running 24x7. This traffic was noticed in the middle of the day. What would be the best course of action to follow?

- A. Shut off the Port to the database and start conducting computer forensics
- B. Let the connection stay up because you do not want to disrupt availability
- C. Contact the FBI or the US Secret Service to give guidance on what steps should be taken
- D. Block the IP address at the perimeter and create a bit level copy of the database server. Run antivirus scan on the database and add to the IPS a rule to automatically block similar traffic.

Answer: D

Explanation: Block the IP address at the perimeter and create a bit level copy of the database

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server. Run antivirus scan on the database and add a rule to the IPS to automatically block similar traffic. It would also be wise to add a rule on your perimeter gateway such as your firewall to block the suspected external IP address.

The following answers are incorrect:

Contact the FBI or the US Secret Service to give guidance on what steps should be taken?

Before you scream that you are under attack, you must ensure that you are in fact under attack and some losses has been suffered. The law enforcement authority might not be interested in your case unless you have suffered losses.

Let the connection stay up because you do not want to disrupt availability?

Although Availability is a great concern, you must take action to ensure that information is not at risk.

Shut off the Port to the database and start conducting computer forensics?

Imposing a total shutdown on a critical database might cause more issues. You are not even sure what the problem is at this stage. A series of PUSH flag indicates a transfer of data which might or might not be malicious.

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The following reference(s) were/was used to create this question:

Experience working with incident investigation.

The book "Computer Forensics and Investigation" by Thompson Learning

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### QUESTION 1291

The US Department of Health, Education and Welfare developed a list of fair information practices focused on privacy of individually, personal identifiable information. Which one of the following is incorrect?

- A. There must be a way for a person to find out what information about them exists and how it is used.
- B. There must be a personal data record-keeping system whose very existence shall be kept secret.
- C. There must be a way for a person to prevent information about them, which was obtained for one purpose, from being used or made available for another purpose without their consent.
- D. Any organization creating, maintaining, using, or disseminating records of personal identifiable information must ensure reliability of the data for their intended use and must make precautions to prevent misuses of that data.

Answer: B

Explanation: The question asks which is incorrect this is the correct answer because: There must not be personal data record-keeping systems whose very existence is secret

The following answers are incorrect:

All other options correct information practices.

If the existence of such personal data record-keeping is kept secret then the person whose data is being kept cannot

1. Find what information about them is in record and how it is being used.
2. Prevent use of this information for use other purpose than intended one.

The following reference(s) were/was used to create this question:

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The CISSP Prep Guide Ronald L Krutz, Russell D Vines Page 317.

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**QUESTION 1292**

An attack that involves an fraudster tricking a user into making inappropriate security decisions is known as:

- A. Spoofing
- B. Surveillance
- C. Social Engineering
- D. Man-in-the-Middle

Answer: C

Explanation: The

Answer: Social Engineering is the act of tricking another person into providing information that they otherwise would not. Social Engineering may also incorporate spoofing to trick someone in to believing the fraudster is someone else.

The following answers are incorrect:

Spoofing is incorrect because it is presenting a false context to get someone to make a bad decision and trickery alone.

Surveillance and Man in the middle are detractors

The following reference(s) were/was used to create this question: Shon Harris, CISSP All-in-One Exam Guide, 3rd Edition, pg 762.

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**QUESTION 1293**

The US-EU Safe Harbor process has been created to address which of the following?

- A. Integrity of data transferred between U.S. and european companies
- B. Confidentiality of data transferred between U.S and European companies
- C. Protection of personal data transferred between U.S and European companies
- D. Confidentiality of data transferred between European and international companies

Answer: C

Explanation: US-EU Safe Harbor is a streamlined process for US companies to comply with the EU Directive 95/46/EC on the protection of personal data.

The European Commission's Directive on Data Protection went into effect in October of 1998, and would prohibit the transfer of personal data to non-European Union countries that do not meet the  
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European Union (EU) "adequacy" standard for privacy protection.

While the United States and the EU share the goal of enhancing privacy protection for their citizens, the United States takes a different approach to privacy from that taken by the EU. In order to bridge these differences in approach and provide a streamlined means for U.S. organizations to comply with the Directive, the U.S. Department of Commerce in consultation with the European Commission developed a "safe harbor" framework and a website to provide the information an

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organization should need to evaluate – and then join – the U.S.-EU Safe Harbor program. See link to the website listed below.

Intended for organizations within the EU or US that store customer data, the Safe Harbor Principles are designed to prevent accidental information disclosure or loss. US companies can opt into the program as long as they adhere to the 7 principles outlined in the Directive.

These principles must provide:

Notice - Individuals must be informed that their data is being collected and about how it will be used.

Choice - Individuals must have the ability to opt out of the collection and forward transfer of the data to third parties.

Onward Transfer - Transfers of data to third parties may only occur to other organizations that follow adequate data protection principles.

Security - Reasonable efforts must be made to prevent loss of collected information.

Data Integrity - Data must be relevant and reliable for the purpose it was collected for.

Access - Individuals must be able to access information held about them, and correct or delete it if it is inaccurate.

Enforcement - There must be effective means of enforcing these rules.

The process was developed by the US Department of Commerce in consultation with the EU.

The following answers are incorrect:

Integrity of data transferred between U.S. and European companies: Integrity is not the goal of the Safe Harbor requirements.

Confidentiality of data transferred between U.S. and European companies: Confidentiality is not the goal of the Safe Harbor requirements.

Confidentiality of data transferred between European and international companies: Safe Harbor has been created to deal with U.S. companies and does not focus on confidentiality.

The following reference(s) were/was used to create this question:

All In One by Shon Harris 5th edition p(855)

9

Wikipedia: The United States Department of Commerce runs a certification program which it calls Safe Harbor and which aims to harmonize data privacy practices in trading between the United States of America and the stricter privacy controls of the European Union Directive 95/46/EC on the protection of personal data. For more information, see Safe Harbor Principles.

[http://export.gov/safeharbor/eu/eg\\_main\\_018365.asp](http://export.gov/safeharbor/eu/eg_main_018365.asp) : U.S. – European Union Safe Harbor

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## QUESTION 1294

What is Dumpster Diving?

- A. Going through dust bin
- B. Running through another person's garbage for discarded document, information and other various items that could be used against that person or company
- C. Performing media analysis
- D. performing forensics on the deleted items

Answer: B

Explanation: The following answers are incorrect:

Going through dust bin will not give you access to sensitive information. It was not the best choice. Performing forensics on the deleted items is related to data remanence which means files were not destroyed properly and they can be recovered using specialized tools.

Performing media analysis is not related to going through rubbish in a dumpster.

The following reference(s) were/was used to create this question:

CISSP Summary 2002 by John Wallhoff

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### QUESTION 1295

Which of the following is the most important ISC2 Code of Ethics Canons?

- A. Act honorably, honestly, justly, responsibly, and legally
- B. Advance and protect the profession
- C. Protect society, the commonwealth, and the infrastructure
- D. Provide diligent and competent service to principals

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Answer: C

Explanation: The 4 Canons of the ISC(2) Code of Ethics are specifically ordered according to their importance. The ordering is as follows.

1. Protect society, the commonwealth, and the infrastructure.
2. Act honorably, honestly, justly, responsibly, and legally.
3. Provide diligent and competent service to principals.
4. Advance and protect the profession.

The FULL code of ethics is available at:

[https://www.isc2.org/uploadedFiles/\(ISC\)2\\_Public\\_Content/Code\\_of\\_ethics/ISC2-Code-of-Ethics.pdf](https://www.isc2.org/uploadedFiles/(ISC)2_Public_Content/Code_of_ethics/ISC2-Code-of-Ethics.pdf)

Even thou you don't have numbering in front of the canons listed in the document above, there is a paragraph talking about the order of the canons and which one is more important than the other one. Close the end of the second page of the code of Ethics they say clearly:

Compliance with the preamble and canons is mandatory. Conflicts between the canons should be resolved in the order of the canons. The canons are not equal and conflicts between them are not intended to create ethical binds.

TIP: I would STRONGLY recommend you visit the link above and you download a copy of the code of ethics. There will be questions on the exam covering some of it's details for sure. It is easy points you can get.

### CONFLICTING INFORMATION

The ISC2 website at <https://www.isc2.org/ethics/default.aspx> has some brief information on the Code of Ethics where they list 4 canons that are NOT the same as their full Code of Ethics available at the link above.

Code of Ethics Canons:

Protect society, the common good, necessary public trust and confidence, and the infrastructure.

Act honorably, honestly, justly, responsibly, and legally.

Provide diligent and competent service to principals.

Advance and protect the profession.

The following answers are incorrect (not the most important but still VERY important):

Act honorably, honestly, justly, responsibly, and legally.

Provide diligent and competent service to principals.

Advance and protect the profession

The following reference(s) were/was used to create this question:

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CISSP Study Guide 11th Hour by Eric Conrad. Page 171.

and

[https://www.isc2.org/uploadedFiles/\(ISC\)2\\_Public\\_Content/Code\\_of\\_ethics/ISC2-Code-of-Ethics.pdf](https://www.isc2.org/uploadedFiles/(ISC)2_Public_Content/Code_of_ethics/ISC2-Code-of-Ethics.pdf)

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### QUESTION 1296

What Cloud Deployment model consist of a cloud infrastructure provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units)? Such deployment model may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

- A. Private Cloud
- B. Public Cloud
- C. Hybrid Cloud
- D. Community Cloud

Answer: A

Explanation: A Private cloud. The cloud infrastructure is provisioned for exclusive use by a single organization comprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

Other Cloud Deployment Models are:

Community cloud.

The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.

Public cloud.

The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.

Hybrid cloud.

The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, 2

community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

The following reference(s) were/was used to create this question:

NIST Special Publication 800-145 The NIST definition of Cloud Computing

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and also see

NIST Special Publication 800-146 The Cloud Computing Synopsis and Recommendations

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### QUESTION 1297

When referring to the Cloud Computing Service models. What would you call a service model where the consumer does not manage or control the underlying cloud infrastructure including networks, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment?

- A. Code as a Service (CaaS)
- B. Platform as a Service (PaaS)
- C. Software as a Service (SaaS)
- D. Infrastructure as a Service (IaaS)

Answer: B

Explanation: The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including networks, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the applicationhosting environment.

Platform-as-a-Service (PaaS) is a model of service delivery whereby the computing platform is provided as an on-demand service upon which applications can be developed and deployed. Its main purpose is to reduce the cost and complexity of buying, housing, and managing the underlying hardware and software components of the platform, including any needed program and database development tools. The development environment is typically special purpose, determined by the cloud provider and tailored to the design and architecture of its platform. The cloud consumer has control over applications and application environment settings of the platform. Security provisions are split between the cloud provider and the cloud consumer.

The following answers are incorrect:

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Software-as-a-Service.

Software-as-a-Service (SaaS) is a model of service delivery whereby one or more applications and the computational resources to run them are provided for use on demand as a turnkey service. Its main purpose is to reduce the total cost of hardware and software development, maintenance, and operations. Security

provisions are carried out mainly by the cloud provider. The cloud consumer does not manage or control the underlying cloud infrastructure or individual applications, except for preference selections and limited administrative application settings.

Infrastructure-as-a-Service.

Infrastructure-as-a-Service (IaaS) is a model of service delivery whereby the basic computing infrastructure of servers, software, and network equipment is provided as an on-demand service upon which a platform to develop and execute applications can be established. Its main purpose is to avoid purchasing, housing, and managing the basic hardware and software infrastructure components, and instead obtain those resources as virtualized objects controllable via a service

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interface. The cloud consumer generally has broad freedom to choose the operating system and development environment to be hosted. Security provisions beyond the basic infrastructure are carried out mainly by the cloud consumer

#### Code as a Service (CaaS)

CaaS does not exist and is only a detractor. This is no such service model.

#### Cloud Deployment Models

#### NOTE: WHAT IS A CLOUD INFRASTRUCTURE?

A cloud infrastructure is the collection of hardware and software that enables the five essential characteristics of cloud computing. The cloud infrastructure can be viewed as containing both a physical layer and an abstraction layer. The physical layer consists of the hardware resources that are necessary to support the cloud services being provided, and typically includes server, storage and network components. The abstraction layer consists of the software deployed across the physical layer, which manifests the essential cloud characteristics. Conceptually the abstraction layer sits above the physical layer.

The following reference(s) were/was used to create this question:

NIST Special Publication 800-144 Guidelines on Security and Privacy in Public Cloud Computing  
and

NIST Special Publication 800-145 The NIST definition of Cloud Computing

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### QUESTION 1298

The exact requirements for the admissibility of evidence vary across legal systems and between different cases (e.g., criminal versus tort). At a more generic level, evidence should have some probative value, be relevant to the case at hand, and meet the following criteria which are often called the five rules of evidence:

- A. It has to be encrypted, accurate, complete, convincing, and Admissible.
- B. It has to be authentic, hashed, complete, convincing, and Admissible.
- C. It has to be authentic, accurate, complete, convincing, and auditable.
- D. It has to be authentic, accurate, complete, convincing, and Admissible.

Answer: D

Explanation: The exact requirements for the admissibility of evidence vary across legal systems and between different cases (e.g., criminal versus tort). At a more generic level, evidence should have some probative value, be relevant to the case at hand, and meet the following criteria (often called the five rules of evidence):

Be authentic  
Be accurate  
Be complete  
Be convincing  
Be admissible

Digital or electronic evidence, although more fragile or volatile, must meet these criteria as well. What constitutes digital/electronic evidence is dependent on the investigation; do not rule out any possibilities until they can be positively discounted. With evidence, it is better to have and not need than vice versa.

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Given the variance that is possible, the axiom to follow here is check with the respective judiciary, attorneys, or officer of the court for specific admissibility requirements. The dynamic nature of digital electronic evidence bears further comment.

Unlike more traditional types of evidence (e.g., fingerprints, hair, fibers, bullet holes), digital/electronic evidence can be very fragile and can be erased, partially destroyed, or contaminated very easily, and, in some circumstances, without the investigator knowing this has occurred.

This type of evidence may also have a short life span and must be collected very quickly (e.g., cache memory, primary/ random access memory, swap space) and by order of volatility (i.e., most volatile first).

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Sufficient care must also be taken not to disturb the timeline or chronology of events. Although time stamps are best considered relative and easily forged, the investigator needs to ensure that any actions that could alter the chronology (e.g., examining a live file system or accessing a drive that has not been write protected) are recorded or, if possible, completely avoided.

Two concepts that are at the heart of dealing effectively with digital/electronic evidence, or any evidence for that matter, are the chain of custody and authenticity/ integrity. The chain of custody refers to the “who, what, when, where, and how” the evidence was handled—from its identification through its entire life cycle, which ends with destruction or permanent archiving.

All of the other choices presented were incorrect.

The following reference(s) were/was used to create this question:

Official (ISC)2 Guide to the CISSP CBK, Second Edition ((ISC)2 Press) (Kindle Locations 11791-11811). Taylor & Francis. Kindle Edition.

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### QUESTION 1299

You work in a police department forensics lab where you examine computers for evidence of crimes. Your work is vital to the success of the prosecution of criminals.

One day you receive a laptop and are part of a two man team responsible for examining it together. However, it is lunch time and after receiving the laptop you leave it on your desk and you both head out to lunch.

What critical step in forensic evidence have you forgotten?

- A. Chain of custody
- B. Locking the laptop in your desk
- C. Making a disk image for examination
- D. Cracking the admin password with chntpw

Answer: A

Explanation: When evidence from a crime is to be used in the prosecution of a criminal it is critical that you follow the law when handling that evidence. Part of that process is called chain of custody and is when you maintain proactive and documented control over ALL evidence involved in a crime.

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Failure to do this can lead to the dismissal of charges against a criminal because if the evidence is compromised because you failed to maintain of chain of custody.

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A chain of custody is chronological documentation for evidence in a particular case, and is especially important with electronic evidence due to the possibility of fraudulent data alteration, deletion, or creation. A fully detailed chain of custody report is necessary to prove the physical custody of a piece of evidence and show all parties that had access to said evidence at any given time.

Evidence must be protected from the time it is collected until the time it is presented in court.

The following answers are incorrect:

- Locking the laptop in your desk: Even this wouldn't assure that the defense team would try to challenge chain of custody handling. It's usually easy to break into a desk drawer and evidence should be stored in approved safes or other storage facility.
- Making a disk image for examination: This is a key part of system forensics where we make a disk image of the evidence system and study that as opposed to studying the real disk drive. That could lead to loss of evidence. However if the original evidence is not secured than the chain of custoday has not been maintained properly.
- Cracking the admin password with chntpw: This isn't correct. Your first mistake was to compromise the chain of custody of the laptop. The chntpw program is a Linux utility to (re)set the password of any user that has a valid (local) account on a Windows system, by modifying the encrypted password in the registry's SAM file. You do not need to know the old password to set a new one. It works offline which means you must have physical access (i.e., you have to shutdown your computer and boot off a linux floppy disk). The bootdisk includes stuff to access NTFS partitions and scripts to glue the whole thing together. This utility works with SYSKEY and includes the option to turn it off. A bootdisk image is provided on their website at <http://freecode.com/projects/chntpw>.

The following reference(s) was used to create this question:

[http://en.wikipedia.org/wiki/Chain\\_of\\_custody](http://en.wikipedia.org/wiki/Chain_of_custody)

and

[http://www.datarecovery.com/forensic\\_chain\\_of\\_custody.asp](http://www.datarecovery.com/forensic_chain_of_custody.asp)

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## QUESTION 1300

Researchers have recently developed a tool that imitates a 14 year old on the Internet. The authors developed a "Chatter Bot" that mimics conversation and treats the dissemination of personal information as the goal to determine if the other participant in the conversation is a pedophile.

The tool engages people in conversation and uses artificial intelligence to check for inappropriate questions by the unsuspecting human. If the human types too many suggestive responses to the "artificial" 14 year old, the tool then notifies the police.

From a legal perspective, what is the greatest legal challenge to the use of this tool?

- A. Violation of Privacy
- B. Enticement
- C. Entrapment
- D. Freedom of Speech

Answer: C

Explanation: Entrapment occurs when a law enforcement agent or someone acting as an "agent" of law enforcement induces a person to commit a crime not contemplated by the person. A person who makes a knowingly false representation designed to induce the belief that the conduct is not prohibited, or employs methods of persuasion or inducement which create a substantial risk that such an offense will be committed by persons other than those who are ready to commit it. Basically, the Chatter Bot could possibly induce a person to engage in conduct that the person would not otherwise have engaged in if the chatterbot did not "feed" the information to the person. Entrapment does not prove that a person intended to commit a crime. It only proves that a person was successfully tricked into committing a crime.

The following answers are incorrect:

Violation of Privacy and Freedom of Speech are detractors, as these Constitutional protections do not apply in the commission of the crime.

Enticement is very easily confused with entrapment. Enticement is the act of coaxing or luring someone to do something (but not necessarily a criminal act). Enticement is legal and ethical. A good example of Enticement would be the use of a HoneyPot. If a person is lured into a honey pot because there are open ports that may be probed, that is enticement. The person who proceeds by poking into those open ports is enticed and proceeds to commit a crime based on their own actions. However, if a person is lured with a false promise of an illegal bounty that awaits

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them if they follow a link to a honeypot, (for example, a link that promises free movie downloads), that is entrapment because the lure may be so overwhelming that even an innocent person may be tempted to proceed in the commission of the illegal act.

The following reference(s) were/was used to create this question:

Black's Law Dictionary

and

Shon Harris - All-In-One CISSP Exam Guide - Sixth Edition - page 1057

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### QUESTION 1301

You are a criminal hacker and have infiltrated a corporate network via a compromised host and a misconfigured firewall. You find many targets inside the network but all appear to be hardened except for one. It has several notable vulnerable services and it therefore seems out of place with an otherwise secured network. (Except for the misconfigured firewall, of course)

What is it that you are likely seeing here?

- A. A Honeypot
- B. A Cisco Switch
- C. IDS - Intrusion Detection System
- D. File Server

Answer: A

Explanation: It is common practice in secure environments to set up a server that is deliberately unsecured so that it entices intruders to spend time on that server rather than the sensitive servers with important data. In this case it would be fairly easy to see that it's a honeypot because all other devices are secure except for this one, which makes it a bit too obvious.

In computer terminology, a honeypot is a trap set to detect, deflect, or in some manner counteract

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attempts at unauthorized use of information systems. Generally it consists of a computer, data, or a network site that appears to be part of a network, but is actually isolated and monitored, and which seems to contain information or a resource of value to attackers. This is similar to a police officer baiting a criminal and watching their reaction while undercover.

The following answers are incorrect:

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- A Cisco Switch: This isn't correct because switches generally offer few services apart from possibly TFTP, FTP, Telnet or SSH and little useful data is usually available on a switch.
- IDS - Intrusion Detection System: This isn't a right answer either. IDS systems, if present are generally locked down and won't offer services. They simply listen and may even be configured without an IP Address but a rule that looks for traffic addressed to a specific IP Address. This way it can receive data from IDS Sensors but not be subject to attack because it lacks an IP Address to target.
- File Server: This is not a bad answer but a properly scanned, patched and hardened file server can resist attack, especially if 802.1X certificate security is used to validate user identity.

The following reference(s) was used to create this question:

[http://en.wikipedia.org/wiki/Honeypot\\_%28computing%29](http://en.wikipedia.org/wiki/Honeypot_%28computing%29)

(Physical (Environmental) Security)

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## QUESTION 1302

The most prevalent cause of computer center fires is which of the following?

- A. AC equipment
- B. Electrical distribution systems
- C. Heating systems
- D. Natural causes

Answer: B

Explanation: When you consider top priority tickets for the data center, security, data protection, and power consumption rise to the top. But the one thing that every data center should have, that we often throw on the back burner, is fire protection. Right now, if you heard that your data center was engulfed in flames, you would likely sit in shock, especially if you were not equipped with the proper protection. Fortunately, you can avoid this reality by taking the proper steps to protect your data center.

Dave Admirand, chief data center engineer at PTS Data Center Solutions ([www.ptsdcs.com](http://www.ptsdcs.com)), says in his own experience, electrical fires are the most common types of fires in data centers. He says, "These are typically caused by electronic equipment failures or failures of the branch circuits powering the data center equipment, including UPS and air-conditioning equipment—if located in the data center."

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So what does the industry offer when it comes to fire detectors and extinguishing systems designed for the data center? According to Ziembra, there is a myriad of different smoke and heat detectors available, and some, he says, are so sophisticated that they can detect—and help extinguish—a fire even before it reaches the incipient, or flame, stage. He says, "Detectors that provide early warning capabilities are very effective in this type of situation. Addressable control

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panels serve as the brains for the overall fire suppression system in that they receive the signals from the detectors, provide some type of warning to the occupants, and then discharge the system.”

The following Reference(s) were used for this question:

[http://xtralis.com/resources/article\\_level1/838/Processor\\_Editorial\\_-\\_Data\\_Center\\_Fire\\_Protection\\_January\\_5x\\_2007.pdf](http://xtralis.com/resources/article_level1/838/Processor_Editorial_-_Data_Center_Fire_Protection_January_5x_2007.pdf)

and

[http://www.interfire.org/features/electric\\_wiring\\_faults.asp](http://www.interfire.org/features/electric_wiring_faults.asp)

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### QUESTION 1303

Under what conditions would the use of a Class C fire extinguisher be preferable to a Class A extinguisher?

- A. When the fire involves paper products
- B. When the fire is caused by flammable products
- C. When the fire involves electrical equipment
- D. When the fire is in an enclosed area

Answer: C

Explanation: A Class C fire extinguisher is preferable when a fire involves electrical equipment including wiring. Common Class C suppression includes: gas (i.e. Halon, FM-200, Carbon Dioxide, etc) or soda acid.

To aid in memorization of Fire Class write on a paper the classes A through D, simply think of my first name which is CLEMENT then put the word CLEM vertically as shown below:

Class A -> C = Combustible

Class B -> L = Liquid

Class C -> E = Electrical

Class D -> M = Metals

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Below you will find a more detailed model.

Class A = Combustible

Type of Fire: Common Combustibles

Elements of Fire: wood products, paper, and laminates

Suppression Method: water, foam

Class B = Liquid

Type of Fire: Liquid

Elements of Fire: Petroleum products and coolants

Suppression Method: Gas, CO<sub>2</sub>, foam, dry powders.

Class C = Electrical

Type of Fire: Electrical

Elements of Fire: Electrical equipment and wires

Suppression Method: Gas, CO<sub>2</sub>, dry powders.

Class D = Metals

Type of Fire: Combustible Metals

Elements of Fire: Magnesium, sodium, potassium

Suppression Method: Dry powder.

The following answers are incorrect:

When the fire involves paper products Class A fires involve paper products and would not require a Class C extinguisher.

When the fire is caused by flammable products This is a distractor

When the fire is in an enclosed area This is not the best answer, because a paper product fire could still be extinguished by a Class A extinguisher, even in an enclosed area.

The following references was/were used to create this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 10: Physical security (page 335).

and

[https://en.wikipedia.org/wiki/Fire\\_classes](https://en.wikipedia.org/wiki/Fire_classes)

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### QUESTION 1304

Examples of types of physical access controls include all EXCEPT which of the following?

- A. badges
- B. locks
- C. guards
- D. passwords

Answer: D

Explanation: Passwords are considered a Preventive/Technical (logical) control.

The following answers are incorrect:

badges Badges are a physical control used to identify an individual. A badge can include a smart device which can be used for authentication and thus a Technical control, but the actual badge itself is primarily a physical control.

locks Locks are a Preventative Physical control and has no Technical association.

guards Guards are a Preventative Physical control and has no Technical association.

The following reference(s) were/was used to create this question:

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 2: Access control systems (page 35).

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### QUESTION 1305

Guards are appropriate whenever the function required by the security program involves which of the following?

- A. The use of discriminating judgment
- B. The use of physical force
- C. The operation of access control devices
- D. The need to detect unauthorized access

Answer: A

Explanation: The

Answer: The use of discriminating judgment, a guard can make the determinations that hardware or other automated security devices cannot make due to its ability to 3

adjust to rapidly changing conditions, to learn and alter recognizable patterns, and to respond to various conditions in the environment. Guards are better at making value decisions at times of incidents. They are appropriate whenever immediate, discriminating judgment is required by the security entity.

The following answers are incorrect:

The use of physical force This is not the best answer. A guard provides discriminating judgment, and the ability to discern the need for physical force.

The operation of access control devices A guard is often uninvolved in the operations of an automated access control device such as a biometric reader, a smart lock, mantrap, etc.

The need to detect unauthorized access The primary function of a guard is not to detect unauthorized access, but to prevent unauthorized physical access attempts and may deter social engineering attempts.

The following reference(s) were/was used to create this question:

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 10: Physical security (page 339).

Source: ISC2 Official Guide to the CBK page 288-289.

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## QUESTION 1306

What physical characteristic does a retinal scan biometric device measure?

- A. The amount of light reaching the retina
- B. The amount of light reflected by the retina
- C. The pattern of light receptors at the back of the eye
- D. The pattern of blood vessels at the back of the eye

Answer: D

Explanation: The retina, a thin nerve (1/50th of an inch) on the back of the eye, is the part of the eye which senses light and transmits impulses through the optic nerve to the brain - the equivalent of film in a camera. Blood vessels used for biometric identification are located along the neural retina, the outermost of retina's four cell layers.

The following answers are incorrect:

The amount of light reaching the retina The amount of light reaching the retina is not used in the 4

biometric scan of the retina.

The amount of light reflected by the retina The amount of light reflected by the retina is not used in the biometric scan of the retina.

The pattern of light receptors at the back of the eye This is a distractor

The following reference(s) were/was used to create this question:

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Reference: Retina Scan Technology.  
ISC2 Official Guide to the CBK, 2007 (Page 161)

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**QUESTION 1307**

Which of the following is the most costly countermeasure to reducing physical security risks?

- A. Procedural Controls
- B. Hardware Devices
- C. Electronic Systems
- D. Security Guards

Answer: D

Explanation: One drawback of guards is that the cost of maintaining a guard function either internally or through an external service is expensive. Although some guards are contracted through a separate company, they should still be considered part of personnel and are the most expensive service of the choices provided. A guard can also potentially incur liability costs.

The following answers are incorrect:

procedural controls Procedural controls are not expensive, they often involve time to develop but are certainly not the most expensive countermeasure.

hardware devices Hardware devices can be expensive, especially if they are biometric readers. However, there is a fairly fixed cost of ownership whereas guards could incur liability costs and can be a very costly 24x7 countermeasure.

electronic systems Electronic systems can be expensive, especially if they are biometric readers. However, there is a fairly fixed cost of ownership whereas guards could incur liability costs and can be a very costly 24x7 countermeasure.

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The following reference(s) were/was used to create this question:

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 10: Physical security (page 340).

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**QUESTION 1308**

Which is the last line of defense in a physical security sense?

- A. people
- B. interior barriers
- C. exterior barriers
- D. perimeter barriers

Answer: A

Explanation: "Ultimately, people are the last line of defense for your company's assets" (Pastore & Dulaney, 2006, p. 529).

Pastore, M. and Dulaney, E. (2006). CompTIA Security+ study guide: Exam SY0-101. Indianapolis, IN: Sybex.

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**QUESTION 1309**

Devices that supply power when the commercial utility power system fails are called which of the following?

- A. power conditioners
- B. uninterruptible power supplies
- C. power filters
- D. power dividers

Answer: B

Explanation: From Shon Harris AIO Fifth Edition:

Protecting power can be done in three ways: through UPSs, power line conditioners, and backup

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sources.

UPSs use battery packs that range in size and capacity. A UPS can be online or standby.

Online UPS systems use AC line voltage to charge a bank of batteries. When in use, the UPS has an inverter that changes the DC output from the batteries into the required AC form and that regulates the voltage as it powers computer devices.

Online UPS systems have the normal primary power passing through them day in and day out. They constantly provide power from their own inverters, even when the electric power is in proper use. Since the environment's electricity passes through this type of UPS all the time, the UPS device is able to quickly detect when a power failure takes place. An online UPS can provide the necessary electricity and picks up the load after a power failure much more quickly than a standby UPS.

Standby UPS devices stay inactive until a power line fails. The system has sensors that detect a power failure, and the load is switched to the battery pack. The switch to the battery pack is what causes the small delay in electricity being provided.

So an online UPS picks up the load much more quickly than a standby UPS, but costs more of course.

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**QUESTION 1310**

Which of the following is true about a "dry pipe" sprinkler system?

- A. It is a substitute for carbon dioxide systems.
- B. It maximizes chances of accidental discharge of water.
- C. It reduces the likelihood of the sprinkler system pipes freezing.
- D. It uses less water than "wet pipe" systems.

Answer: C

Explanation: A dry pipe system is used in areas where the water in the pipes is subject to freezing, and to minimize the chances of accidental discharge of water if the pipes would freeze in the winter time, and It minimizes chances of accidental discharge of water as well by not releasing the water until the pressure in the pipe would drop due to one of the sprinkler head being opened.

A Dry Pipe system has the water being held back from charging the sprinkler pipe system by a special kind of check valve called a "dry pipe valve" or "clapper valve". A dry pipe system is also a system which the pipes are filled with pressurized air or nitrogen rather than water. The air uses a mechanical advantage which holds back a device known as a dry pipe valve or clapper valve that

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prevent the water from getting into the pipe when it is pressurized. A small amount of water, called priming water, is also inside the dry pipe system, which is filled with either air or nitrogen under pressure.

The sprinkler pipe system is filled with pressurized air or nitrogen, which keeps the dry pipe valve closed using mechanical advantage. When any of the sprinkler valves open, the pressurized air or nitrogen is released, and the dropping pressure permits the dry pipe valve to open. It's primary use is to protect the sprinkler pipes from freezing.

A Wet Pipe system has the pipes always charged with water, and the thermal-fusible link in each sprinkler head is holding back the water. If any sprinkler head is exposed to enough heat, for long enough, the link will break/melt and water will be discharged. A wet pipe system is generally used when there is no danger of the water in the pipes freezing or when there are no special conditions that require a special purpose sprinkler system.

A Preaction Pipe system is used where accidental activation is undesired. It is similar to a Dry Pipe system, except one or more other interlocks, such as fire/heat sensors, are used in addition to sprinkler head opening and relieving the air pressure, which then permits the water to charge the sprinkler pipe system and flow through the open sprinkler head. This system has the added value of requiring a series of events before the water is actually permitted to flow, which can enable personnel to handle a small fire or incident without the flow of water.

All of the other answers were NOT true so they were wrong choices

The following reference(s) were/was used to create this question:

Shon Harris, AIO v5, pg 444-445

and

Ronald Krutz adn Russell Vines, The CISSP and CAP Prep Guide, pg 530

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### QUESTION 1311

Which of the following is a class A fire?

- A. common combustibles
- B. liquid
- C. electrical
- D. Halon

Answer: A

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Explanation: One of my student shared a tip with me on how to remember the classes of fire. He said that he thinks about my first name to do so. More specifically the first four letters of my first name which is CLEMENT.

C stands for Common Combustible (CLASS A)

L stands for Liquid Fire (CLASS B)

E stands for Electrical Fire (CLASS C)

M stands for Metals that are burning (CLASS D)

Esha Oyarivjibie has shared another tip with me:

For another mnemonic: clem

klm Show verb (used with object), verb (used without object), clemmed, clem•ming. British Dialect . to starve.

I think this is a very poignant way to remember the classes of fires being that you want to know the difference in fires so that you can effectively "starve" the fire of its fuel.

Source:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 335.

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### QUESTION 1312

Which of the following is the preferred way to suppress an electrical fire in an information center?

- A. CO2
- B. CO2, soda acid, or Halon
- C. water or soda acid
- D. ABC Rated Dry Chemical

Answer: A

Explanation: It must be noted that Halon is now banned in most countries or cities.

The reason CO2 is preferred in an information center is the agent is considered a clean agent, as well as non-conductive. The agent evaporates and does not leave a residue on the equipment.

CO2 can be hazardous to people so special care must be taken when implemented.

Water may be a sound solution for large physical areas such as warehouses, but it is entirely inappropriate for computer equipment. A water spray can irreparably damage hardware more 9

quickly than encroaching smoke or heat. Gas suppression systems operate to starve the fire of oxygen. In the past, Halon was the choice for gas suppression systems; however, Halon leaves residue, depletes the ozone layer, and can injure nearby personnel.

NOTE FROM CLEMENT:

For the purpose of the exam do not go outside of the 4 choices presented. YES, it is true that there are many other choices that would be more adequate for a Data Centre. An agent such as IG-55 from Ardent would probably be a better choice than CO2, however it is NOT in the list of choices.

You will also notice that Shon Harris and Krutz and Vines disagree on which one is the best. This is why you must do your own research to supplement the books, sometimes books could be opined as well. When in doubt refer to the official book and look at what is ISC2 view of the topic and which one ISC2 considers to be the best for the exam.

ISC2 recommends also the following:

Aero-K - uses an aerosol of microscopic potassium compounds in a carrier gas released from small canisters mounted on walls near the ceiling. The Aero-K generators are not pressurized until fire is detected. The Aero-K system uses multiple fire detectors and will not release until a fire is "confirmed" by two or more detectors (limiting accidental discharge). The gas is non-corrosive, so it does not damage metals or other materials. It does not harm electronic devices or media such

as tape or discs. More important, Aero-K is nontoxic and does not injure personnel. FM-200 - is a colorless, liquefied compressed gas. It is stored as a liquid and dispensed into the hazard as a colorless, electrically non-conductive vapor that is clear and does not obscure vision. It leaves no residue and has acceptable toxicity for use in occupied spaces at design concentration. FM-200 does not displace oxygen and, therefore, is safe for use in occupied spaces without fear of oxygen deprivation.

The following are incorrect choices:

Water or Soda/Acid & Halon: (old water extinguishers) will damage sensitive equipment as well as conduct electricity which could endanger the life of the person using such a fire extinguisher.

Halon has been banned due to the Montreal Protocol.

ABC rated Dry chemical extinguishers: They are suitable for electrically energized fires, but they are not acceptable on sensitive equipment. It is like throwing a couple kilograms of flour in around in a room. It is extremely hard to clean off of equipment and some of the chemicals are corrosive in nature.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition  
0

((ISC)2 Press) (Kindle Locations 25609-25612). Auerbach Publications. Kindle Edition.  
and

<http://www.ehs.ucf.edu/labsafe/safemgequip.html>

or

<http://www.osha.gov/doc/outreachtraining/htmlfiles/extmark.html>

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### QUESTION 1313

What are the four basic elements of Fire?

- A. Heat, Fuel, Oxygen, and Chain Reaction
- B. Heat, Fuel, CO<sub>2</sub>, and Chain Reaction
- C. Heat, Wood, Oxygen, and Chain Reaction
- D. Flame, Fuel, Oxygen, and Chain Reaction

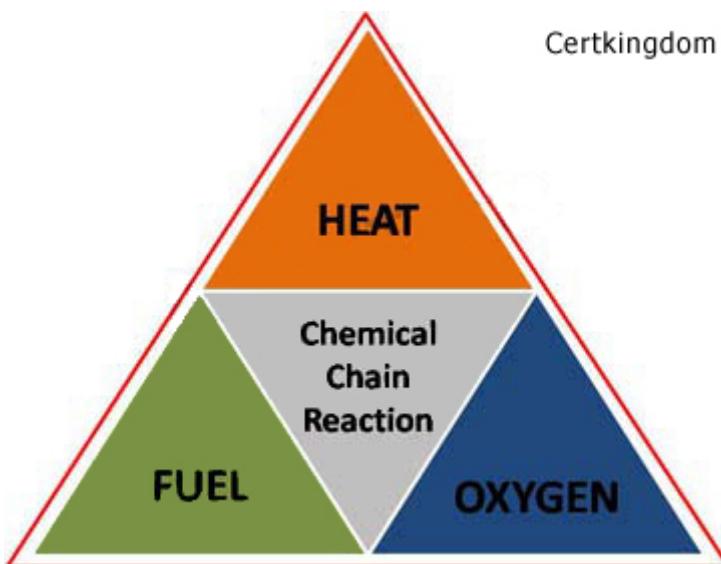
Answer: A

Explanation: Four elements must be present in order for fire to exist. These elements are HEAT, FUEL, OXYGEN and CHAIN REACTION.

While not everything is known about the combustion process, it is generally accepted that fire is a chemical reaction. This reaction is dependent upon a material rapidly oxidizing, or uniting with oxygen so rapidly that it produces heat and flame.

Until the advent of newer fire extinguishing agents, fire was thought of as a triangle with the three sides represented by heat, fuel, and oxygen. If any one of the three sides were to be taken away, the fire would cease to exist.

Studies of modern fire extinguishing agents have revealed a fourth element - a self propagating chain reaction in the combustion process. As a result, the basic elements of fire are represented by the fire tetrahedron - HEAT, FUEL, OXYGEN and CHAIN REACTION.



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### Fire Tetrahedron

The theory of fire extinguishment is based on removing any one or more of the four elements in the fire tetrahedron to suppress the fire.

#### REMOVING THE HEAT

In order to remove the heat, something must be applied to the fire to absorb the heat or act as a heat exchanger. Water is not the only agent used to accomplish this, but it is the most common.

#### REMOVING THE FUEL

Under many circumstances, it is not practical to attempt to remove the fuel from the fire. When dealing with flammable liquid fires, valves can be shut off and storage vessels pumped to safe areas to help eliminate the supply of fuel to the fire. Flammable gas fires are completely extinguished by shutting off the fuel supply.

#### REMOVE THE OXYGEN

Oxygen as it exists in our atmosphere (21%) is sufficient to support combustion in most fire situations. Removal of the air or oxygen can be accomplished by separating it from the fuel source or by displacing it with an inert gas. Examples of separation would be foam on a flammable liquid fire, a wet blanket on a trash fire, or a tight fitting lid on a skillet fire. Agents such as CO<sub>2</sub>, nitrogen, and steam are used to displace the oxygen.

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#### INTERRUPT THE CHAIN REACTION

Modern extinguishing agents, such as dry chemical and halons, have proven to be effective on various fires even though these agents do not remove heat, fuel, or oxygen. Dry chemical and halogenated agents are thought to suspend or bond with “free radicals” that are created in the combustion process and thus prevent them from continuing the chain reaction.

It must be noted that Halon is now banned in most country or cities. The agreement banning Halon Production is called The Montreal Protocol.

Click on the following link to see a nice video on fire fighting and extinguishing agents, it cover key information you need to know for the exam.

Resume of the class of Fires:

TYPES OF FIRES			TYPES OF EXTINGUISHERS	
Class	Info	Symbol	Class	Symbol
A	ORDINARY COMBUSTIBLES: wood, paper, cloth, trash and other ordinary materials.		A	
B	FLAMMABLE LIQUIDS & GASES: gasoline, oils, paint lacquer and tar.		A:B	
C	FIRE INVOLVING LIVE ELECTRICAL EQUIPMENT.		A:B:C	
D	COMBUSTIBLE METALS OR COMBUSTIBLE METAL ALLOYS (NO picture symbol)		A:C	
K	FIRES IN COOKING APPLIANCES THAT INVOLVE COMBUSTIBLE COOKING MEDIA: vegetable or animal oils and fats		B:C	
			D	
			A:K	

Certkingdom

## Class of Fires

All of the other answers are incorrect:

References:

Fire and Fire Extinguishment

and

<http://code7700.com/fire.html>

3

## QUESTION 1314

Which of the following suppresses combustion by disrupting a chemical reaction, by doing so it kills the fire?

- A. Halon
- B. CO<sub>2</sub>
- C. water
- D. soda acid

Answer: A

Explanation: It must be noted that Halon is now banned from being produced or manufactured in most countries or cities.

Multiple countries have agreed to and signed The Montreal Protocol which disallows production of Halon.

Data Centers that still have Halon loaded within their cylinders will replace it with a safe replacement such as FM200 or Inergen if they ever make use of it.

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Halon is a "Clean Agent." The National Fire Protection Association defines, a "Clean Agent" as "an electrically non-conducting, volatile, or gaseous fire extinguishant that does not leave a residue upon evaporation."

Halon is a liquefied, compressed gas that stops the spread of fire by chemically disrupting combustion. Halon 1211 (a liquid streaming agent) and Halon 1301 (a gaseous flooding agent) leave no residue and are remarkably safe for human exposure. Halon is rated for class "B" (flammable liquids) and "C" (electrical fires), but it is also effective on class "A" (common combustibles) fires. Halon 1211 and Halon 1301 are low-toxicity, chemically stable compounds that, as long as they remain contained in cylinders, are easily recyclable.

Halon is an extraordinarily effective fire extinguishing agent, even at low concentrations. According to the Halon Alternative Research Corporation: "Three things must come together at the same time to start a fire. The first ingredient is fuel (anything that can burn), the second is oxygen (normal breathing air is ample) and the last is an ignition source (high heat can cause a fire even without a spark or open flame). Traditionally, to stop a fire you need to remove one side of the triangle - the ignition, the fuel or the oxygen. Halon adds a fourth dimension to fire fighting - breaking the chain reaction. It stops the fuel, the ignition and the oxygen from dancing together by chemically reacting with them."

A key benefit of Halon, as a clean agent, is its ability to extinguish fire without the production of residues that could damage the assets being protected. Halon has been used for fire and

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explosion protection throughout the 20th century, and remains an integral part of the safety plans in many of today's manufacturing, electronic and aviation companies. Halon protects computer and communication rooms throughout the electronics industry; it has numerous military applications on ships, aircraft and tanks and helps ensure safety on all commercial aircraft. Because Halon is a CFC, production of new Halon ceased in 1994. There is no cost effective means of safely and effectively disposing of the Halon. Therefore, recycling and reusing the existing supply intelligently and responsibly to protect lives and property is the wisest solution.

Sources:

[http://www.h3rcleanagents.com/support\\_faq\\_2.htm](http://www.h3rcleanagents.com/support_faq_2.htm)

and

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 335.

And

AIO v4 pg. 443 has a great chart on how the different extinguishers kill a fire

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### QUESTION 1315

Which of the following is a class C fire?

- A. electrical
- B. liquid
- C. common combustibles
- D. soda acid

Answer: A

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Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 335.

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**QUESTION 1316**

Which of the following is NOT a system-sensing wireless proximity card?

- A. magnetically striped card
- B. passive device
- C. field-powered device
- D. transponder

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Answer: A

Explanation: The

Answer: Magnetically striped cards are digitally encoded cards.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 342.

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**QUESTION 1317**

Which of the following is NOT a type of motion detector?

- A. Photoelectric sensor
- B. Passive infrared sensors
- C. Microwave Sensor.
- D. Ultrasonic Sensor.

Answer: A

Explanation: A photoelectric sensor does not "directly" sense motion there is a narrow beam that won't set off the sensor unless the beam is broken. Photoelectric sensors, along with dry contact switches, are a type of perimeter intrusion detector.

All of the other answers are valid types of motion detectors types.

The content below on the different types of sensors is from Wikipedia:

#### Indoor Sensors

These types of sensors are designed for indoor use. Outdoor use would not be advised due to false alarm vulnerability and weather durability.

#### Passive infrared detectors



## Passive Infrared Sensor

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The passive infrared detector (PIR) is one of the most common detectors found in household and small business environments because it offers affordable and reliable functionality. The term passive means the detector is able to function without the need to generate and radiate its own energy (unlike ultrasonic and microwave volumetric intrusion detectors that are “active” in operation). PIRs are able to distinguish if an infrared emitting object is present by first learning the ambient temperature of the monitored space and then detecting a change in the temperature caused by the presence of an object. Using the principle of differentiation, which is a check of presence or nonpresence, PIRs verify if an intruder or object is actually there. Creating individual zones of detection where each zone comprises one or more layers can achieve differentiation. Between the zones there are areas of no sensitivity (dead zones) that are used by the sensor for comparison.

## Ultrasonic detectors

Using frequencies between 15 kHz and 75 kHz, these active detectors transmit ultrasonic sound waves that are inaudible to humans. The Doppler shift principle is the underlying method of operation, in which a change in frequency is detected due to object motion. This is caused when a moving object changes the frequency of sound waves around it. Two conditions must occur to successfully detect a Doppler shift event:

There must be motion of an object either towards or away from the receiver.

The motion of the object must cause a change in the ultrasonic frequency to the receiver relative to the transmitting frequency.

The ultrasonic detector operates by the transmitter emitting an ultrasonic signal into the area to be protected. The sound waves are reflected by solid objects (such as the surrounding floor, walls and ceiling) and then detected by the receiver. Because ultrasonic waves are transmitted through air, hard-surfaced objects tend to reflect most of the ultrasonic energy, while soft surfaces tend to absorb most energy.

When the surfaces are stationary, the frequency of the waves detected by the receiver will be equal to the transmitted frequency. However, a change in frequency will occur as a result of the Doppler principle, when a person or object is moving towards or away from the detector. Such an event initiates an alarm signal. This technology is considered obsolete by many alarm professionals, and is not actively installed.

## Microwave detectors

This device emits microwaves from a transmitter and detects any reflected microwaves or reduction in beam intensity using a receiver. The transmitter and receiver are usually combined inside a single housing (monostatic) for indoor applications, and separate housings (bistatic) for

outdoor applications. To reduce false alarms this type of detector is usually combined with a

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passive infrared detector or "Dualtec" alarm.

Microwave detectors respond to a Doppler shift in the frequency of the reflected energy, by a phase shift, or by a sudden reduction of the level of received energy. Any of these effects may indicate motion of an intruder.

#### Photo-electric beams

Photoelectric beam systems detect the presence of an intruder by transmitting visible or infrared light beams across an area, where these beams may be obstructed. To improve the detection surface area, the beams are often employed in stacks of two or more. However, if an intruder is aware of the technology's presence, it can be avoided. The technology can be an effective longrange detection system, if installed in stacks of three or more where the transmitters and receivers are staggered to create a fence-like barrier. Systems are available for both internal and external applications. To prevent a clandestine attack using a secondary light source being used to hold the detector in a 'sealed' condition whilst an intruder passes through, most systems use and detect a modulated light source.

#### Glass break detectors

The glass break detector may be used for internal perimeter building protection. When glass breaks it generates sound in a wide band of frequencies. These can range from infrasonic, which is below 20 hertz (Hz) and can not be heard by the human ear, through the audio band from 20 Hz to 20 kHz which humans can hear, right up to ultrasonic, which is above 20 kHz and again cannot be heard. Glass break acoustic detectors are mounted in close proximity to the glass panes and listen for sound frequencies associated with glass breaking. Seismic glass break detectors are different in that they are installed on the glass pane. When glass breaks it produces specific shock frequencies which travel through the glass and often through the window frame and the surrounding walls and ceiling. Typically, the most intense frequencies generated are between 3 and 5 kHz, depending on the type of glass and the presence of a plastic interlayer. Seismic glass break detectors "feel" these shock frequencies and in turn generate an alarm condition.

The more primitive detection method involves gluing a thin strip of conducting foil on the inside of the glass and putting low-power electrical current through it. Breaking the glass is practically guaranteed to tear the foil and break the circuit.

#### Smoke, heat, and carbon monoxide detectors



#### Heat Detection System

Most systems may also be equipped with smoke, heat, and/or carbon monoxide detectors. These are also known as 24 hour zones (which are on at all times). Smoke detectors and heat detectors protect from the risk of fire and carbon monoxide detectors protect from the risk of carbon monoxide. Although an intruder alarm panel may also have these detectors connected, it may not

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meet all the local fire code requirements of a fire alarm system.

Other types of volumetric sensors could be:

- Active Infrared
  - Passive Infrared/Microware combined
  - Radar
  - Acoustical Sensor/Audio
  - Vibration Sensor (seismic)
  - Air Turbulence
- 

**QUESTION 1318**

Which of the following is NOT a precaution you can take to reduce static electricity?

- A. power line conditioning
- B. anti-static sprays
- C. maintain proper humidity levels
- D. anti-static flooring

Answer: A

Explanation: The

Answer: Power line conditioning is a protective measure against noise. It helps to ensure the transmission of clean power.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 334.

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**QUESTION 1319**

Which of the following is currently the most recommended water system for a computer room?

9

- A. preaction
- B. wet pipe
- C. dry pipe
- D. deluge

Answer: A

Explanation: The

Answer: Preaction combines both the dry and wet pipe systems and allows manual intervention before a full discharge of water on the equipment occurs.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 334.

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**QUESTION 1320**

Which of the following is electromagnetic interference (EMI) that is noise from the radiation generated by the difference between the hot and ground wires?

- A. traverse-mode noise
- B. common-mode noise
- C. crossover-mode noise
- D. transversal-mode noise

Answer: B

Explanation: The

Answer: Common-mode noise is electrical noise between the hot and ground wire and between the neutral and ground wire.

Common mode noise will disrupt the memory logic of the processor. Noise between neutral and ground creates problems since the theoretical zero voltage between neutral and ground is utilized by microprocessors and digital logic control systems as zero voltage reference. A voltage on the ground wire will disrupt the stored memory variables of today's fast microprocessors. Common mode noise can be incorrectly interpreted as data.

This noise can cause what appears to be "software glitches", erratic performance of the equipment and partial or complete memory loss. Poor grounding also contributes significantly to common mode noise and this dynamic situation can change with building age, material corrosion, soil conditions and construction.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, page 332.

The Official ISC2 Study book on page 461 says:

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EMI is categorized as either common-mode noise or traverse-mode noise.

Common-Mode noise occurs between hot and ground wires.

Traverse-mode noise occurs between hot and neutral wires.

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### QUESTION 1321

The "vulnerability of a facility" to damage or attack may be assessed by all of the following except:

- A. Inspection
- B. History of losses
- C. Security controls
- D. security budget

Answer: D

Explanation: Source: The CISSP Examination Textbook- Volume 2: Practice by S. Rao Vallabhaneni.

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### QUESTION 1322

Which of the following is not an EPA-approved replacement for Halon?

- A. Bromine
- B. Innergen
- C. FM-200

## D. FE-13

Answer: A

Explanation: Halon is a compound consisting of bromine, fluorine, and carbon. Halons are used as fire extinguishing agents, both in built-in systems and in handheld portable fire extinguishers. Halon production in the U.S. ended on December 31, 1993, because they contribute to ozone depletion. Bromine being part of Halon is not a safe replacement for Halon.

The following are some of the EPA-approved replacements for halon:

Several substitutes have been approved by the SNAP program that may be considered as potential candidates for specific use conditions as cited in 40 CFR 82 Appendix A to Subpart G, Substitutes Subject to Use Restrictions and Unacceptable Substitutes. It should be noted that the  
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following substitutions are merely comments on usage and not conditions. For example, the Army has considered the use of HFC-125 in the crew compartments of its ground combat vehicles. Also, the Army has installed IG-541 in normally occupied areas. The following substitutes are listed:

Total Flooding Agents Acceptable Substitutes

Water Mist Systems using Potable or Natural Sea Water

[Foam] A (formerly identified as Water Mist Surfactant Blend A) This agent is not a clean agent, but is a low-density, short duration foam.

Carbon Dioxide (Must meet NFPA 12 and OSHA 1910.162(b)5 requirements

Water Sprinklers

Total Flooding Agents Substitutes Acceptable Subject To Use Conditions

Normally Occupied Areas

C4F10 (PFC-410 or CEA-410)

C3F8 (PFC-218 or CEA-308)

HCFC Blend A (NAF S-III)

HFC-23 (FE 13)

HFC-227ea (FM 200)

IG-01 (Argon)

IG-55 (Aragonite)

HFC-125

HFC-134a

Normally Unoccupied Areas

Powdered Aerosol C

CF3I

HCFC-22

HCFC-124

HFC-125

HFC-134a

Gelled Halocarbon/Dry Chem. Suspension (PGA)

Inert Gas/Powdered Aerosol Blend (FS 0140)

IG-541 (Inergen)

Unacceptable Substitutes

HFC-32

The following were incorrect answers:

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The following are all safe replacement for Halon:

2

FE-13™ is an Halon replacement (Halon 1301) in total flooding and inerting applications where its low toxicity provides for improved safety margins, the protected spaces are large, the cylinder storage area is remote from the protected space, or where the temperatures are likely to go below 0°C (32°F). Of the clean agents available, DuPont™ FE-13™ has the lowest toxicity and is the safest for protecting areas where people are present. DuPont™ FE-13™ provides the ultimate in human safety while protecting high-value assets and business continuity with a clean agent.

DuPont™ FE-13™ is:

safe for people

a clean agent that does not leave a residue

electrically nonconductive and noncorrosive

an environmentally preferred alternative to Halon with zero ozone depletion potential (ODP)

FM-200 is a colorless, liquefied compressed gas. It is stored as a liquid and dispensed into the hazard as a colorless, electrically non-conductive vapor that is clear and does not obscure vision.

It leaves no residue and has acceptable toxicity for use in occupied spaces at design

concentration. FM-200 does not displace oxygen and, therefore, is safe for use in occupied

spaces without fear of oxygen deprivation.

INERGEN is a blend of inert atmospheric gases that contains 52% nitrogen, 40% argon, 8% carbon dioxide, used for fire suppression system agent. It is considered a clean agent for use in gaseous fire suppression applications. Inergen does not contain halocarbons, and has no ozone depletion potential. It is non-toxic. Inergen is used at design concentrations of 35-50% to lower the concentration of oxygen to a point that cannot support combustion, but still safe for humans.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 25616-25620). Auerbach Publications. Kindle Edition.

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (pp. 473-474). McGraw-Hill. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 25623-25626). Auerbach Publications. Kindle Edition.

and

<http://en.wikipedia.org/wiki/Inergen>

and

[http://www.p2sustainabilitylibrary.mil/P2\\_Opportunity\\_Handbook/3\\_III\\_2.html](http://www.p2sustainabilitylibrary.mil/P2_Opportunity_Handbook/3_III_2.html)

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### QUESTION 1323

Which of the following is not a physical control for physical security?

- A. lighting
- B. fences
- C. training
- D. facility construction materials

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Answer: C

Explanation: Some physical controls include fences, lights, locks, and facility construction materials. Some administrative controls include facility selection and construction, facility management, personnel controls, training, and emergency response and procedures.

From: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 3rd. Ed., Chapter 6, page 403.

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**QUESTION 1324**

Crime Prevention Through Environmental Design (CPTED) is a discipline that:

- A. Outlines how the proper design of a physical environment can reduce crime by directly affecting human behavior.
- B. Outlines how the proper design of the logical environment can reduce crime by directly affecting human behavior.
- C. Outlines how the proper design of the detective control environment can reduce crime by directly affecting human behavior.
- D. Outlines how the proper design of the administrative control environment can reduce crime by directly affecting human behavior.

Answer: A

Explanation: Crime Prevention Through Environmental Design (CPTED) is a discipline that outlines how the proper design of a physical environment can reduce crime by directly affecting human behavior. It provides guidance about lost and crime prevention through proper facility construction and environmental components and procedures.

CPTED concepts were developed in the 1960s. They have been expanded upon and have matured as our environments and crime types have evolved. CPTED has been used not just to develop corporate physical security programs, but also for large-scale activities such as development of neighborhoods, towns, and cities. It addresses landscaping, entrances, facility and

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neighborhood layouts, lighting, road placement, and traffic circulation patterns. It looks at microenvironments, such as offices and rest-rooms, and macroenvironments, like campuses and cities.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 435). McGraw-Hill. Kindle Edition.

and

CPTED Guide Book

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**QUESTION 1325**

The main risks that physical security components combat are all of the following EXCEPT:

- A. SYN flood
- B. physical damage
- C. theft

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D. Tailgating

Answer: A

Explanation: SYN flood is not a physical security issue. The main risks that physical security components combat are theft, interruptions to services, physical intrusion and damage, compromised system integrity, and unauthorized disclosure of information.

From: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, page 291.

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**QUESTION 1326**

A momentary power outage is a:

- A. spike
- B. blackout
- C. surge
- D. fault

Answer: D

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Explanation: A momentary power outage is a fault.

Power Excess

Spike --> Too much voltage for a short period of time.

Surge --> Too much voltage for a long period of time.

Power Loss

Fault --> A momentary power outage.

Blackout --> A long power interruption.

Power Degradation

Sag or Dip --> A momentary low voltage.

Brownout --> A prolonged power supply that is below normal voltage.

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 3rd. Edition McGraw-Hill/Osborne, 2005, page 368.

and

[https://en.wikipedia.org/wiki/Power\\_quality](https://en.wikipedia.org/wiki/Power_quality)

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**QUESTION 1327**

A momentary high voltage is a:

- A. spike
- B. blackout
- C. surge
- D. fault

Answer: A

Explanation: Too much voltage for a short period of time is a spike.

Too much voltage for a long period of time is a surge.

Not enough voltage for a short period of time is a sag or dip

Not enough voltage for a long period of time is brownout

A short power interruption is a fault

A long power interruption is a blackout

You MUST know all of the power issues above for the purpose of the exam.

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From: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 3rd. Edition McGraw-Hill/Osborne, 2005, page 368.

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### QUESTION 1328

A momentary low voltage, from 1 cycle to a few seconds, is a:

- A. spike
- B. blackout
- C. sag
- D. fault

Answer: C

Explanation: A momentary low voltage is a sag. A synonym would be a dip.

Risks to electrical power supply:

#### POWER FAILURE

- Blackout: complete loss of electrical power
- Fault: momentary power outage

#### POWER DEGRADATION

- Brownout: an intentional reduction of voltage by the power company.
- Sag/dip: a short period of low voltage

#### POWER EXCESS

- Surge: Prolonged rise in voltage
- Spike: Momentary High Voltage
- In-rush current: the initial surge of current required by a load before it reaches normal operation.
- Transient: line noise or disturbance is superimposed on the supply circuit and can cause fluctuations in electrical power

Reference(s) used for this question:

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (p. 462). McGraw-Hill. Kindle Edition.

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### QUESTION 1329

A prolonged high voltage is a:

- A. spike
- B. blackout

- C. surge
- D. fault

Answer: C

Explanation: A prolonged high voltage is a surge.

From: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 3rd. Edition McGraw-Hill/Osborne, 2005, page 368.

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### QUESTION 1330

A prolonged complete loss of electric power is a:

- A. brownout
- B. blackout
- C. surge
- D. fault

Answer: B

Explanation: A prolonged power outage is a blackout.

From: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 3rd. Edition McGraw-Hill/Osborne, 2005, page 368.

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### QUESTION 1331

A prolonged power supply that is below normal voltage is a:

- A. brownout
- B. blackout
- 8
- C. surge
- D. fault

Answer: A

Explanation: A prolonged power supply that is below normal voltage is a brownout.

From: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 3rd. Edition McGraw-Hill/Osborne, 2005, page 368.

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### QUESTION 1332

While referring to Physical Security, what does Positive pressurization means?

- A. The pressure inside your sprinkler system is greater than zero.
- B. The air goes out of a room when a door is opened and outside air does not go into the room.
- C. Causes the sprinkler system to go off.
- D. A series of measures that increase pressure on employees in order to make them more productive.

Answer: B

Explanation: Positive pressurization means that when an employee opens a door, the air goes out and outside air does not come in.

From: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 3rd. Edition McGraw-Hill/Osborne, 2005, page 373.

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### QUESTION 1333

Because ordinary cable introduces a toxic hazard in the event of fire, special cabling is required in a separate area provided for air circulation for heating, ventilation, and air-conditioning (sometimes referred to as HVAC) and typically provided in the space between the structural ceiling and a dropdown ceiling. This area is referred to as the:

- A. smoke boundary area
- B. fire detection area
- C. Plenum area
- D. Intergen area

Answer: C

Explanation: In building construction, a plenum (pronounced PLEH-nuhm, from Latin meaning full) is a separate space provided for air circulation for heating, ventilation, and air-conditioning (sometimes referred to as HVAC) and typically provided in the space between the structural ceiling and a drop-down ceiling. A plenum may also be under a raised floor. In buildings with computer installations, the plenum space is often used to house connecting communication cables. Because ordinary cable introduces a toxic hazard in the event of fire, special plenum cabling is required in plenum areas.

Source: [http://searchdatacenter.techtarget.com/sDefinition/0,,sid80\\_gci213716,00.html](http://searchdatacenter.techtarget.com/sDefinition/0,,sid80_gci213716,00.html)

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### QUESTION 1334

Controls like guards and general steps to maintain building security, securing of server rooms or laptops, the protection of cables, and usage of magnetic switches on doors and windows are some of the examples of:

- A. Administrative controls
- B. Logical controls
- C. Technical controls
- D. Physical controls

Answer: D

Explanation: Controls like guards and general steps to maintain building security, securing of server rooms or laptops, the protection of cables, and usage of magnetic switches on doors and windows are all examples of Physical Security.

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Reference(s) used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 33.

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### QUESTION 1335

To mitigate the risk of fire in your new data center, you plan to implement a heat-activated fire detector. Your requirement is to have the earliest warning possible of a fire outbreak. Which type of sensor would you select and where would you place it?

- A. Rate-of-rise temperature sensor installed on the side wall
- B. Variable heat sensor installed above the suspended ceiling
- C. Fixed-temperature sensor installed in the air vent
- D. Rate-of-rise temperature sensor installed below the raised floors

Answer: D

Explanation: "Heat-activated detectors can be configured to sound an alarm either when a predefined temperature (fixed temperature) is reached or when the temperature increases over a period of time (rate-of-rise).

Rate-of-rise temperature sensors usually provide a quicker warning than fixed-temperature sensors because they are more sensitive, but they can also cause more false alarms. Placing a sensor under the raise floor is also a good choice. However for complete coverage you would also add sensors on and above suspended ceilings and within air ducts as well. The sensors can either be spaced uniformly throughout a facility, or implemented in a line type of installation, which is operated by a heat-sensitive cable.

It is not enough to have temperature monitoring, you should also have smoke detectors installed in the facility; they must be installed in the right places. Detectors should be installed both on and above suspended ceilings and below raised floors, because companies run many types of wires in both places that could start an electrical fire. No one would know about the fire until it broke through the floor or dropped ceiling if detectors were not placed in these areas.

Smoke Detectors should also be located in enclosures and air ducts, because smoke can gather in these areas before entering other spaces. It is important that people are alerted about a fire as quickly as possible so that damage may be reduced, fire suppression activities may start quickly, and lives may be saved."

NOTE:

The question did not contain any specific details about the specifics of the ventilation system such as the usage of hot aisles versus cold aisles. So you must work with the details you have and find out which of the 4 choices is the best according to the question asking for the earliest warning.

The following are incorrect answers:

Rate-of-rise temperature sensor and on the side wall: is wrong as placing a smoke detector on a side wall is usually not as effective as placing it on or above the suspended ceiling, under raised floors or in air vents.

Variable heat sensor and above the suspended ceiling: is wrong as there is no such thing as a variable heat sensor in smoke detection. However, you could place a smoke detector in the suspended ceiling.

Fixed-temperature sensor and in the air vent: is wrong as a fixed-temperature sensor is not as sensitive as a rate-of-rise sensor and therefore does not warn you as quickly. An air vent is a good  
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place to place a sensor because the ventilation system will pick up the smoke and the sensor will trigger at that point.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 470) . McGraw-Hill. Kindle Edition.

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**QUESTION 1336**

Which type of fire extinguisher is most appropriate for a digital information processing facility?

- A. Type A
- B. Type B
- C. Type C
- D. Type D

Answer: C

Explanation: Type C fire extinguishers deal with electrical fires. They are most likely to be found around a digital information processing facility or data center.

Type A is for common combustibles

Type B is for liquids (petroleum products and coolants)

Type D is used specifically for fighting flammable metal fires (eg: magnesium). Additionally Class K fires are caused by cooking oils and fats. They typically burn much hotter than Class B fires and are extinguished using wet chemical (alkali) fire extinguishers.

To remember the 4 classes of fire and what they are you can think about my first name which is CLEMENT. See an example of this below:

Class Type

A Common combustible

B Liquid

C Electrical Fire

D Metal Burning

References:

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 6: Physical security (page 312).

2

Underwriters Laboratory's Rating and Testing of Fire Extinguishers (UL 711).

National Fire Protection Association's glossary.

[http://en.wikipedia.org/wiki/Fire\\_classes](http://en.wikipedia.org/wiki/Fire_classes)

[http://en.wikipedia.org/wiki/Fire\\_extinguisher](http://en.wikipedia.org/wiki/Fire_extinguisher)

[http://en.wikipedia.org/wiki/Fire\\_retardant\\_foam](http://en.wikipedia.org/wiki/Fire_retardant_foam)

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**QUESTION 1337**

Which of the following controls related to physical security is not an administrative control?

- 
- A. Personnel controls
  - B. Alarms
  - C. Training
  - D. Emergency response and procedures

Answer: B

Explanation: Physical security involves administrative, technical and physical controls. All of the choices presented are part of Administrative Controls except Alarms which is a technical control.

Administrative Controls are mostly on paper. Senior management must decide what role security will play in the organization, including the security goals and objectives. These directives will dictate how all the supporting mechanisms will fall into place. Basically, senior management provides the skeleton of a security infrastructure and then appoints the proper entities to fill in the rest. Publishing the company security plan or security policy would be one of the first step under the administrative controls.

Personnel controls are part of Administrative Controls, it indicate how employees are expected to interact with security mechanisms and address noncompliance issues pertaining to these expectations. These controls indicate what security actions should be taken when an employee is hired, terminated, suspended, moved into another department, or promoted. Specific procedures must be developed for each situation, and many times the human resources and legal departments are involved with making these decisions.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 242). McGraw-Hill . Kindle Edition.

and

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Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 242). McGraw-Hill . Kindle Edition.

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### QUESTION 1338

Which of the following is related to physical security and is not considered a technical control?

- A. Access control Mechanisms
- B. Intrusion Detection Systems
- C. Firewalls
- D. Locks

Answer: D

Explanation: All of the above are considered technical controls except for locks, which are physical controls.

Administrative, Technical, and Physical Security Controls

Administrative security controls are primarily policies and procedures put into place to define and guide employee actions in dealing with the organization's sensitive information. For example, policy might dictate (and procedures indicate how) that human resources conduct background

checks on employees with access to sensitive information. Requiring that information be classified and the process to classify and review information classifications is another example of an administrative control. The organization security awareness program is an administrative control used to make employees cognizant of their security roles and responsibilities. Note that administrative security controls in the form of a policy can be enforced or verified with technical or physical security controls. For instance, security policy may state that computers without antivirus software cannot connect to the network, but a technical control, such as network access control software, will check for antivirus software when a computer tries to attach to the network.

Technical security controls (also called logical controls) are devices, processes, protocols, and other measures used to protect the C.I.

A. of sensitive information. Examples include logical access systems, encryption systems, antivirus systems, firewalls, and intrusion detection systems.

Physical security controls are devices and means to control physical access to sensitive information and to protect the availability of the information. Examples are physical access systems (fences, mantraps, guards), physical intrusion detection systems (motion detector, alarm system), and physical protection systems (sprinklers, backup generator). Administrative and technical controls depend on proper physical security controls being in place. An administrative

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policy allowing only authorized employees access to the data center do little good without some kind of physical access control.

From the GIAC.ORG website

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### QUESTION 1339

Which of the following floors would be most appropriate to locate information processing facilities in a 6-stories building?

- A. Basement
- B. Ground floor
- C. Third floor
- D. Sixth floor

Answer: C

Explanation: You data center should be located in the middle of the facility or the core of a building to provide protection from natural disasters or bombs and provide easier access to emergency crewmembers if necessary. By being at the core of the facility the external wall would act as a secondary layer of protection as well.

Information processing facilities should not be located on the top floors of buildings in case of a fire or flooding coming from the roof. Many crimes and theft have also been conducted by simply cutting a large hole on the roof.

They should not be in the basement because of flooding where water has a natural tendency to flow down :-) Even a little amount of water would affect your operation considering the quantity of electrical cabling sitting directly on the cement floor under under your raise floor.

The data center should not be located on the first floor due to the presence of the main entrance where people are coming in and out. You have a lot of high traffic areas such as the elevators, the

loading docks, cafeteria, coffee shop, etc.. Really a bad location for a data center. So it was easy to come up with the answer by using the process of elimination where the top, the bottom, and the basement are all bad choices. That left you with only one possible answer which is the third floor.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, 5th Edition, Page 425.

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**QUESTION 1340**

What can be defined as a momentary low voltage?

- A. Spike
- B. Sag
- C. Fault
- D. Brownout

Answer: B

Explanation: A sag is a momentary low voltage. A spike is a momentary high voltage. A fault is a momentary power out and a brownout is a prolonged power supply that is below normal voltage.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 6: Physical security (page 299).

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**QUESTION 1341**

Which of the following fire extinguishing systems incorporating a detection system is currently the most recommended water system for a computer room?

- A. Wet pipe
- B. Dry pipe
- C. Deluge
- D. Preaction

Answer: D

Explanation: The preaction system combines both the dry and wet pipe systems, by first releasing the water into the pipes when heat is detected (dry pipe), then releasing the water flow when the link in the nozzle melts (wet pipe).

This allows manual intervention before a full discharge of water on the equipment occurs. This is currently the most recommended water system for a computer room.

According to the ISC2 Official Study Guide:

All buildings should be equipped with an effective fire suppression system, providing the building with around the clock protection. Traditionally, fire suppression systems employed arrays of water sprinklers that would douse a fire and surrounding areas.

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Sprinkler systems are classified into four different groups: wet, dry, preaction, and deluge.

Wet systems have a constant supply of water in them at all times; these sprinklers once activated will not shut off until the water source is shut off.

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Dry systems do not have water in them. The valve will not release until the electric valve is stimulated by excess heat.

Pre-action systems incorporate a detection system, which can eliminate concerns of water damage due to false activations. Water is held back until detectors in the area are activated. Deluge systems operate in the same function as the pre-action system except all sprinkler heads are in the open position. Water may be a sound solution for large physical areas such as warehouses, but it is entirely inappropriate for computer equipment. A water spray can irreparably damage hardware more quickly than encroaching smoke or heat. Gas suppression systems operate to starve the fire of oxygen. In the past, Halon was the choice for gas suppression systems; however, Halon leaves residue, depletes the ozone layer, and can injure nearby personnel.

Shon Harris in her latest study guide says:

Four main types of water sprinkler systems are available: wet pipe, dry pipe, preaction, and deluge.

- Wet pipe Wet pipe systems always contain water in the pipes and are usually discharged by temperature control-level sensors. One disadvantage of wet pipe systems is that the water in the pipes may freeze in colder climates. Also, if there is a nozzle or pipe break, it can cause extensive water damage. These types of systems are also called closed head systems.
- Dry pipe In dry pipe systems, the water is not actually held in the pipes. The water is contained in a “holding tank” until it is released. The pipes hold pressurized air, which is reduced when a fire or smoke alarm is activated, allowing the water valve to be opened by the water pressure. Water is not allowed into the pipes that feed the sprinklers until an actual fire is detected. First, a heat or smoke sensor is activated; then, the water fills the pipes leading to the sprinkler heads, the fire alarm sounds, the electric power supply is disconnected, and finally water is allowed to flow from the sprinklers. These pipes are best used in colder climates because the pipes will not freeze.
- Preaction Preaction systems are similar to dry pipe systems in that the water is not held in the pipes, but is released when the pressurized air within the pipes is reduced. Once this happens, the pipes are filled with water, but it is not released right away. A thermal-fusible link on the sprinkler head has to melt before the water is released. The purpose of combining these two techniques is

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to give people more time to respond to false alarms or to small fires that can be handled by other means. Putting out a small fire with a handheld extinguisher is better than losing a lot of electrical equipment to water damage. These systems are usually used only in data processing environments rather than the whole building, because of the higher cost of these types of systems.

- Deluge A deluge system has its sprinkler heads wide open to allow a larger volume of water to be released in a shorter period. Because the water being released is in such large volumes, these systems are usually not used in data processing environments.

Reference used for this question:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 10: Physical security (page 336).  
and

Corporate; (Isc)<sup>2</sup> (2010-04-20). Official (ISC)2 Guide to the CISSP CBK, Second Edition ((ISC)2 Press) (Kindle Locations 14379-14391). Taylor & Francis. Kindle Edition.  
and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 10245-10253). McGraw-Hill. Kindle Edition.

and

Harris, Shon (2012-10-25). CISSP All-in-One Exam Guide, 6th Edition (Kindle Locations 10256-10260). McGraw-Hill. Kindle Edition.

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**QUESTION 1342**

For maximum security design, what type of fence is most effective and cost-effective method (Foot are being used as measurement unit below)?

- A. 3' to 4' high.
- B. 6' to 7' high.
- C. 8' high and above with strands of barbed wire.
- D. Double fencing

Answer: D

Explanation: The most commonly used fence is the chain linked fence and it is the most affordable. The standard is a six-foot high fence with two-inch mesh square openings. The material should consist of nine-gauge vinyl or galvanized metal. Nine-gauge is a typical fence material installed in residential areas.

Additionally, it is recommended to place barbed wire strands angled out from the top of the fence at a 45° angle and away from the protected area with three strands running across the top. This will provide for a seven-foot fence. There are several variations of the use of “top guards” using V-shaped barbed wire or the use of concertina wire as an enhancement, which has been a replacement for more traditional three strand barbed wire “top guards.”

The fence should be fastened to ridged metal posts set in concrete every six feet with additional bracing at the corners and gate openings. The bottom of the fence should be stabilized against intruders crawling under by attaching posts along the bottom to keep the fence from being pushed or pulled up from the bottom. If the soil is sandy, the bottom edge of the fence should be installed below ground level.

For maximum security design, the use of double fencing with rolls of concertina wire positioned between the two fences is the most effective deterrent and cost-efficient method. In this design, an intruder is required to use an extensive array of ladders and equipment to breach the fences.

Most fencing is largely a psychological deterrent and a boundary marker rather than a barrier, because in most cases such fences can be rather easily penetrated unless added security measures are taken to enhance the security of the fence. Sensors attached to the fence to provide electronic monitoring of cutting or scaling the fence can be used.

Reference(s) used for this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 24416-24431). Auerbach Publications. Kindle Edition.

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**QUESTION 1343**

The viewing of recorded events after the fact using a closed-circuit TV camera is considered a

- A. Preventative control.
- B. Detective control

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- C. Compensating control
  - D. Corrective control

Answer: B

Explanation: Detective security controls are like a burglar alarm. They detect and report an unauthorized or undesired event (or an attempted undesired event). Detective security controls are invoked after the undesirable event has occurred. Example detective security controls are log monitoring and review, system audit, file integrity checkers, and motion detection.

Visual surveillance or recording devices such as closed circuit television are used in conjunction  
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with guards in order to enhance their surveillance ability and to record events for future analysis or prosecution.

When events are monitored, it is considered preventative whereas recording of events is considered detective in nature.

Below you have explanations of other types of security controls from a nice guide produced by James Purcell (see reference below):

Preventive security controls are put into place to prevent intentional or unintentional disclosure, alteration, or destruction (D.A.D.) of sensitive information. Some example preventive controls follow:

- Policy – Unauthorized network connections are prohibited.
- Firewall – Blocks unauthorized network connections.
- Locked wiring closet – Prevents unauthorized equipment from being physically plugged into a network switch.

Notice in the preceding examples that preventive controls cross administrative, technical, and physical categories discussed previously. The same is true for any of the controls discussed in this section.

Corrective security controls are used to respond to and fix a security incident. Corrective security controls also limit or reduce further damage from an attack. Examples follow:

- Procedure to clean a virus from an infected system
- A guard checking and locking a door left unlocked by a careless employee
- Updating firewall rules to block an attacking IP address

Note that in many cases the corrective security control is triggered by a detective security control.

Recovery security controls are those controls that put a system back into production after an incident. Most Disaster Recovery activities fall into this category. For example, after a disk failure, data is restored from a backup tape.

Directive security controls are the equivalent of administrative controls. Directive controls direct that some action be taken to protect sensitive organizational information. The directive can be in the form of a policy, procedure, or guideline.

Deterrent security controls are controls that discourage security violations. For instance, “Unauthorized Access Prohibited” signage may deter a trespasser from entering an area. The  
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presence of security cameras might deter an employee from stealing equipment. A policy that states access to servers is monitored could deter unauthorized access.

Compensating security controls are controls that provide an alternative to normal controls that cannot be used for some reason. For instance, a certain server cannot have antivirus software

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installed because it interferes with a critical application. A compensating control would be to increase monitoring of that server or isolate that server on its own network segment.

Note that there is a third popular taxonomy developed by NIST and described in NIST Special Publication 800-53, "Recommended Security Controls for Federal Information Systems." NIST categorizes security controls into 3 classes and then further categorizes the controls within the classes into 17 families. Within each security control family are dozens of specific controls. The NIST taxonomy is not covered on the CISSP exam but is one the CISSP should be aware of if you are employed within the US federal workforce.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 10: Physical security (page 340).

and

CISSP Study Guide By Eric Conrad, Seth Misenar, Joshua Feldman, page 50-52

and

Security Control Types and Operational Security, James E. Purcell, <http://www.giac.org/cissppapers/207.pdf>

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### QUESTION 1344

Which of the following protection devices is used for spot protection within a few inches of the object, rather than for overall room security monitoring?

- A. Wave pattern motion detectors
- B. Capacitance detectors
- C. Field-powered devices
- D. Audio detectors

Answer: B

Explanation: Capacitance detectors monitor an electrical field surrounding the object being monitored. They are used for spot protection within a few inches of the object, rather than for overall room security monitoring used by wave detectors. Penetration of this field changes the electrical capacitance of the field enough to generate and alarm. Wave pattern motion detectors

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generate a frequency wave pattern and send an alarm if the pattern is disturbed as it is reflected back to its receiver. Field-powered devices are a type of personnel access control devices. Audio detectors simply monitor a room for any abnormal sound wave generation and trigger an alarm.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 10: Physical security (page 344).

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### QUESTION 1345

The Physical Security domain focuses on three areas that are the basis to physically protecting enterprise's resources and sensitive information. Which of the following is not one of these areas?

- A. Threats
- B. Countermeasures

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- C. Vulnerabilities
  - D. Risks

Answer: B

Explanation: Countermeasures are used to mitigate the risks, threats, and vulnerabilities and are not areas that are protected.

Security is very important to organizations and their infrastructures, and physical security is no exception. Physical security encompasses a different set of threats, vulnerabilities, and risks than the other types of security that have been addressed so far.

Physical security mechanisms include site design and layout, environmental components, emergency response readiness, training, access control, intrusion detection, and power and fire protection. Physical security mechanisms protect people, data, equipment, systems, facilities, and a long list of company assets.

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### QUESTION 1346

Physical security is accomplished through proper facility construction, fire and water protection, anti-theft mechanisms, intrusion detection systems, and security procedures that are adhered to and enforced. Which of the following is not a component that achieves this type of security?

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- A. Administrative control mechanisms
- B. Integrity control mechanisms
- C. Technical control mechanisms
- D. Physical control mechanisms

Answer: B

Explanation: Integrity Controls Mechanisms are not part of physical security. All of the other detractors were correct this one was the wrong one that does not belong to Physical Security.

Below you have more details extracted from the SearchSecurity web site:

Information security depends on the security and management of the physical space in which computer systems operate. Domain 9 of the CISSP exam's Common Body of Knowledge addresses the challenges of securing the physical space, its systems and the people who work within it by use of administrative, technical and physical controls. The following topics are covered:

Facilities management: The administrative processes that govern the maintenance and protection of the physical operations space, from site selection through emergency response.

Risks, issues and protection strategies: Risk identification and the selection of security protection components.

Perimeter security: Typical physical protection controls.

Facilities management

Facilities management is a complex component of corporate security that ranges from the planning of a secure physical site to the management of the physical information system environment. Facilities management responsibilities include site selection and physical security planning (i.e. facility construction, design and layout, fire and water damage protection, antitheft mechanisms, intrusion detection and security procedures.) Protections must extend to both people

and assets. The necessary level of protection depends on the value of the assets and data. CISSP® candidates must learn the concept of critical-path analysis as a means of determining a component's business function criticality relative to the cost of operation and replacement. Furthermore, students need to gain an understanding of the optimal location and physical attributes of a secure facility. Among the topics covered in this domain are site inspection, location, accessibility and obscurity, considering the area crime rate, and the likelihood of natural hazards such as floods or earthquakes.

This domain also covers the quality of construction material, such as its protective qualities and load capabilities, as well as how to lay out the structure to minimize risk of forcible entry and accidental damage. Regulatory compliance is also touched on, as is preferred proximity to civil protection services, such as fire and police stations. Attention is given to computer and equipment rooms, including their location, configuration (entrance/egress requirements) and their proximity to wiring distribution centers at the site.

#### Physical risks, issues and protection strategies

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An overview of physical security risks includes risk of theft, service interruption, physical damage, compromised system integrity and unauthorized disclosure of information. Interruptions to business can manifest due to loss of power, services, telecommunications connectivity and water supply. These can also seriously compromise electronic security monitoring alarm/response devices. Backup options are also covered in this domain, as is a strategy for quantifying the risk exposure by simple formula.

Investment in preventive security can be costly. Appropriate redundancy of people skills, systems and infrastructure must be based on the criticality of the data and assets to be preserved.

Therefore a strategy is presented that helps determine the selection of cost appropriate controls. Among the topics covered in this domain are regulatory and legal requirements, common standard security protections such as locks and fences, and the importance of establishing service level agreements for maintenance and disaster support. Rounding out the optimization approach are simple calculations for determining mean time between failure and mean time to repair (used to estimate average equipment life expectancy) — essential for estimating the cost/benefit of purchasing and maintaining redundant equipment.

As the lifeblood of computer systems, special attention is placed on adequacy, quality and protection of power supplies. CISSP candidates need to understand power supply concepts and terminology, including those for quality (i.e. transient noise vs. clean power); types of interference (EMI and RFI); and types of interruptions such as power excess by spikes and surges, power loss by fault or blackout, and power degradation from sags and brownouts. A simple formula is presented for determining the total cost per hour for backup power. Proving power reliability through testing is recommended and the advantages of three power protection approaches are discussed (standby UPS, power line conditioners and backup sources) including minimum requirements for primary and alternate power provided.

Environmental controls are explored in this domain, including the value of positive pressure water drains and climate monitoring devices used to control temperature, humidity and reduce static electricity. Optimal temperatures and humidity settings are provided. Recommendations include strict procedures during emergencies, preventing typical risks (such as blocked fans), and the use of antistatic armbands and hygrometers. Positive pressurization for proper ventilation and monitoring for air born contaminants is stressed.

The pros and cons of several detection response systems are deeply explored in this domain. The

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concept of combustion, the classes of fire and fire extinguisher ratings are detailed. Mechanisms behind smoke-activated, heat-activated and flame-activated devices and Automatic Dial-up alarms are covered, along with their advantages, costs and shortcomings. Types of fire sources are distinguished and the effectiveness of fire suppression methods for each is included. For instance, Halon and its approved replacements are covered, as are the advantages and the inherent risks to equipment of the use of water sprinklers.

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#### Administrative controls

The physical security domain also deals with administrative controls applied to physical sites and assets. The need for skilled personnel, knowledge sharing between them, separation of duties, and appropriate oversight in the care and maintenance of equipment and environments is stressed. A list of management duties including hiring checks, employee maintenance activities and recommended termination procedures is offered. Emergency measures include accountability for evacuation and system shutdown procedures, integration with disaster and business continuity plans, assuring documented procedures are easily available during different types of emergencies, the scheduling of periodic equipment testing, administrative reviews of documentation, procedures and recovery plans, responsibilities delegation, and personnel training and drills.

#### Perimeter security

Domain nine also covers the devices and techniques used to control access to a space. These include access control devices, surveillance monitoring, intrusion detection and corrective actions. Specifications are provided for optimal external boundary protection, including fence heights and placement, and lighting placement and types. Selection of door types and lock characteristics are covered. Surveillance methods and intrusion-detection methods are explained, including the use of video monitoring, guards, dogs, proximity detection systems, photoelectric/photometric systems, wave pattern devices, passive infrared systems, and sound and motion detectors, and current flow sensitivity devices that specifically address computer theft. Room lock types — both preset and cipher locks (and their variations) -- device locks, such as portable laptop locks, lockable server bays, switch control locks and slot locks, port controls, peripheral switch controls and cable trap locks are also covered. Personal access control methods used to identify authorized users for site entry are covered at length, noting social engineering risks such as piggybacking. Wireless proximity devices, both user access and system sensing readers are covered (i.e. transponder based, passive devices and field powered devices) in this domain.

Now that you've been introduced to the key concepts of Domain 9, watch the Domain 9, Physical Security video

Return to the CISSP Essentials Security School main page

See all SearchSecurity.com's resources on CISSP certification training

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, Page 280.

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#### QUESTION 1347

The environment that must be protected includes all personnel, equipment, data, communication

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devices, power supply and wiring. The necessary level of protection depends on the value of the data, the computer systems, and the company assets within the facility. The value of these items can be determined by what type of analysis?

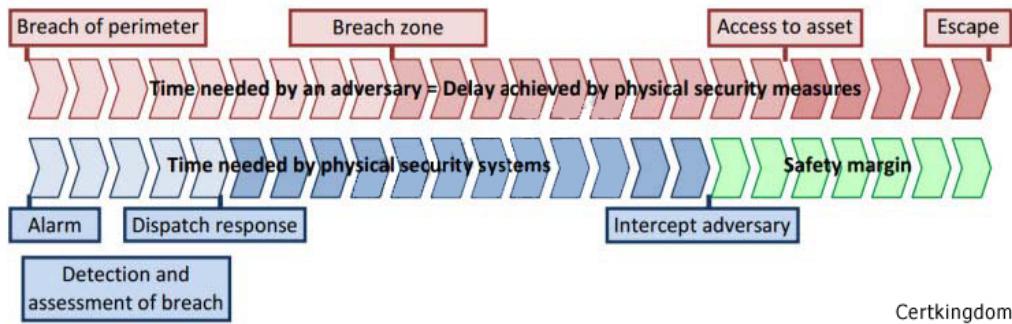
- A. Critical-channel analysis
- B. Covert channel analysis
- C. Critical-path analysis
- D. Critical-conduit analysis

Answer: C

**Explanation:** The effectiveness of security controls is measured by the probability of detection at the point where there is enough time for a response team to interrupt an adversary. The critical path is the adversary path with the lowest probability of interruption.

An adversary path is an ordered sequence of actions against an asset that could result in it being compromised. Adversaries could normally be expected to take the easiest and most direct route. Early detection of unauthorised access enables a quicker response. Ideally interception should occur before access to the asset, but this depends on the asset and the security objectives.

Interruption may not be required if tamper evidence is the objective for protecting the asset. See example below:



### Critical Path Analysis Physical Security

#### THE CISSP EXAM AND PHYSICAL SECURITY

Information security depends on the security and management of the physical space in which computer systems operate. The CISSP exam's Common Body of Knowledge addresses the challenges of securing the physical space, its systems and the people who work within it by use of administrative, technical and physical controls.

The following topics are covered:

Facilities management: The administrative processes that govern the maintenance and protection of the physical operations space, from site selection through emergency response.

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Risks, issues and protection strategies: Risk identification and the selection of security protection components.

Perimeter security: Typical physical protection controls.

Facilities management

Facilities management is a complex component of corporate security that ranges from the planning of a secure physical site to the management of the physical information system environment. Facilities management responsibilities include site selection and physical security planning (i.e. facility construction, design and layout, fire and water damage protection, antitheft mechanisms, intrusion detection and security procedures.) Protections must extend to both people

and assets. The necessary level of protection depends on the value of the assets and data. As an exam candidate you must learn the concept of critical-path analysis as a means of determining a component's business function criticality relative to the cost of operation and replacement. Furthermore, students need to gain an understanding of the optimal location and physical attributes of a secure facility. Among the topics covered in this domain are site inspection, location, accessibility and obscurity, considering the area crime rate, and the likelihood of natural hazards such as floods or earthquakes.

**EXAM TIP:**

This topic could be either from a Physical Security perspective or from a Logical Security Perspective.

From a logical perspective it is define as: An analysis that defines relationships between mission critical applications. This type of analysis is performed to show what must happen to stay in business.

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, Page 281.

and

<http://www.protectivesecurity.gov.au/physicalsecurity/Documents/Security-zones-and-riskmitigation-control-measures.pdf>

and

[http://www.onlineexpert.com/elearning/user/SampleFiles/SECURITY/CISSP\\_PS\\_Glossary.html](http://www.onlineexpert.com/elearning/user/SampleFiles/SECURITY/CISSP_PS_Glossary.html)

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**QUESTION 1348**

Electrical systems are the lifeblood of computer operations. The continued supply of clean, steady power is required to maintain the proper personnel environment as well as to sustain data operations. Which of the following is not an element that can threaten power systems?

- A. Transient Noise
- B. Faulty Ground
- C. Brownouts
- D. UPS

Answer: D

Explanation: An uninterruptible power supply, also uninterruptible power source, UPS or battery/flywheel backup, is an electrical apparatus that provides emergency power to a load when the input power source, typically mains power, fails. A UPS differs from an auxiliary or emergency power system or standby generator in that it will provide near-instantaneous protection from input power interruptions, by supplying energy stored in batteries or a flywheel. The on-battery runtime of most uninterruptible power sources is relatively short (only a few minutes) but sufficient to start a standby power source or properly shut down the protected equipment.

A UPS is typically used to protect computers, data centers, telecommunication equipment or other electrical equipment where an unexpected power disruption could cause injuries, fatalities, serious business disruption or data loss.

The primary role of any UPS is to provide short-term power when the input power source fails.

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However, most UPS units are also capable in varying degrees of correcting common utility power problems:

Voltage spike or sustained Overvoltage

Momentary or sustained reduction in input voltage.

Noise, defined as a high frequency transient or oscillation, usually injected into the line by nearby equipment.

Instability of the mains frequency.

Harmonic distortion: defined as a departure from the ideal sinusoidal waveform expected on the line.

NOTE:

Some organization are constantly running off the UPS. Of course in such case if the online UPS would fail and you did not think about redundancy, it could contribute to failure instead of helping to avoid power failure. It was reported by a few quiz takers that standby UPS could create issues as well. I totally agree but this is more the exception than the norm. Any countermeasures, safeguards, or controls not deployed or maintained properly could introduce risks instead of minimizing their effect or preventing them. Once again, the question is not attempting to look at ALL possible issues and situations, you must remain within the context of the question, you look at the four choice and see which one is the best according to the question presented. Looking at the

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4 choices presented along with this question, UPS is definitively the least likely to cause power issues.

Reference used for this question:

[http://en.wikipedia.org/wiki/Uninterruptible\\_power\\_supply](http://en.wikipedia.org/wiki/Uninterruptible_power_supply)

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### QUESTION 1349

The ideal operating humidity range is defined as 40 percent to 60 percent. High humidity (greater than 60 percent) can produce what type of problem on computer parts?

- A. Static electricity
- B. Corrosion
- C. Energy-plating
- D. Element-plating

Answer: B

Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 333.

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### QUESTION 1350

In a dry pipe system, there is no water standing in the pipe - it is being held back by what type of valve?

- A. Relief valve
- B. Emergency valve
- C. Release valve
- D. Clapper valve

Answer: D

Explanation: Dry pipe sprinkler systems commonly are used where the ambient temperature of the space they are protecting is expected to be less than 40 °F (4.4 °C). The sprinkler pipe is filled with compressed air or nitrogen that is released when a sprinkler opens and allows the dry pipe valve to open, filling the overhead pipes with water. This prevents the pipes from freezing in unattended facilities such as warehouses.

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What keeps water from entering the sprinkler pipes prematurely?

The dry pipe valve is designed so that the pressure from the compressed air or nitrogen keeps the valve closed until it is needed.



This open dry pipe valve housing illustrates the size difference between the incoming waterway and the upper valve surface.

CertKingdom

#### Clapper Valve Interior

Look at the interior of the valve assembly in the photograph above. The waterway at the bottom is smaller than the air chamber above the clapper valve. This design enables it to enjoy the mechanical advantage of the “differential principle.” The larger surface area under relatively low air pressure is able to hold back the water pressure from the smaller orifice.

In most dry pipe valves, this differential principle operates on a ratio of about 1:6; one unit of air pressure will resist six units of water pressure. If, for example, the incoming water pressure were 60 psi (4.1 bar), the differential principle created by the larger surface area would allow as little as 10 psi (0.7 bar) air pressure to keep the valve closed. Some “low-differential” dry pipe valves operate with an air to water pressure ratio of 1:1.2.

While the minimum air pressure will keep the dry pipe valve closed during normal conditions, most sprinkler fitters will put an additional 20 psi (1.4 bar) air pressure on the system to prevent

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inadvertent

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valve operation in the event of a small air leak.

The National Fire Protection Association (NFPA) 13, Standard for the installation of Automatic Sprinkler Systems, provides guidance on minimum air pressure that must be maintained. Another important feature of this dry pipe valve is the latching device pictured in the upper left hand corner. This attachment is designed to hold the heavy dry pipe valve in the open position once it operates so that it does not interfere with water flowing to control a fire.

For additional information, refer to NFPA 13, Standard for the Installation of Automatic Sprinkler Systems.

All of the other choices presented within the question were only detractors and not good responses for this specific question.

Reference:

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 336.

And

KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: GOLD EDITION, John Wiley & Sons, 2002, page 471.

and

The United State Fire Administration at [http://www.usfa.dhs.gov/downloads/pdf/coffeebreak/cb\\_fp\\_2010\\_20.pdf](http://www.usfa.dhs.gov/downloads/pdf/coffeebreak/cb_fp_2010_20.pdf)

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## QUESTION 1351

The National Institute of Standards and Technology (NIST) standard pertaining to perimeter protection states that critical areas should be illuminated up to?

- A. Illuminated at nine feet high with at least three foot-candles
- B. Illuminated at eight feet high with at least three foot-candles
- C. Illuminated at eight feet high with at least two foot-candles
- D. Illuminated at nine feet high with at least two foot-candles

Answer: C

Explanation: The National Institute of Standards and Technology (NIST) standard pertaining to perimeter protection states that critical areas should be illuminated eight feet high with at least two  
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foot-candles.

It can also be referred to as illuminating to a height of eight feet, with a BRIGHTNESS of two footcandles. One footcandle 10.764 lux. The footcandle (or lumen per square foot) is a non-SI unit of illuminance. Like the BTU, it is obsolete but it is still in fairly common use in the United States, particularly in construction-related engineering and in building codes. Because lux and footcandles are different units of the same quantity, it is perfectly valid to convert footcandles to lux and vice versa.

The name "footcandle" conveys "the illuminance cast on a surface by a one-candela source one foot away." As natural as this sounds, this style of name is now frowned upon, because the dimensional formula for the unit is not foot • candela, but lumens per square foot.

Some sources do however note that the "lux" can be thought of as a "metre-candle" (i.e. the illuminance cast on a surface by a one-candela source one meter away). A source that is farther away casts less illumination than one that is close, so one lux is less illuminance than one footcandle. Since illuminance follows the inverse-square law, and since one foot = 0.3048 m, one lux = 0.30482 footcandle /10.764 footcandle.

#### TIPS FROM CLEMENT:

Illuminance (light level) – The amount of light, measured in foot-candles (US unit), that falls on a surface, either horizontal or vertical.

Parking lots lighting needs to be an average of 2 foot candles; uniformity of not more than 3:1, no area less than 1 fc.

All illuminance measurements are to be made on the horizontal plane with a certified light meter calibrated to NIST standards using traceable light sources.

The CISSP Exam Cram 2 from Michael Gregg says:

Lighting is a commonly used form of perimeter protection.

Some studies have found that up to 80% of criminal acts at businesses and shopping centers happen in adjacent parking lots. Therefore, it's easy to see why lighting can be such an important concern.

Outside lighting discourages prowlers and thieves.

The National Institute of Standards and Technologies (NIST) states that, for effective perimeter control, buildings should be illuminated 8 feet high, with 2-foot candle power.

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Reference used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2001, Page 325.

and

Shon's AIO v5 pg 459

and

<http://en.wikipedia.org/wiki/Foot-candle>

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#### QUESTION 1352

The ideal operating humidity range is defined as 40 percent to 60 percent. Low humidity (less than 40 percent) can produce what type of problem on computer parts?

- A. Static electricity
- B. Electro-plating
- C. Energy-plating
- D. Element-plating

Answer: A

Explanation: Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, 2001, John Wiley & Sons, Page 333.

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#### QUESTION 1353

Which fire class can water be most appropriate for?

- 
- A. Class A fires
  - B. Class B fires
  - C. Class C fires
  - D. Class D fires

Answer: A

Explanation: Water is appropriate for class A (common combustibles) fires. Class B fires (liquid) are best handled by CO<sub>2</sub>, soda acid or Halon. Class C fires (electrical) are best handled by CO<sub>2</sub> and Halon. Fire class D is used for combustible metals like magnesium.

Source: WALLHOFF, John, CBK#10 Physical Security (CISSP Study Guide), April 2002 (page 3).

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### QUESTION 1354

Critical areas should be lighted:

- A. Eight feet high and two feet out.
- B. Eight feet high and four feet out.
- C. Ten feet high and four feet out.
- D. Ten feet high and six feet out.

Answer: A

Explanation: Lighting should be used to discourage intruders and provide safety for personnel, entrances, parking areas and critical sections. Critical areas should be illuminated 8 feet high and 2 feet out.

Source: WALLHOFF, John, CBK#10 Physical Security (CISSP Study Guide), April 2002 (page 4).

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### QUESTION 1355

At which temperature does damage start occurring to magnetic media?

- A. 100 degrees Fahrenheit or 37,7° Celsius
- B. 125 degrees Fahrenheit or 51,66 Celsius
- C. 150 degrees Fahrenheit or 65,5° Celsius
- D. 175 degrees Fahrenheit or 79,4° Celsius

Answer: A

Explanation: Magnetic media are affected from 100 degrees Fahrenheit or 37,7° Celsius.

Disks are damaged at 150 degrees Fahrenheit or 65,5° Celsius

Computer equipment at 175 degrees Fahrenheit or 79,4° Celsius, and

Paper products at 350 degrees Fahrenheit or 176,66 Celsius.

Source: ROTHKE, Ben, CISSP CBK Review presentation on domain 10.

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**QUESTION 1356**

What is the minimum static charge able to cause disk drive data loss?

- A. 550 volts
- B. 1000 volts
- C. 1500 volts
- D. 2000 volts

Answer: C

Explanation: A static charge of 1500 volts is able to cause disk drive data loss.

A charge of 1000 volts is likely to scramble monitor display and a charge of 2000 volts can cause a system shutdown.

It should be noted that charges of up to 20,000 volts or more are possible under conditions of very low humidity with non-static-free carpeting.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 10: Physical Security (page 333).

**QUESTION 1357**

What mechanism automatically causes an alarm originating in a data center to be transmitted over the local municipal fire or police alarm circuits for relaying to both the local police/fire station and the appropriate headquarters?

- A. Central station alarm
- B. Proprietary alarm
- C. A remote station alarm
- D. An auxiliary station alarm

Answer: D

Explanation: Auxiliary station alarms automatically cause an alarm originating in a data center to be transmitted over the local municipal fire or police alarm circuits for relaying to both the local police/fire station and the appropriate headquarters. They are usually Municipal Fire Alarm Boxes are installed at your business or building, they are wired directly into the fire station.

Central station alarms are operated by private security organizations. It is very similar to a

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proprietary alarm system (see below). However, the biggest difference is the monitoring and receiving of alarm is done off site at a central location manned by non staff members. It is a third party.

Proprietary alarms are similar to central stations alarms except that monitoring is performed directly on the protected property. This type of alarm is usually used to protect large industrial or commercial buildings. Each of the buildings in the same vicinity has their own alarm system, they are all wired together at a central location within one of the buildings acting as a common receiving point. This point is usually far away from the other building so it is not under the same danger. It is usually manned 24 hours a day by a trained team who knows how to react under different conditions.

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A remote station alarm is a direct connection between the signal-initiating device at the protected property and the signal-receiving device located at a remote station, such as the fire station or usually a monitoring service. This is the most popular type of implementation and the owner of the premise must pay a monthly monitoring fee. This is what most people use in their home where they get a company like ADT to receive the alarms on their behalf.

A remote system differs from an auxiliary system in that it does not use the municipal fire or police alarm circuits.

Reference(s) used for this question:

ANDRESS, Mandy, Exam Cram CISSP, Coriolis, 2001, Chapter 11: Physical Security (page 211).  
and

Great presentation J.T.

A. Stone on SlideShare

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### QUESTION 1358

Which of the following questions is less likely to help in assessing physical access controls?

- A. Does management regularly review the list of persons with physical access to sensitive facilities?
- B. Is the operating system configured to prevent circumvention of the security software and application controls?
- C. Are keys or other access devices needed to enter the computer room and media library?
- D. Are visitors to sensitive areas signed in and escorted?

Answer: B

Explanation: Physical security and environmental security are part of operational controls, and are measures taken to protect systems, buildings, and related supporting infrastructures against

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threats associated with their physical environment. All the questions above are useful in assessing physical access controls except for the one regarding operating system configuration, which is a logical access control.

Source: SWANSON, Marianne, NIST Special Publication 800-26, Security Self-Assessment Guide for Information Technology Systems, November 2001 (Pages A-21 to A-24).

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### QUESTION 1359

Which of the following questions is less likely to help in assessing physical and environmental protection?

- A. Are entry codes changed periodically?
- B. Are appropriate fire suppression and prevention devices installed and working?
- C. Are there processes to ensure that unauthorized individuals cannot read, copy, alter, or steal printed or electronic information?
- D. Is physical access to data transmission lines controlled?

Answer: C

Explanation: Physical security and environmental security are part of operational controls, and are measures taken to protect systems, buildings, and related supporting infrastructures against threats associated with their physical environment. All the questions above are useful in assessing physical and environmental protection except for the one regarding processes that ensuring that unauthorized individuals cannot access information, which is more a production control.

Source: SWANSON, Marianne, NIST Special Publication 800-26, Security Self-Assessment Guide for Information Technology Systems, November 2001 (Pages A-21 to A-24).

### QUESTION 1360

Which of the following statements pertaining to fire suppression systems is TRUE?

- A. Halon is today the most common choice as far as agent are concern because it is highly effective in the way that it interferes with the chemical reaction of the elements within a fire.
- B. Gas masks provide an effective protection against use of CO<sub>2</sub> systems. They are recommended for the protection of the employees within data centers.
- C. CO<sub>2</sub> systems are NOT effective because they suppress the oxygen supply required to sustain the fire.
- D. Water Based extinguisher are NOT an effective fire suppression method for class C (electrical) fires.

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Answer: D

Explanation: Water Based fire extinguishers should never be used on Electrical Fire. If you do so, it will probably the last time you use such an extinguisher to put out an electrical fire as you will be electrocuted. Any liquid based agent should be avoided for Electrical Fire.

CO<sub>2</sub> systems are effective because they suppress the oxygen supply required to sustain the fire.

Since oxygen is removed, it can be potentially lethal to people and gas masks do not provide protection against CO<sub>2</sub>. These systems are more appropriate for unattended facilities.

The Montreal Protocol of 1987 states that Halon has been designated an ozone-depleting substance and due to the risk to the environment production was stopped January 1st, 1994.

Companies that still have Halon systems have been asked to replace them with nontoxic extinguishers. The name of the agreement is called The Montreal Protocol.

Soda acid is an effective fire suppression method for common combustibles and liquids, but not for electrical fires.

TIP:

Do remember the name of the agreement that was signed in Montreal where countries have agreed to stop production of Halon, it is called: The Montreal Protocol

A student of mine told me that he thinks about me when he wish to remember the classes of fire, that scared me off a bit but his explanations made a lot of sense, here how he is using my first name to remember the classes of fire. My name is CLEMENT but he is using only the CLEM portion:

C = Common Combustible

L = Liquid Fire

E = Electrical Fire

M = Metals that are flammable

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HERE IS ANOTHER WAY TO REMEMBER THEM FROM HARRISON:

A - Ash (common combustible)

B - Bubble/Boil (Liquid)

C - Circuit (Electrical)

D - Metal. (Just remember it :)

Reference(s) used for this question:

HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 6: Physical Security (page 313).

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### QUESTION 1361

How should a doorway of a manned facility with automatic locks be configured?

- A. It should be configured to be fail-secure.
- B. It should be configured to be fail-safe.
- C. It should have a door delay cipher lock.
- D. It should not allow piggybacking.

Answer: B

Explanation: Access controls are meant to protect facilities and computers as well as people.

In some situations, the objectives of physical access controls and the protection of people's lives may come into conflict. In these situations, a person's life always takes precedence.

Many physical security controls make entry into and out of a facility hard, if not impossible.

However, special consideration needs to be taken when this could affect lives. In an information processing facility, different types of locks can be used and piggybacking should be prevented, but the issue here with automatic locks is that they can either be configured as fail-safe or fail-secure.

Since there should only be one access door to an information processing facility, the automatic lock to the only door to a man-operated room must be configured to allow people out in case of emergency, hence to be fail-safe (sometimes called fail-open), meaning that upon fire alarm activation or electric power failure, the locking device unlocks. This is because the solenoid that maintains power to the lock to keep it in a locked state fails and thus opens or unlocks the electronic lock.

Fail Secure works just the other way. The lock device is in a locked or secure state with no power applied. Upon authorized entry, a solenoid unlocks the lock temporarily. Thus in a Fail Secure lock, loss of power or fire alarm activation causes the lock to remain in a secure mode.

Reference(s) used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (p. 451). McGraw-Hill. Kindle Edition.

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 20249-20251). Auerbach Publications. Kindle Edition.

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### QUESTION 1362

Which of the following is a proximity identification device that does not require action by the user

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and works by responding with an access code to signals transmitted by a reader?

- A. A passive system sensing device
- B. A transponder
- C. A card swipe
- D. A magnetic card

Answer: B

Explanation: A transponder is a proximity identification device that does not require action by the user.

The reader transmits signals to the device and the device responds with an access code.

These transponder devices contain a radio receiver and transmitter, a storage place for the access code, control logic, and a battery.

A passive device only uses the power from the reader to detect the presence of the card. Card swipes and smart cards are not proximity identification devices.

Source: HARRIS, Shon, All-In-One CISSP Certification Exam Guide, McGraw-Hill/Osborne, 2002, chapter 6: Physical Security (page 323).

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### QUESTION 1363

According to ISC2, what should be the fire rating for the internal walls of an information processing facility?

- A. All walls must have a one-hour minimum fire rating.
- B. All internal walls must have a one-hour minimum fire rating, except for walls to adjacent rooms where records such as paper and media are stored, which should have a two-hour minimum fire rating.
- C. All walls must have a two-hour minimum fire rating.
- D. All walls must have a two-hour minimum fire rating, except for walls to adjacent rooms where records such as paper and media are stored, which should have a three-hour minimum fire rating.

Answer: B

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Explanation: The internal walls of your processing facility must be a floor to ceiling slab with a one-hour minimum fire rating.

Any adjacent walls where records such as paper, media, etc. must have a two-hour minimum fire rating.

There are different regulations that exists for external walls from state to state.

This topic is to illustrate that proper thickness of wall really helps in case of fire. This was demonstrated with some of the large bush fire that took place in California, we could see a few homes that were still standing because they were made of cement and fire resistant material.

The ASTM (American Society for Testing and Materials) is the organization that performs testing of material and set standards in this specific area.

Source: Chris Hare's CISSP Study Notes on Physical Security, based on ISC2 CBK document.

Source: CISSP Certification Exam Study Guide - All you need to pass the exam

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Author: K. Wan  
ISBN: 9889732319  
The CISSP and CAP Prep Guide  
By Ronald L. Krutz, Russell Dean Vines

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**QUESTION 1364**

Which of the following statements pertaining to air conditioning for an information processing facility is correct?

- A. The AC units must be controllable from outside the area.
- B. The AC units must keep negative pressure in the room so that smoke and other gases are forced out of the room.
- C. The AC units must be on the same power source as the equipment in the room to allow for easier shutdown.
- D. The AC units must be dedicated to the information processing facility.

Answer: D

Explanation: The AC units used in a information processing facility (computer room) must be dedicated and controllable from within the area. They must be on an independent power source from the rest of the room and have a dedicated Emergency Power Off switch. It is positive, not negative pressure that forces smoke and other gases out of the room.

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Source: Chris Hare's CISSP Study Notes on Physical Security, based on ISC2 CBK document.  
Available at <http://www.ccure.org>.

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**QUESTION 1365**

Which of the following statements pertaining to secure information processing facilities is incorrect?

- A. Walls should have an acceptable fire rating.
- B. Windows should be protected with bars.
- C. Doors must resist forcible entry.
- D. Location and type of fire suppression systems should be known.

Answer: B

Explanation: Windows are normally not acceptable in the data center. If they do exist, however, they must be translucent and shatterproof.

Source: KRUTZ, Ronald L. & VINES, Russel D., The CISSP Prep Guide: Mastering the Ten Domains of Computer Security, John Wiley & Sons, 2001, Chapter 10: Physical security (page 329).

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**QUESTION 1366**

What is a common problem when using vibration detection devices for perimeter control?

- 
- A. They are vulnerable to non-adversarial disturbances.
  - B. They can be defeated by electronic means.
  - C. Signal amplitude is affected by weather conditions.
  - D. They must be buried below the frost line.

Answer: A

Explanation: Vibration sensors are similar and are also implemented to detect forced entry. Financial institutions may choose to implement these types of sensors on exterior walls, where bank robbers may attempt to drive a vehicle through. They are also commonly used around the ceiling and flooring of vaults to detect someone trying to make an unauthorized bank withdrawal. Such sensors are prone to false positive. If there is a large truck with heavy equipment driving by it may trigger the sensor. The same with a storm with thunder and lightning, it may trigger the alarm 2

even though there are no adversarial threat or disturbance.

The following are incorrect answers:

All of the other choices are incorrect.

Reference used for this question:

Harris, Shon (2012-10-18). CISSP All-in-One Exam Guide, 6th Edition (pp. 495-496). McGraw-Hill . Kindle Edition.

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### QUESTION 1367

Under what conditions would the use of a "Class C" hand-held fire extinguisher be preferable to the use of a "Class A" hand-held fire extinguisher?

- A. When the fire is in its incipient stage.
- B. When the fire involves electrical equipment.
- C. When the fire is located in an enclosed area.
- D. When the fire is caused by flammable products.

Answer: B

Explanation: Source: TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.

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### QUESTION 1368

To be in compliance with the Montreal Protocol, which of the following options can be taken to refill a Halon flooding system in the event that Halon is fully discharged in the computer room?

- A. Order an immediate refill with Halon 1201 from the manufacturer.
- B. Contact a Halon recycling bank to make arrangements for a refill.
- C. Order a Non-Hydrochlorofluorocarbon compound from the manufacturer.
- D. Order an immediate refill with Halon 1301 from the manufacturer.

Answer: C

Explanation: The best choice is to find or replace the systems with a Non-

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Hydrochlorofluorocarbon compound. A safe replacement such as Innergen, FM-200, or other non ozone depleting agent would be used.

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The goal of the Montreal Protocol is the cessation of production of ozone depleting agents. The Montreal Protocol on Substances That Deplete the Ozone Layer is a landmark international agreement designed to protect the stratospheric ozone layer. The treaty was originally signed in 1987 and substantially amended in 1990 and 1992. The Montreal Protocol stipulates that the production and consumption of compounds that deplete ozone in the stratosphere--chlorofluorocarbons (CFCs), halons, carbon tetrachloride, and methyl chloroform--are to be phased out by 2000 (2005 for methyl chloroform).

Scientific theory and evidence suggest that, once emitted to the atmosphere, these compounds could significantly deplete the stratospheric ozone layer that shields the planet from damaging UVB radiation. The United Nations Environment Programme (UNEP) has prepared a Montreal Protocol Handbook that provides additional detail and explanation of the provisions.

References:

TIPTON, Hal, (ISC)2, Introduction to the CISSP Exam presentation.  
and  
[http://ozone.unep.org/Publications/MP\\_Handbook/MP-Handbook-2009.pdf](http://ozone.unep.org/Publications/MP_Handbook/MP-Handbook-2009.pdf)

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### QUESTION 1369

Within Crime prevention through Environmental Design (CPTED) the concept of territoriality is best described as:

- A. Ownership
- B. Protecting specific areas with different measures
- C. Localized emissions
- D. Compromise of the perimeter

Answer: A

Explanation: Crime prevention through Environmental Design (CPTED) is a concept that encourages individuals to feel ownership and respect for the territory they consider occupy. By encouraging the use of physical attributes that express ownership, the individual is more apt to protect and be aware in that environment

The three main components of CPTED are:

1) natural access control - the guidance of people entering and leaving a space by the placement of doors, fences, lighting, and even landscaping

2) natural surveillance - the goal is make criminals feel uncomfortable by providing many ways

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observers could potentially see them

3) natural territorial reinforcement - creates physical designs that emphasize or extend the company's physical sphere of influence so users feel a sense of ownership of that space.

The following answers are incorrect:

Localized emissions is incorrect because it was a made up answer.

Compromise of the perimeter is incorrect because territoriality is meant to protect the perimeter and the territory, not compromise it.

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Protecting specific areas with different measures is incorrect. Compartmentalized Areas would require specific protection to prevent intrusion. Territoriality deals with the protection of the entire facility and a sense of ownership, not the protection of a specific area only.

The following reference(s) were/was used to create this question:

ISC2 Official Guide to the CiSSP exam, p455, Shon Harris, All in One Exam Guide, p344-346  
and

AIO Version 5 (Shon Harris) page 411-412

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### QUESTION 1370

In the physical security context, a security door equipped with an electronic lock configured to ignore the unlock signals sent from the building emergency access control system in the event of an issue (fire, intrusion, power failure) would be in which of the following configuration?

- A. Fail Soft
- B. Fail Open
- C. Fail Safe
- D. Fail Secure

Answer: D

Explanation: The context of this question is VERY important. As you can see, the question is in the Physical Security context where they make reference to a door electronic access control mechanism.

In case of a power failure the door electronic lock would usually default to being unlocked which is called Fail Safe in the physical security context. This allows people to evacuate the building and make their way to a secure meeting point.

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If the signal is ignored the door will NOT become unlocked as it usually does. People may be trapped inside or they may be expected to remain inside to defend the facility, think of employment such as embassy security or other high security environment where your job description include risking your life to defend the facility and its occupant. This is referred to as Fail Secure.

Everything will remain locked and people would not evacuate the facility. A synonym for Fail Secure is Fail Closed.

Operations will be expected to ensure that fail-safe and fail-secure mechanisms are working correctly. While both are concerned with how a system behaves when it fails, they are often confused with each other. It is important for the security professional to distinguish between them: Fail-safe mechanisms focus on failing with a minimum of harm to personnel, facility, or systems. Fail-secure focuses on failing in a controlled manner to block access while the systems or facility is in an inconsistent state.

For example, data center door systems will fail safe to ensure that personnel can escape the area when the electrical power fails. A fail-secure door would prevent personnel from using the door at all, which could put personnel in jeopardy. Fail-safe and fail-secure mechanisms will need to be maintained and tested on a regular basis to ensure that they are working as designed.

The other answers presented were not correct choices. See some definitions below:

Fail soft

A system that experiences a security issue would disable only the portion of the system being

affected by the issue. The rest of the system would continue to function as expected. The component or service that failed would be isolated or protected from being abused.

#### Fail Safe

A fail-safe lock in the PHYSICAL security context will default to being unlocked in case of a power interruption.

A fail-safe mechanisms in the LOGICAL security context will default to being locked in case of problems or issues. For example if you have a firewall and it cannot apply the policy properly, it will default to NO access and all will be locked not allowing any packet to flow through without being inspected.

#### Fail open

A Fail Open mean that the mechanism will default to being unlocked in case of a failure or problem. This is very insecure. If you have a door access control mechanism that fail open then it means that the door would be unlocked and anyone could get through. A logical security

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mechanism would grant access and there would be no access control in place.

#### Fail closed

A Fail closed mechanism will default to being locked in case of a failure or problem. That would be a lot more secure than Fail Open for a logical access control mechanism.

#### Fail secure

A fail-secure in the logical or physical security context will default to being locked in case of a power interruption or a service that is not functioning properly. Nobody could exit the building and nobody would be able to come in either. In case of the logical context there is no access granted and everything is locked.

The following reference(s) were/was used to create this question:

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition ((ISC)2 Press) (Kindle Locations 20247-20251). Auerbach Publications. Kindle Edition.

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### QUESTION 1371

Which of the following is a NOT a guideline necessary to enhance security in the critical Heating Ventilation Air Conditioning (HVAC) aspect of facility operations?

- A. Restrict access to main air intake points to persons who have a work-related reason to be there
- B. Maintain access rosters of maintenance personnel who are not authorized to work on the system
- C. Escort all contractors with access to the system while on site
- D. Ensure that all air intake points are adequately secured with locking devices

Answer: B

Explanation: This is a DETAIL oriented question. While you may not know the answer to such questions, look for things that just do not seem logical. As far as the exam is concerned, there will be negative questions, most people will trip and miss the NOT keyword because they are reading too fast.

In this case, by changing just a few key words, a correct answer becomes a wrong one. The book has "Maintain access rosters of pre-approved maintenance personnel authorized to work on the system"

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While you can theoretically keep rosters of people you don't want to work on the system, this is not really practical. A much better approach is to keep a list of those who ARE approved.

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HVAC is commonly overlooked from a physical security standpoint. From the ISC2 guide "Over the past several years there has been an increasing awareness dealing with anthrax and airborne attacks. Harmful agents introduced into the HVAC systems can rapidly spread throughout the structure and infect all persons exposed to the circulated air."

On a practical real world note; for those who work in smaller shops without a dedicated maintenance team, where you have to outsource. It would be wise to make sure that NO ONE has access other than when you call them for service. If a maintenance technician shows up on your doorstep wanting access so they can service the equipment, CALL your vendors MAIN line using the number that YOU have and verify that they sent someone out. Don't take the technicians word for it, or you may just become a victim of social engineering.

The following answers are incorrect:

Restrict access to main air intake points to persons who have a work-related reason to be there

Escort all contractors with access to the system while on site

Ensure that all air intake points are adequately secured with locking devices

The following reference(s) were/was used to create this question:

Tipton, Harold F. (2010-04-20). Official (ISC)2 Guide to the CISSP CBK, Second Edition ((ISC)2 Press), Chapter 8, Physical and Environmental Security "Environmental Controls, HVAC"

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### QUESTION 1372

Which of the following type of lock uses a numeric keypad or dial to gain entry?

- A. Bolting door locks
- B. Cipher lock
- C. Electronic door lock
- D. Biometric door lock

Answer: B

Explanation: The combination door lock or cipher lock uses a numeric key pad, push button, or dial to gain entry, it is often seen at airport gate entry doors and smaller server rooms. The combination should be changed at regular intervals or whenever an employee with access is transferred, fired or subject to disciplinary action. This reduces risk of the combination being known by unauthorized people.

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A cipher lock, is controlled by a mechanical key pad, typically 5 to 10 digits that when pushed in the right combination the lock will release and allow entry. The drawback is someone looking over a shoulder can see the combination. However, an electric version of the cipher lock is in production in which a display screen will automatically move the numbers around, so if someone is trying to watch the movement on the screen they will not be able to identify the number indicated unless they are standing directly behind the victim.

Remember locking devices are only as good as the wall or door that they are mounted in and if the frame of the door or the door itself can be easily destroyed then the lock will not be effective. A lock will eventually be defeated and its primary purpose is to delay the attacker.

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For your exam you should know below types of lock

Bolting door lock – These locks required the traditional metal key to gain entry. The key should be stamped “do not duplicate” and should be stored and issued under strict management control.

Biometric door lock – An individual's unique physical attribute such as voice, retina, fingerprint, hand geometry or signature, activate these locks. This system is used in instances when sensitive facilities must be protected such as in the military.

Electronic door lock – This system uses a magnetic or embedded chip based plastic card key or token entered into a sensor reader to gain access. A special code internally stored in the card or token is read by sensor device that then activates the door locking mechanism.

The following were incorrect answers:

Bolting door lock – These locks required the traditional metal key to gain entry. The key should be stamped “do not duplicate” and should be stored and issued under strict management control.

Biometric door lock – An individual's unique body features such as voice, retina, fingerprint,, hand geometry or signature, activate these locks. This system is used in instances when extremely sensitive facilities must be protected such as in the military.

Electronic door lock – This system uses a magnetic or embedded chip based plastic card key or token entered into a sensor reader to gain access. A special code internally stored in the card or token is read by sensor device that then activates the door locking mechanism.

Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 376

and

Hernandez CISSP, Steven (2012-12-21). Official (ISC)2 Guide to the CISSP CBK, Third Edition  
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### QUESTION 1373

Which of the following biometrics methods provides the HIGHEST accuracy and is LEAST accepted by users?

- A. Palm Scan
- B. Hand Geometry
- C. Fingerprint
- D. Retina scan

Answer: D

Explanation: Retina based biometric involves analyzing the layer of blood vessels situated at the back of the eye.

An established technology, this technique involves using a low-intensity light source through an optical coupler to scan the unique patterns of the retina. Retinal scanning can be quite accurate but does require the user to look into a receptacle and focus on a given point. This is not particularly convenient if you wear glasses or are concerned about having close contact with the reading device. For these reasons, retinal scanning is not warmly accepted by all users, even though the technology itself can work well.

For your exam you should know the information below:

Biometrics

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Biometrics verifies an individual's identity by analyzing a unique personal attribute or behavior, which is one of the most effective and accurate methods of verifying identification and not well received by society. Biometrics is a very sophisticated technology; thus, it is much more expensive and complex than the other types of identity verification processes. A biometric system can make authentication decisions based on an individual's behavior, as in signature dynamics, but these can change over time and possibly be forged. Biometric systems that base authentication decisions on physical attributes (such as iris, retina, or fingerprint) provide more accuracy because physical attributes typically don't change, absent some disfiguring injury, and are harder to impersonate.

Biometrics is typically broken up into two different categories. The first is the physiological. These are traits that are physical attributes unique to a specific individual. Fingerprints are a common example of a physiological trait used in biometric systems. The second category of biometrics is known as behavioral. The behavioral authentication is also known as continuous authentication.

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The behavioral/continuous authentication prevents session hijacking attack. This is based on a characteristic of an individual to confirm his identity. An example is signature Dynamics.

Physiological is "what you are" and behavioral is "what you do."

When a biometric system rejects an authorized individual, it is called a Type I error (false rejection rate). When the system accepts impostors who should be rejected, it is called a Type II error (false acceptance rate). The goal is to obtain low numbers for each type of error, but Type II errors are the most dangerous and thus the most important to avoid.

When comparing different biometric systems, many different variables are used, but one of the most important metrics is the crossover error rate (CER). This rating is stated as a percentage and represents the point at which the false rejection rate equals the false acceptance rate. This rating is the most important measurement when determining the system's accuracy. A biometric system that delivers a CER of 3 will be more accurate than a system that delivers a CER of 4. Crossover error rate (CER) is also called equal error rate (EER).

Throughput describes the process of authenticating to a biometric system. This is also referred to as the biometric system response time. The primary consideration that should be put into the purchasing and implementation of biometric access control are user acceptance, accuracy and processing speed.

#### Biometric Considerations

In addition to the access control elements of a biometric system, there are several other considerations that are important to the integrity of the control environment. These are:

Resistance to counterfeiting

Data storage requirements

User acceptance

Reliability and

Target User and approach

Fingerprint

Fingerprints are made up of ridge endings and bifurcations exhibited by friction ridges and other detailed characteristics called minutiae. It is the distinctiveness of these minutiae that gives each individual a unique fingerprint. An individual places his finger on a device that reads the details of the fingerprint and compares this to a reference file. If the two match, the individual's identity has been verified.

Palm Scan

The palm holds a wealth of information and has many aspects that are used to identify an individual. The palm has creases, ridges, and grooves throughout that are unique to a specific person. The palm scan also includes the fingerprints of each finger. An individual places his hand on the biometric device, which scans and captures this information. This information is compared 1

to a reference file, and the identity is either verified or rejected.

#### Hand Geometry

The shape of a person's hand (the shape, length, and width of the hand and fingers) defines hand geometry. This trait differs significantly between people and is used in some biometric systems to verify identity. A person places her hand on a device that has grooves for each finger. The system compares the geometry of each finger, and the hand as a whole, to the information in a reference file to verify that person's identity.

#### Retina Scan

A system that reads a person's retina scans the blood-vessel pattern of the retina on the backside of the eyeball. This pattern has shown to be extremely unique between different people. A camera is used to project a beam inside the eye and capture the pattern and compare it to a reference file recorded previously.

#### Iris Scan

An iris scan is a passive biometric control

The iris is the colored portion of the eye that surrounds the pupil. The iris has unique patterns, rifts, colors, rings, coronas, and furrows. The uniqueness of each of these characteristics within the iris is captured by a camera and compared with the information gathered during the enrollment phase. When using an iris pattern biometric system, the optical unit must be positioned so the sun does not shine into the aperture; thus, when implemented, it must have proper placement within the facility.

#### Signature Dynamics

When a person signs a signature, usually they do so in the same manner and speed each time. Signing a signature produces electrical signals that can be captured by a biometric system. The physical motions performed when someone is signing a document create these electrical signals. The signals provide unique characteristics that can be used to distinguish one individual from another. Signature dynamics provides more information than a static signature, so there are more variables to verify when confirming an individual's identity and more assurance that this person is who he claims to be.

#### Keystroke Dynamics

Whereas signature dynamics is a method that captures the electrical signals when a person signs a name, keystroke dynamics captures electrical signals when a person types a certain phrase. As a person types a specified phrase, the biometric system captures the speed and motions of this action. Each individual has a certain style and speed, which translate into unique signals. This type of authentication is more effective than typing in a password, because a password is easily obtainable. It is much harder to repeat a person's typing style than it is to acquire a password.

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#### Voice Print

People's speech sounds and patterns have many subtle distinguishing differences. A biometric system that is programmed to capture a voice print and compare it to the information held in a reference file can differentiate one individual from another. During the enrollment process, an individual is asked to say several different words.

### Facial Scan

A system that scans a person's face takes many attributes and characteristics into account. People have different bone structures, nose ridges, eye widths, forehead sizes, and chin shapes. These are all captured during a facial scan and compared to an earlier captured scan held within a reference record. If the information is a match, the person is positively identified.

### Hand Topography

Whereas hand geometry looks at the size and width of an individual's hand and fingers, hand topology looks at the different peaks and valleys of the hand, along with its overall shape and curvature. When an individual wants to be authenticated, she places her hand on the system. Off to one side of the system, a camera snaps a side-view picture of the hand from a different view and angle than that of systems that target hand geometry, and thus captures different data. This attribute is not unique enough to authenticate individuals by itself and is commonly used in conjunction with hand geometry.

### Vascular Scan

Vascular Scan uses the blood vessel under the first layer of skin.

The following answers are incorrect:

Fingerprint - Fingerprints are made up of ridge endings and bifurcations exhibited by friction ridges and other detailed characteristics called minutiae. It is the distinctiveness of these minutiae that gives each individual a unique fingerprint. An individual places his finger on a device that reads the details of the fingerprint and compares this to a reference file. If the two match, the individual's identity has been verified.

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Palm Scan - The palm holds a wealth of information and has many aspects that are used to identify an individual. The palm has creases, ridges, and grooves throughout that are unique to a specific person. The palm scan also includes the fingerprints of each finger. An individual places his hand on the biometric device, which scans and captures this information. This information is

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Following reference(s) were/was used to create this question:

CISA review manual 2014 Page number 330 and 331

Official ISC2 guide to CISSP CBK 3rd Edition Page number 924