

Advanced Level – Information and Communication Technology

2014 MCQ Past Paper

| | |
|--------------------------|--|
| (1) Blaise Pascal | Introduced Pascaline |
| (2) Charles Babbage | Introduced Difference Engine and Analytical Engine |
| (3) John Von Neumann | Introduced Von Neumann Architecture |
| (4) Ada Augusta Lovelace | World's First Computer programmer |
| (5) John Presper Eckert | Co-invented ENIAC with John Mauchly |

2. Which of the following statements is correct with respect to the evolution of computing devices?

 - (1) Vacuum tubes were used by Blaise Pascal to build the Pascaline.
 - (2) The Pascaline is considered as a first generation computing device.
 - (3) Computers built using vacuum tubes are considered as second generation computers.
 - (4) Electronic Numerical Integrator and Computer (ENIAC) was built using vacuum tubes.
 - (5) Apple I and Apple II are two examples for second generation computers.

| | |
|---|---------------------------------|
| (1) Mechanical technology | Mechanical age (1450 – 1840) |
| (2) Vacuum tube technology | First Generation (1940 – 1956) |
| (3) Transistor technology | Second Generation (1956 – 1963) |
| (4) Integrated Circuit (IC) technology | Third Generation (1964 – 1975) |
| (5) Very Large Scale Integrated (VLSI) Circuit technology | Fourth Generation (1976 – 1989) |

| | | |
|------------|-----------|---|
| Answer (1) | Incorrect | Vacuum tubes were used in first generation and the Pascaline was built in mechanical age. |
| Answer (2) | Incorrect | The Pascaline was built in mechanical age which was before first generation. |
| Answer (3) | Incorrect | Vacuum tubes were used in first generation |
| Answer (4) | Correct | ENIAC was built in 1946 which means it was built in first generation |
| Answer (5) | Incorrect | These computers were introduced in 1976 and 1977 respectively. |

3. Which of the following statements is true with respect to programming languages?
- (1) Machine languages belong to the second generation programming languages.
 - (2) Assembly language programs can run directly on any computer.
 - (3) Assembly languages belong to the first generation programming languages.
 - (4) Assembly language is more human readable form of machine language.
 - (5) Machine language programs can be translated into assembly language programs by using assemblers.

| High Level Language | Assembly Language | Machine Language |
|---|--|---|
| <p>Is being designed to make writing and reading codes easier for humans.</p> <pre>def Odd_Even(n): if(n%2!=1): print("The number is even") else: print("The number is odd") Odd_Even(10) Odd_Even(5) </pre> | <p>A low-level programming language designed to interface directly with computer hardware which consists of some human-readable commands.</p> <pre>section .text global _start _start: mov edx, len mov ecx, msg mov ebx, 1 mov eax, 4 int 0x80 mov eax, 1 int 0x80 section .data msg db 'Hello, world!', 0xa len equ \$ - msg</pre> | <p>Low-level language which consists of binary or hexadecimal instructions to which a computer can directly react.</p> <pre>00000000 00000100 0000000000000000 01011110 00001100 11000010 00000000000010 11101111 00010110 0000000000000101 11101111 10011110 000000000001011 11111000 10101101 11011111 0000000000010010 01100010 11011111 0000000000010101 11101111 00000010 11111011 0000000000010111 11110100 10101101 11011111 000000000011110 00000011 10100010 11011111 0000000000100001 11101111 00000010 11111011 0000000000100100 01111110 11110100 10101101 11111000 10101110 11000101 0000000000101011 00000110 10100010 11111011 0000000000110001 11101111 00000010 11111011 0000000000110100 01010000 11010100 0000000000111011 00000100 0000000000111101</pre> |

| Compiler | Interpreter | Assembler |
|---|---|--|
| Converts the whole source code in one session and reports all the errors afterwards | Converts the source code line by line and reports an error as soon as it is found | Translates assembly language to machine language |

| | | |
|------------|-----------|--|
| Answer (1) | Incorrect | Machine language belongs to first generation |
| Answer (2) | Incorrect | As assembly language programs cannot directly run on computer, they have to compiled or assembled into machine language in order to be executed. |
| Answer (3) | Incorrect | Assembly language belongs to second generation |
| Answer (4) | Correct | |
| Answer (5) | Incorrect | Assembler translates assembly language to machine language; not the other way around. |

4. Which of the following statements is true with respect to comments in programming languages?
- At the time of execution, comments are translated into special machine instructions.
 - Comments should always be limited to a single line.
 - Comments should start with the symbol # in all programming languages.
 - It is a good practice to include comments in a program to explain its functionality.
 - In Python programming, comments should always start at the first column.

| | | |
|------------|-----------|--|
| Answer (1) | Incorrect | That does not happen. Comments are used for us to understand a code easily |
| Answer (1) | Incorrect | A comment can contain multiple lines |
| Answer (1) | Incorrect | In python single line comments starts with #. But other languages' comments differ from that |
| Answer (1) | Correct | |
| Answer (1) | Incorrect | There is no such rule |

5. Which of the followings is an **invalid** Python variable name?
- MyCountry
 - mycountry
 - My country
 - My_country
 - _my_country_

| Rules for naming variables |
|---|
| 1. Any name can be given to a variable. But they have to meaningful and precise |
| 2. The first character must be a letter or an underscore (_). But can't use a number as the first character |
| 3. The rest of the variable can include any letter, any number, or the underscore. Can't use any other characters including spaces , symbols and punctuation marks. |

6. The decimal number equivalent to the 100111_2 is
- 40.
 - 39.
 - 38.
 - 37
 - 36.

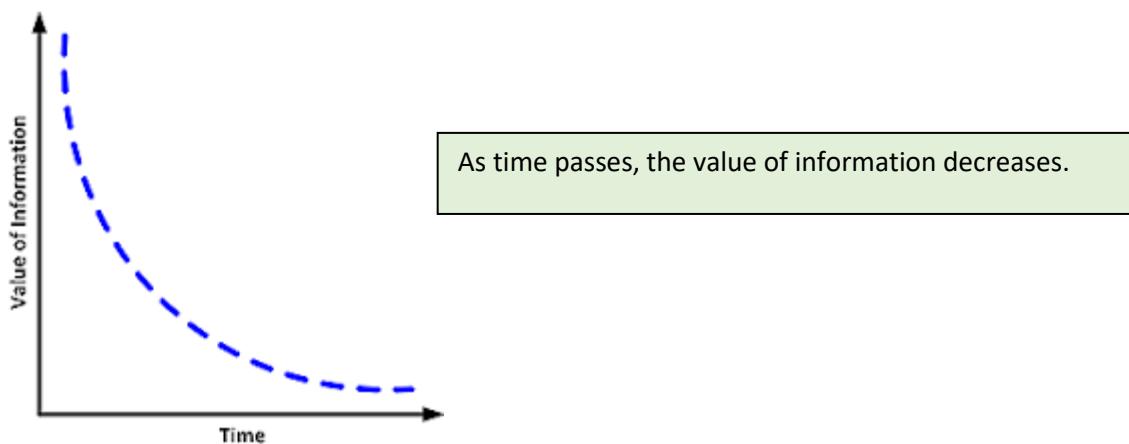
7. Which of the following converts digital data to analog data to transmit over an analog telephone network?
- Network Interface Card (NIC)
 - Modem
 - Multiplexer
 - Bluetooth adaptor
 - Wi-Fi card

| | |
|----------------------------------|--|
| (1) Network Interface Card (NIC) | A piece of computer hardware designed to allow computers to communicate over a computer network. |
| (2) Modem | A computer hardware device that converts data from a digital format into a format suitable for an analog transmission medium such as telephone or radio. |
| (3) Multiplexer | A device that selects between several analog or digital input signals and forwards the selected input to a single output line. |
| (4) Bluetooth adaptor | A USB based device that transmits and receives Bluetooth wireless signals. |
| (5) Wi-Fi card | Enable internet connection through the wireless connection network under the coverage of a wireless LAN |

8. A special digit inserted into a sequence of digits for data validation is called the digit.
Which of the following is most appropriate to fill the blank in the above statement?
(1) check (2) sign (3) least significant
(4) most significant (5) error

| Data Validation methods | |
|-------------------------|--|
| (1) Range check | Checks whether a data entered is within a certain range. ($100 \leq \text{Mark} \leq 0$) |
| (2) Type check | Ensures that the correct type of the data is entered. (int, string, float) |
| (3) Presence check | Checks whether the user has entered compulsory data or not |
| (4) Check digit | Checks whether a set of numbers has been entered accurately. |
| (5) Length Check | Ensures that the defined number of characters/ numbers are entered |

9. The Sri Lankan cricket team won the T-20 World Cup-2014 tournament. The Sri Lankan cricket fans had the highest value of this information when
(1) the final match started.
(2) Thisara Perera scored the winning run.
(3) the captain Lasith Malinga received the trophy.
(4) they saw the news on the newspapers.
(5) they saw the cricket team at the Katunayaka Airport.



10. $4A6_{16} + 99_{10} =$
(1) 615_{16} (2) 615_{10} (3) 509_{10} (4) 509_{16} (5) 659_{16}

- 11 Representations of 5_{10} and -9_{10} in 8-bit Two's complement forms are
- (1) 00000101 and 11110111 respectively. (2) 11111011 and 11110111 respectively.
 (3) 00000101 and 10001001 respectively. (4) 00000101 and 11110110 respectively.
 (5) 11111011 and 11110110 respectively.

$$5_{10}$$

$$\begin{array}{r} 5 \\ \hline 2 | 2 \\ 2 | 2 - 1 \\ 2 | 1 - 0 \\ \hline 0 - 1 \end{array}$$

$= 0000\ 0101$

-9 in Two's Complement

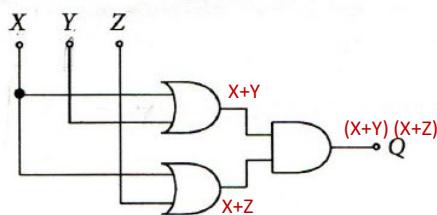
Step 1 : Convert positive 9 to binary
 $= 0000\ 1001$

Step 2 : Invert all and add 1

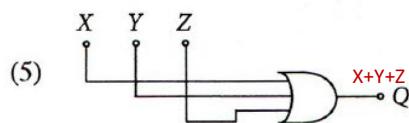
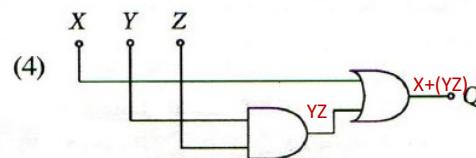
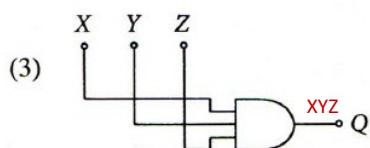
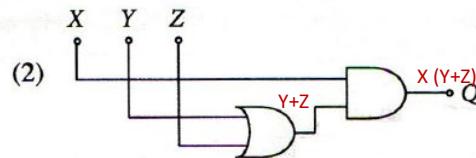
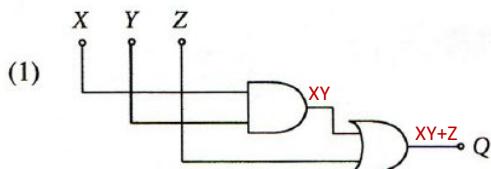
$$\begin{array}{r} 1111\ 0110 \\ + 1 \\ \hline 1111\ 0111 \end{array}$$

$$\begin{array}{r} 9 \\ \hline 2 | 4 \\ 2 | 4 - 1 \\ 2 | 2 - 0 \\ 2 | 1 - 0 \\ \hline 0 - 1 \end{array}$$

12. Consider the following logic circuit:



Which of the following circuit diagrams represents a simplified version of the above circuit?



$$(x+y)(x+z)$$

Distributive Law

$$x(x+z)+y(x+z)$$

Distributive Law

$$xx + xz + xy + yz$$

Idempotent Law $(A \cdot A = A)$

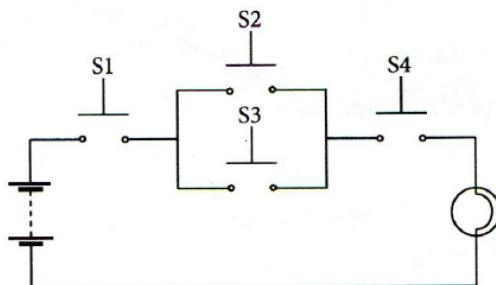
$$x + xz + xy + yz$$

Redundancy Law $(A+A \cdot B = A)$

$$x + yz$$

Redundancy Law

13. Consider the following circuit with four push button switches namely: S1, S2, S3, and S4. These four switches can either be in pushed or released states which are represented by 1 and 0 respectively. (Note: In the circuit given below, all the switches are in released state having value 0.)



Which of the following Boolean expressions represents the function of the bulb, if the on state of the bulb is represented by the value 1?

- (1) $S1 + (S2 \cdot S3) + S4$ (2) $(S1 + S2) \cdot (S3 + S4)$ (3) $(S1 \cdot S2) + (S3 \cdot S4)$
 (4) $S1 \cdot S4 \cdot (S2 + S3)$ (5) $S2 + (S1 \cdot S4) + S3$

The full circuit has to be connected if we want the bulb to turn on. Therefore, **having S1 and S4 is compulsory**.

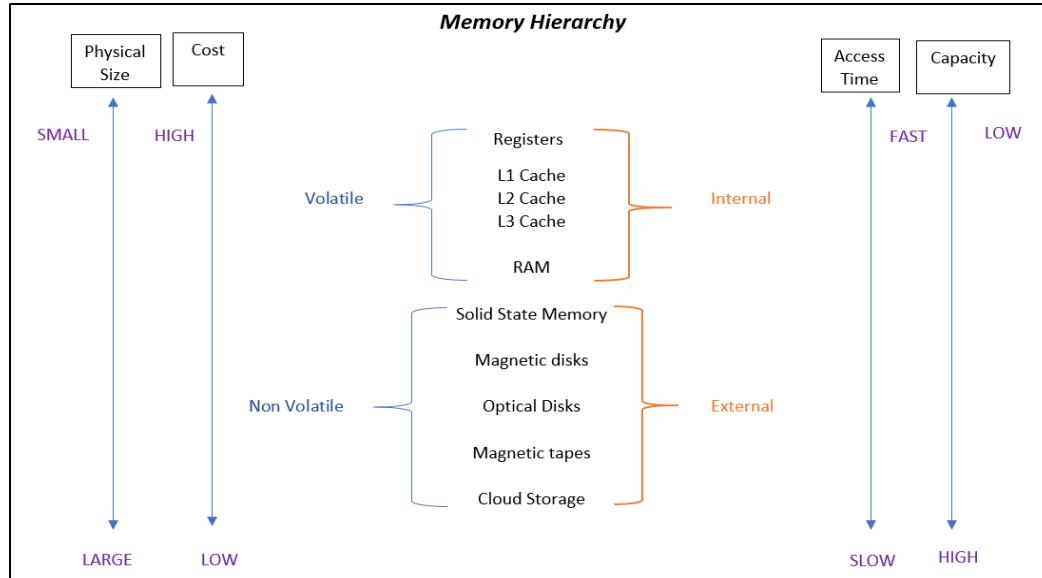
And when considering **S2 and S3**, if **either of them** are connected, the current will flow through and the bulb will be turned on.

$$\rightarrow (S1 \cdot S4) \cdot (S2 + S3)$$

There is a AND gate in between as we have to have even one of S2 or S3 along with both S1 and S4 to turn on the bulb

14. Which of the following has the fastest access speed?

- (1) Extended Memory (2) Register Memory (3) Flash Memory
 (4) Cache Memory (5) Virtual Memory



15. Which of the following is **not** a main function of an operating system?
- (1) Memory Management (2) Process Scheduling (3) File Handling
(4) Virus Detection (5) User Interfacing

| Tasks of an operating system | |
|--|--|
| 1. Memory Management | Keeps track of the primary memory; |
| 2. Process Management | Allocates and deallocates the CPU to processes |
| 3. Device Management | Keeps track of all the devices |
| 4. File Management | Allocates and deallocates resources |
| 5. Security | Prevents unauthorized access to programs and data |
| 6. Error-detecting | Production of error messages and error detecting methods |
| Showing us the user interface is also done by the operating system | |

16. In an operating system, moving a process from the main memory to the secondary storage in order to bring in another process to the main memory is called
(1) Demand Paging. (2) Context Switching. (3) Swapping.
(4) Interrupting. (5) Scheduling.

| | |
|-----------------------|--|
| (1) Demand Paging | A memory management method that enables applications to only access memory when needed |
| (2) Context Switching | Saving the current state of a process before unloading it to RAM from the CPU and loading the saved state of the process which is to be executed next to the CPU |
| (3) Swapping | A method of managing memory in which any running task can be switched temporarily from main memory to secondary memory, freeing up main memory for use by other processes. |
| (4) Interrupting | An interrupt means a signal to get immediate attention of the OS or CPU. There are three types such as Hardware Interrupts, Software Interrupts and Timer Interrupts. |
| (5) Scheduling | Process scheduling is the task that the process management performs to select a different process based on a specific strategy and move the active process from the CPU |

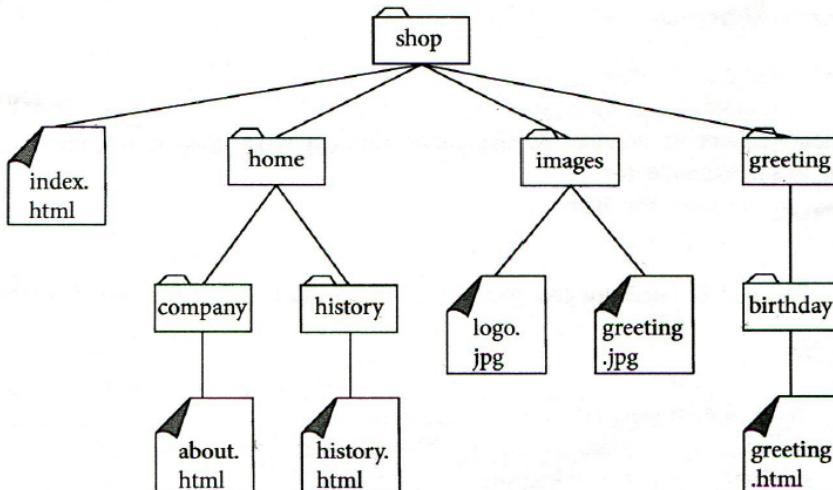
- 17 The following element is a markup for including an image to an HTML document. The name of the source file of the image used is "arrow.jpg" which is in the same folder as the HTML document.

```
<img ..... = "arrow.jpg"/>
```

Which of the following is the most suitable to fill the blank in the above element?

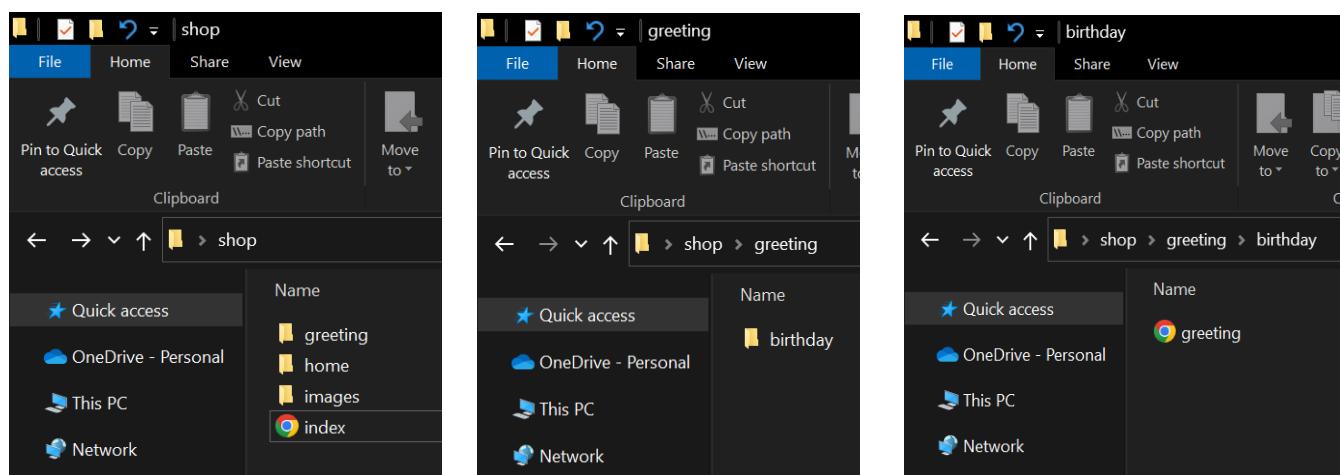
- (1) alt (2) src (3) scr (4) href (5) link

18. Consider the folder structure given below:



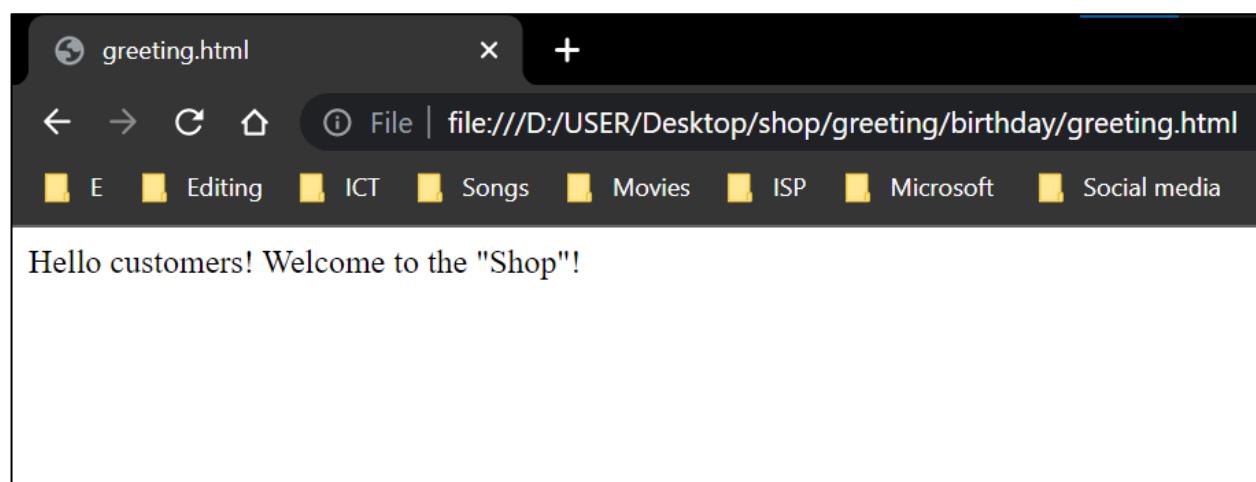
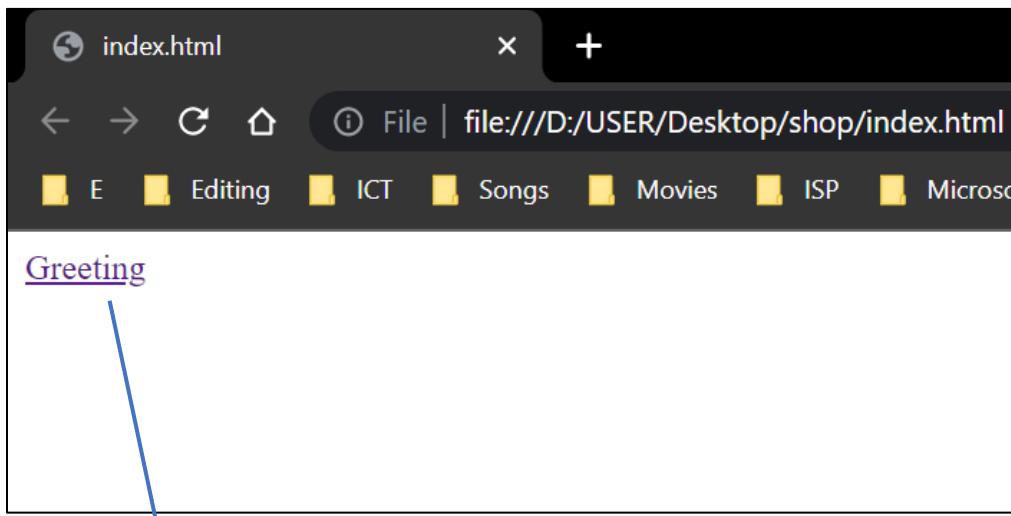
Which of the followings is the correct markup to include in the index.html to link greeting.html document?

- (1) Greeting
(2) Greeting
(3) Greeting
(4) Greeting
(5) Greeting



```
<html>
<body>
<a href="greeting/birthday/greeting.html"> Greeting </a>
</body>
<html>
```

HTML code of index.html



19. Which of the followings is a client-side scripting language that is commonly used to add interactivity to web pages?

- (1) CSS (2) PHP (3) XML (4) HTML 2 (5) JavaScript

| | |
|----------------|---|
| (1) CSS | A language we use to style an HTML document |
| (2) PHP | A server scripting language, and a powerful tool for making dynamic and interactive web pages |
| (3) XML | A metalanguage which allows users to define their own customized markup languages |
| (4) HTML 2 | A simple markup language used to create hypertext documents that are platform independent. |
| (5) JavaScript | Programming language of the web which allows us to create dynamic web contents |

20. Consider the following HTML element:

`<input type = "text" size = 10/>`

The attribute 'size' on the above element refers to the

- (1) length of the text box in pixels.
(2) maximum number of characters displayed in the text box.
(3) maximum number of characters that can be typed into the text box.
(4) font size of the text box.
(5) number of lines displayed in the text box.

The **size** attribute specifies the visible width, in characters of an input element.

21 Facebook is a popular social network connecting millions of people with new members joining daily. Which of the following statements is correct?

- (1) Facebook plays a very important role in building and maintaining your family relationships.
(2) Facebook is the only social network available today.
(3) Privacy settings of Facebook assure the privacy of its users completely.
(4) Publishing private information in Facebook has resulted in unfortunate incidents.
(5) Real identity of a person is always guaranteed in Facebook.

| | | |
|------------|-----------|---|
| Answer (1) | Incorrect | Facebook is not needed to maintain relationships. Interaction is what is needed. |
| Answer (2) | Incorrect | There are more than 100 social media sites and platforms in the world. |
| Answer (3) | Incorrect | The settings do not cover all the factors that are needed for one's privacy. |
| Answer (4) | Correct | It would be the best if you keep your private information for yourself so that nobody can harm you using them |
| Answer (5) | Incorrect | There are so many fake accounts nowadays. |

22. Which of the following statements is true?

- (1) Computer based learning is a teacher oriented learning technique.
- (2) Skype is a famous video conferencing technique.
- (3) Virtual Private Network (VPN) provides a medium for telecommuting.
- (4) Conducting offline examinations can be considered as computer aided assessments.
- (5) Microsoft Power Point is Free and Open Source Software (FOSS) for computer based presentations.

| | |
|------------|--|
| Answer (1) | <p>Computer based learning refers to any kind of learning with the help of computers.</p> <p>Teacher oriented learning is a teaching method where the teacher is actively involved in teaching while the learners are in a passive, receptive mode listening as the teacher teaches.</p> |
| Answer (2) | <p>Video conferencing is a live video-based meeting between two or more people in different locations using video-enabled devices.</p> |
| Answer (3) | <p>VPN is a secure and private network that allows employees to connect to their company's network from anywhere in the world.</p> <p>Telecommuting is the practice of working from home, making use of the internet, email, and the telephone.</p> |
| Answer (4) | <p>Computer Aided Assessments refers to an educational setting where a computer software is being used to help the user to study a certain subject.</p> |
| Answer (5) | All the Microsoft applications are paid softwares. |

23. Computers attached to a LAN use the default gateway connected to the same network

- (1) to translate the domain names to IP addresses.
- (2) to forward IP packets when they do not know any specific route to the destination.
- (3) as the firewall for the network.
- (4) to send all the data packets to other computers in the same LAN
- (5) to assign IP address to a computer on the LAN

The default gateway is the path used to pass information when the device doesn't know where the destination is.

LAN – Local Area Network

A LAN consists of a set of computers connected to one another to establish a network in a specific area.

24. Which of the following statements is true?
- (1) www.ebay.com is an example for C2C.
 - (2) When the government renders its services to the public through www then it is called B2C.
 - (3) www.wikipedia.com is an example for C2B.
 - (4) www.amazon.com is an example for B2E.
 - (5) Facebook groups are examples for E2C.

| Types of e business transactions |
|--|
| B2B - Business makes a commercial transaction with another business online |
| B2C - Products or services are sold to the consumer by the business using Internet |
| C2C - One consumer sells a product or service to another consumer online |
| C2B - Consumer acts as the seller and the business is the buyer. Any transaction will made online |
| B2E - Allows companies to provide products or services to their employees online |
| G2C - Government provides products or services to the citizens online |
| B2G - Imply the relationship between a business the government. Transactions are made through internet |
| G2B - Government provides products or services to businesses through the internet |

25. The command that can be used to measure the round trip propagation delay between two computers on the Internet is
- (1) ping.
 - (2) ifconfig.
 - (3) ssh.
 - (4) ftp.
 - (5) telnet.

| | |
|--------------|---|
| (1) ping | Allows a user to test and verify if a particular destination IP address exists and can accept requests in computer network administration |
| (2) ipconfig | Displays all current TCP/IP network configuration values and refreshes DHCP and DNS settings |
| (3) ssh | Provides a secured, encrypted connection between two hosts over an insecure network |
| (4) ftp | A standard Internet protocol for transmitting files between computers on the Internet |
| (5) telnet | Is a client/ server application protocol that provides access to virtual terminals of remote systems on local area networks or the Internet |

26. In the OSI seven layer reference model, IP protocol maps to the _____ layer.

Which of the following is most appropriate to fill the blank in the above statement?

- (1) application (2) session (3) transport (4) network (5) physical

| 7 layers of OSI reference model (Bottom to Top) | | |
|---|---|--|
| Layer | Explanation | Names for the data units at each layer |
| 1 st layer – Physical layer | It provides a physical medium through which bits are transmitted | Bits |
| 2 nd layer – Data link layer | It is used for error free transfer of data frames | Frames |
| 3 rd layer – Network layer | It is responsible for moving the packets from source to destination | Packets / Datagrams |
| 4 th layer - Transport layer | It provides reliable message delivery from process to process | Segments |
| 5 th layer – Session layer | It is used to establish, manage and terminate the sessions | Data |
| 6 th layer – Presentation layer | It is responsible for translation, compression and encryption | Data |
| 7 th layer – Application layer | It provides the services to the user | Data |

IP protocol : The Internet Protocol (IP) is a protocol, or set of rules, for routing and addressing packets of data so that they can travel across networks and arrive at the correct destination

27 The function of the DHCP server in an IP network is to

- (1) translate domain names to IP addresses. (2) cache the web pages.
(3) dynamically allocate IP addresses. (4) filter IP packets.
(5) provide security

| | |
|------------|---|
| Answer (1) | Function of a DNS Server |
| Answer (2) | Function of a web server/ cache server |
| Answer (3) | Function of a DHCP Server |
| Answer (4) | IP packets are filtered based on the protocol in the IP header of the packet. |
| Answer (5) | Function of a firewall |

28. Which of the following is a valid subnet mask?

- | | | |
|----------------------------|-----------------|--------------------|
| (1) <u>255.255.255.192</u> | (2) 255.0.255.0 | (3) 256.255.255.64 |
| (4) 255.256.255.96 | (5) 0.0.0.255 | |

| | | |
|------------|---------|--|
| Answer (1) | Valid | |
| Answer (2) | Invalid | Having 0 in the 2 nd octet is incorrect |
| Answer (3) | Invalid | Having 256 is incorrect in a subnet mask |
| Answer (4) | Invalid | Having 256 is incorrect in a subnet mask |
| Answer (5) | Invalid | Having 256 is incorrect in a subnet mask |

29. The ping command indicates that there is a 5% packet loss between the computers X and Y . There is an FTP server running on Y . A file is downloaded to X from Y using FTP protocol. Which of the following is the most appropriate statement regarding this file download?

- (1) The downloaded file has exactly 5% of the data missing.
- (2) The downloaded file has more than 5% of the data missing.
- (3) The downloaded file has 5% of data in a different order than the original file.
- (4) The downloaded file has the data in exactly the same order as the original file.
- (5) FTP protocol cannot run on a network connection with errors.

30. Which of the following relations is in the 3rd normal form?

- (1) student(studentIndexNo, name, parentName)
- (2) sport(sportId, sportName, teacherName, teacherId)
- (3) teacher(teacherId, teacherName, telephoneNumber, subjectName, subjectId)
- (4) book(ISBN, title)
- (5) patient(patientId, patientName, ward, wardId)

| First Normal Form | Second Normal Form | Third Normal Form |
|---|--|---|
| <ul style="list-style-type: none">• Each cell of the table consists of atomic values• No repeating groups of columns• No partially filled rows | <ul style="list-style-type: none">• Primary Key is never repeated• Foreign Key may be duplicated | The primary key is not repeated |
| Main features that can be used to identify each form.. | | |
| <p>1. Primary Key may be repeated 2. If there is a composite primary key → Partial Dependency</p> <p>Non-prime attributes doesn't entirely depend on the composite primary key</p> | <p>1. No partial dependencies 2. Has transitive dependency</p> <p>Non-prime attribute/ column doesn't depend on the primary key, but depends on another non-prime attribute</p> | <p>1. Has fully functional dependency</p> <p>- All the attributes depend only on the primary key of each table</p> <p>2. No partial or transitive dependencies</p> |

- Consider the following three tables in a relational database to answer questions 31 to 34. Assume that a subject has only one paper for an examination.

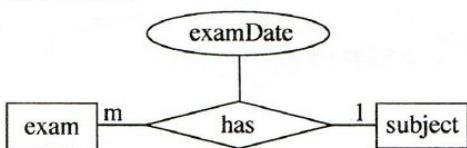
| subjectId | title |
|-----------|----------------------------|
| SUB001 | Information and Technology |
| SUB002 | Chemistry |
| SUB003 | Physics |

| examId | name |
|---------|--------|
| EXAM001 | GCE OL |
| EXAM002 | GCE AL |

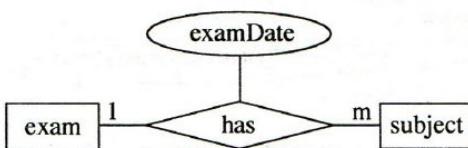
| examId | subjectId | examDate |
|---------|-----------|------------|
| EXAM001 | SUB001 | 2014.12.12 |
| EXAM002 | SUB001 | 2014.8.21 |
| EXAM002 | SUB002 | 2014.8.21 |
| EXAM002 | SUB003 | 2014.8.21 |

31 Which of the following is the most suitable Entity Relationship (ER) diagram to represent the above relational database tables?

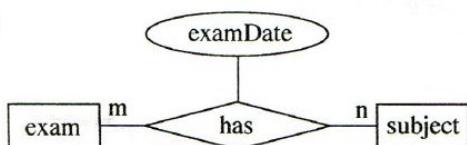
(1)



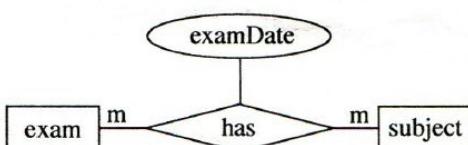
(2)



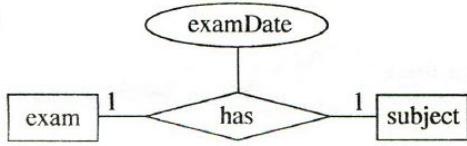
(3)



(4)



(5)



As the 'examDate' is related to both 'exam' and 'subject' tables, that has to be attached to the relationship; 'has'.

The cardinality between the entities is Many to many as one exam has more than one subject and one subject has more than one exams.

32. Which of the following is the correct primary key for examSubject table?
- (1) examId (2) examId, subjectId (3) examId, examDate
(4) subjectId, examDate (5) examId, subjectId, name

Both 'examId' and 'subjectId' have to be used as the primary key because both of them are needed to uniquely identify each record of the table.

33. Which of the following is the correct SQL statement to retrieve examId, name, and examDate of all examinations?
- (1) select examSubject.examId, name, examDate from exam, examSubject where exam.examId=examSubject.examId
(2) select examId, name, examDate from exam and examSubject where exam.examId=examSubject.examId
(3) select examId and name and examDate from exam and examSubject where exam.examId=examSubject.examId
(4) select * from exam and examSubject where exam.examId=examSubject.examId
(5) select * from exam, examSubject where exam.examId=examSubject.examId

| | | |
|------------|-----------|--|
| Answer (1) | Correct | |
| Answer (2) | Incorrect | <ul style="list-style-type: none">As 'examId' and 'subjectId' are used in more than one table, we have to define from which table we select each attribute. |
| Answer (3) | Incorrect | <ul style="list-style-type: none">As 'examId' and 'subjectId' are used in more than one table, we have to define from which table we select each attribute.When selecting multiple attributes and when we select from multiple tables, we have to use commas to separate them. (Cannot use 'and') |
| Answer (4) | Incorrect | <ul style="list-style-type: none">When selecting multiple attributes and when we select from multiple tables, we have to use commas to separate them. (Cannot use 'and')The question doesn't ask us to select all the attributes. |
| Answer (5) | Incorrect | <ul style="list-style-type: none">The question doesn't ask us to select all the attributes. |

34. Which of the following SQL statements changes only the date of examination of Physics paper of GCE AL examination to 2014.08.25?

- (1) update examSubject set examDate='2014.08.25' where subjectId='SUB003' or 'sub003'
- (2) update examSubject set examDate='2014.08.25' where examId='EXAM002' or subjectId='SUB003'
- (3) update examSubject set examDate='2014.08.25' where examId='EXAM002' and subjectId='SUB003'
- (4) update examSubject set examDate='2014.08.25' where examDate='2014.08.21'
- (5) update examSubject set examDate='2014.08.25' where examId='EXAM002' or subjectId='SUB003' or examDate='2014.08.23'

Physics → SUB003

GCE AL → EXAM002

| | | |
|------------|-----------|---|
| Answer (1) | Incorrect | Have to have the 'examId' as well |
| Answer (2) | Incorrect | Having both conditions is compulsory. Therefore using 'or' is incorrect. |
| Answer (3) | Correct | |
| Answer (4) | Incorrect | Using the 'examDate' in the condition is incorrect because there are more exams on that date. |
| Answer (5) | Incorrect | Using the 'examDate' in the condition is incorrect because there is no such date and it is unnecessary. |

| Deployment/ Implementation methods | |
|---|--|
| 1. Parallel | Old and new systems are used at the same time |
| 2. Direct | Old system will be discontinued on one day and the new system will be used on after that |
| 3. Phased | Parts of the new system are implemented over time |
| 4. Pilot | Entire system is used in one location (A new system in one branch of the office) |

36. Which of the following segment of a Data Flow Diagram best represents the process of getting the contact list of a mobile phone?

- ```

sequenceDiagram
 participant User
 participant GCL [Generate contact list]
 participant Contacts
 User->>GCL: Request for contact list
 activate GCL
 GCL->>Contacts:
 activate Contacts
 Contacts-->>GCL:
 deactivate GCL
 deactivate Contacts
 GCL-->>User: Contact list

```

The sequence diagram illustrates the interaction between a User, a process labeled "Generate contact list", and a Contacts database. The User initiates a request for a contact list to the process. The process then interacts with the Contacts database to generate the list, which is then returned to the User.

- ```

sequenceDiagram
    participant User
    participant Generate as Generate contact list
    participant Contacts
    User->>Generate: Request for contact list
    Note over Generate: 
        +-----+
        |       |
        +-----+
        |Generate contact list|
        +-----+
    Generate-->>Contacts: 
        +-----+
        |       |
        +-----+
        | Contacts |
        +-----+
    
```

The diagram illustrates a sequence of interactions between a User and a system component labeled "Generate contact list". The User initiates the process by sending a "Request for contact list" message to the "Generate contact list" component. This component then performs its function, represented by a note containing the text "Generate contact list". Finally, the component sends a response message back to the User, which is represented by a box labeled "Contacts".

- (3)

```

sequenceDiagram
    participant User
    participant GCL [Generate contact list]
    participant Contacts
    User->>GCL: Request for contact list
    GCL->>Contacts: Contact list
    
```

- (4)

```

sequenceDiagram
    participant User
    participant Contacts
    User->>Generate contact list: Request for contact list
    Generate contact list->>User: Contact list
    Contacts->>Generate contact list: 

```

The diagram illustrates a sequence of interactions. A User sends a 'Request for contact list' message to a 'Generate contact list' box. In response, the 'Generate contact list' box sends a 'Contact list' message back to the User. Simultaneously, the 'Generate contact list' box receives a message from the 'Contacts' box.

- (5)

```

sequenceDiagram
    participant User
    participant GCL as Generate contact list
    participant C as Contacts
    User->>GCL: Request for contact list
    GCL->>User: Contact list
    GCL->>C: 
    
```

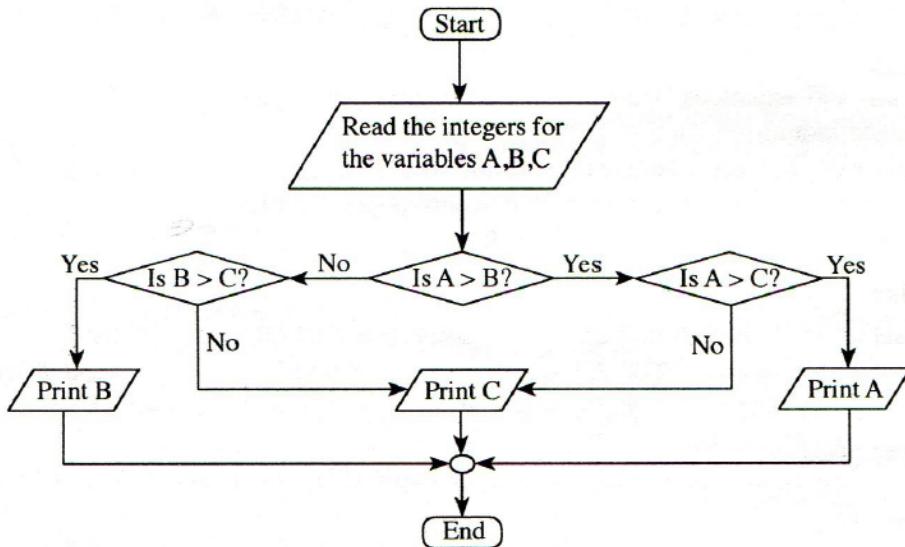
| | | |
|------------|-----------|--|
| Answer (1) | Incorrect | The user who request the contact list will receive it. (Not the other way around) |
| Answer (2) | Incorrect | There has to be an arrow from the data store to the process as the process has to receive them from the data store in order to fulfill a request. (Not storing any data in the data store. Only retrieving them) |
| Answer (3) | Correct | |
| Answer (4) | Incorrect | The request is sent by the user, not by the process |
| Answer (5) | Incorrect | The contact list is sent by the process, not the user |

37 Which of the following is a syntactically correct Python function?

- | | | |
|---|---|---------------------------------------|
| (1) def isLarger(a,b): return a > b | (2) def isLarger(a,b): return a > b | (3) def isLarger(a,b) return a > b |
| (4) function isLarger(a,b): return a > b | (5) function isLarger(a,b) if(a > b) return a else return b | |

| | | |
|------------|-----------|-----------------------------------|
| Answer (1) | Incorrect | Wrong Indention in line 2 |
| Answer (2) | Correct | |
| Answer (3) | Incorrect | Missing ":" in line 1 |
| Answer (4) | Incorrect | A function is defined using 'def' |
| Answer (5) | Incorrect | Missing ":" in line 1,2 and 4 |

- Use the following flowchart to answer questions 38 and 39.



38. If a user input 20, 27, 18 for the variables, A, B, C respectively the output will be

- (1) 18 (2) 20 (3) 27 (4) 20, 27 (5) 27, 18

| A | B | C | A>B | A>C | print A | B>C | print B | print C |
|----|----|----|-----------------|-----|---------|------------------|---------|---------|
| 20 | 27 | 18 | 20 > 27 (No) | - | - | 27 > 18 (Yes) | 27 | - |

39. Which of the following Python programs correctly implements the above flowchart?

(1) A = int(input("Enter a value for A."))
B = int(input("Enter a value for B:"))
C = int(input("Enter a value for C:"))
if (A > B):
 if(A > C):
 print(A)
 else:
 if(B > C):
 print(B)
 else:
 print(C)

(2) A = int(input("Enter a value for A."))
B = int(input("Enter a value for B:"))
C = int(input("Enter a value for C:"))
if (A > B):
 if(A > C):
 print(A)
 else:
 print(C)
 else:
 if(B > C):
 print(B)

(3) A = int(input("Enter a value for A."))
B = int(input("Enter a value for B:"))
C = int(input("Enter a value for C:"))
if (A > B):
 if(A > C):
 print(A)
 else:
 print(C)
else:
 if(B > C):
 print(B)
 else:
 print(C)

(4) A = int(input("Enter a value for A."))
B = int(input("Enter a value for B:"))
C = int(input("Enter a value for C:"))
if (A > B):
 if(A > C):
 print(C)
 else:
 print(A)
else:
 if(B > C):
 print(C)
 else:
 print(B)

(5) A = int(input("Enter a value for A."))
B = int(input("Enter a value for B:"))
C = int(input("Enter a value for C:"))
if (A > B):
 if(A > C):
 print(A)
 else:
 print(C)
else:
 if(B > C):
 print(C)
 else:
 print(B)

| | | |
|------------|-----------|---|
| Answer (1) | Incorrect | After line 6, there has to be “ else: print (c) ” |
| Answer (2) | Incorrect | After line 11, there has to be “ else: print (c) ” |
| Answer (3) | Correct | |
| Answer (4) | Incorrect | Print statements in line 6, 8, 11, 13 are incorrect |
| Answer (5) | Incorrect | Print statements in line 11 and 13 are incorrect |

40. What will be the output when the following Python code is executed?

```
a = ['a', 2, [3, 'b', 4], [6, "abc", 9], 8]
```

```
print(a[2][2])
```

(1) 2

(2) [3, 'b', 4]

(3) 'b'

(4) 4

(5) 22

| | | | | | |
|-------|-----|---|-------------|---------------|---|
| | 'a' | 2 | [3, 'b', 4] | [6, "abc", 9] | 8 |
| Index | 0 | 1 | 2 | 3 | 4 |

| Index 2 | | | |
|---------|---|-----|---|
| | 3 | 'b' | 4 |
| Index | 0 | 1 | 2 |

print (a[2][2]) → print the 2nd index of the 2nd index of list 'a'

41 What is the value of variable z after executing the Python statement z = 1 == 2?

(1) 0

(2) 1

(3) True

(4) False

(5) Null

This python statement means that the variable 'z' equals to value 1 and asks whether 1 is equal to value 2. As that statement is wrong, the answer will be False.

42. Which of the following Python expressions shows the correct evaluation order of the Python expression

$10 - 4 * 3/2 = 5$?

- (1) $((10 - 4) * 3)/2 = 5$ (2) $((10 - (4 * 3))/2) = 5$ (3) $10 - (4 * ((3/2) - 5))$
(4) $10 - ((4 * (3/2)) = 5)$ (5) $(10 - ((4 * 3)/2)) = 5$

Considering the above python expression according to python operator precedence:

1. *
2. /

Therefore,

$$\begin{aligned} &= 10 (4*3)/2 = 5 \\ &= 10 ((4*3)/2) = 5 \\ &= (10 ((4*3)/2)) = 5 \quad \text{or} \quad 10 (((4*3)/2) = 5) \end{aligned}$$

Python Operator Precedence

| | |
|----------------------|---------------------------|
| () | |
| ** | |
| *, /, %, // | ← |
| +, - | ← |
| <<, >> | (Left Shift, Right Shift) |
| & | (Bitwise AND) |
| ^ | (Bitwise XOR) |
| | (Bitwise OR) |
| <, <=, >, >=, !=, == | ← |
| not | |
| and | |
| or | |

When you get these, which are in the same order, in a python expression, you have to solve the expression from left to right (The second line of this question in an example)

43. Consider the following statements on Static Random Access Memory (SRAM):

- A SRAM needs periodic refreshing
- B It is used for Cache memory
- C Registers are made of SRAMs

Which of the above statement(s) is/are correct?

- (1) A only
- (2) B only
- (3) A and B only
- (4) A and C only
- (5) B and C only

| DRAM | SRAM |
|---|---|
| High power consumption | Low power consumption |
| Simple structural complexity (capacitor + transistor per bit) | Complex structural complexity (4 – 6 transistors per bit) |
| Low cost | High cost |
| High memory capacity | Low memory capacity |
| Used for RAM | Used for Cache memory and Registers |
| Requires a memory refreshment circuit | |

44. Consider the following HTML style rules:

- A body {color: red;}
- B h1 {color: red;}
- C p {color red;}
- h1 {color: red;}
- D p, h1 {color: red;}

Which of the above rules will display h1 elements and all the paragraphs of the following document in red?

```
<body>
    <h1>Trees</h1>
    <p>Coconut tree</p>
    <p>Rubber tree</p>
    <h1>Flowers</h1>
    <h2>Rose</h2>
</body>
```

- (1) A only
- (2) C only
- (3) A and B only
- (4) B and D only
- (5) C and D only

| | |
|---|--|
| A | All the letters in the entire body of the html document will be red |
| B | Only headings which are defined under <h1> tag will be red |
| C | All the paragraphs and headings with <h1> tag will be displayed in red |
| D | All the paragraphs and headings with <h1> tag will be displayed in red |

45. Which of the following systems should always be based on Artificial Intelligence?

- A** Expert Systems
 - B** Enterprise Resource Planning (ERP) Systems
 - C** Multi-Agent Systems
 - D** Geographical Information Systems

(1) A and B only (2) A and C only (3) A and D only (4) B and D only (5) C and D only

| | | |
|---|---|---|
| A - Expert Systems | A type of software which uses databases of expert knowledge to offer advice or make decisions in such areas as medical diagnosis | Always base on AI |
| B - Enterprise Resource Planning (ERP) Systems | A software that helps you run your entire business, supporting automation and processes in finance, human resources, manufacturing, supply chain, services, procurement and more. | These systems may not always base on AI |
| C - Multi-Agent Systems | A computerized system which consists of multiple interacting intelligent agents | Always base on AI |
| D - Geographical Information Systems | These systems collect, store, analyze and visualize data of geographic positions on Earth's surface. | These systems may not always base on AI |
| AI refers to the development of computer systems capable of performing tasks that normally require human intelligence, such as learning, reasoning, and problem-solving | | |

46. Consider the following statements about an automated system:

- A Human intervention is not required or minimally required.
B All the operations of the machine are controlled by the micro chip installed in the machine.
C A system that processes daily banking transactions can be considered as an automated system.
Which of the above statement(s) is/are correct?

[View Details](#) | [Edit](#) | [Delete](#)

(2) A and B only

(3) A and C only

Automated systems..

is an integration of sensors, controls, and actuators designed to perform a function with minimal or no human intervention

47 Consider the following statements regarding the requirements of a Bank ATM:

- A A customer shall be able to inquire his/her bank balance.
- B A customer should be able to deposit money through ATM.
- C Maximum withdrawal amount per day is Rs. 20,000.

Which of the above requirements is/are functional requirement(s) of the ATM?

- (1) A only (2) B only (3) C only (4) A and B only (5) A and C only

| Functional requirements | Non-functional requirements |
|--|--|
| Requirements which are expected from the system | Requirements which describe how the system work / requirements which enhance the quality of the system |

| | | |
|-------------|----------------------------|---|
| Statement A | Functional requirement | We expect to have the facility of inquiring the bank balance in an ATM |
| Statement B | Functional requirement | We expect to have the facility of depositing money through an ATM |
| Statement C | Non-functional requirement | Having a limit for withdrawing money is not expected from an ATM. But this rule can be applied by the bank. |

48. Consider the following systems:

- A Human blood circulatory system
- B Human digestive system
- C Human nervous system

The system(s) that can be considered as open system(s) is/are

- (1) A only (2) B only (3) C only (4) A and B only (5) A and C only

| Open System | Closed System |
|--|--|
| <ul style="list-style-type: none"> • Interacts with its environment through giving and receiving data/ information/ material/ energy • Inputs are taken from the system environment and outputs are given to the environment as well | <ul style="list-style-type: none"> • All interaction and knowledge is transmitted within the closed system only • Inputs are taken within the system boundary and outputs are given within the system boundary as well |

| | |
|--------------------------------|-----------------|
| Human blood circulatory system | A closed system |
| Human digestive system | An open system |
| Human nervous system | A closed system |

49. Consider the following statements about Software Agents:

- A A software agent is capable of autonomous actions in order to meet its design objectives.
- B A software agent is capable of user-directed actions in order to meet users' objectives.
- C A multi-agent system is composed of set of interacting agents.

Which of the above statements is/are true?

- (1) A only
- (2) B only
- (3) C only
- (4) A and B only
- (5) A and C only

Characteristics of a Software Agent

- Autonomy - should be able to perform problem-solving tasks without the direct intervention of humans or other agents
- Social Ability – should be able to interact, with other software agents and humans in order to complete their tasks
- Responsiveness/ Reactiveness - should perceive their environment (which may be the physical world, a user, a collection of agents, the INTERNET, etc.) and respond in a timely fashion to changes which occur in it. (Time period they have to respond isn't restricted)
- Proactiveness - should not simply act in response to their environment, they should be able to exhibit opportunistic, goal-directed behavior and take the initiative where appropriate.
- Learn Ability - should be able to learn through experiences

50. Consider the following statements about syntax or semantic errors in Python programming language:

- A A program with syntax errors will not run to the end of the program.
- B A program with only semantic errors will not run to its end.
- C Syntax errors in programs are also called logical errors.
- D Programs with semantic errors may not produce correct outputs for some inputs.

Which of the following statements is correct?

- (1) A and B only
- (2) A and C only
- (3) A and D only
- (4) B and C only
- (5) B and D only

| Syntax errors | Semantic errors | Logical errors |
|---|---|---|
| Occurs when the interpreter comes upon invalid syntax in code | Occurs when a program executes without generating an error but provides a different output from what was expected | When the code runs without any syntax or runtime errors but produces incorrect results due to flawed logic in the code. These types of errors are often caused by incorrect assumptions, an incomplete understanding of the problem, or the incorrect use of algorithms or formulas. |

| | | |
|-------------|-----------|---|
| Statement A | Correct | As soon as an error is found, the program will stop running |
| Statement B | Correct | As semantic errors will not provide the expected output |
| Statement C | Incorrect | Syntax errors differ from logical errors |
| Statement D | Correct | |