IMPACT OF COMPUTING QUESTIONS

DIRECTIONS: Each of the questions or incomplete statements below is followed by four suggested answers or completions. Select the one that is best in each case.

1. Which of the following are examples of how global positioning systems (GPS) have affected human navigation? **Select two answers.**
   (A) GPS can be used to calculate the most efficient route to a location.
   (B) GPS can be used to inform people of nearby points of interest, such as restaurants.
   (C) GPS is used to give people information about points of interest, such as user reviews.
   (D) GPS is used to communicate with other drivers or commuters.

2. Which of the following is an example of a sensor network leading to enhanced interaction?
   (A) At a theme park, pressure-sensitive pads in the ground cause different aspects of the surrounding area to move when they are walked over.
   (B) At a mall, security cameras are used to monitor the activity of patrons.
   (C) At a hospital, a digital system is used to schedule doctor-patient interactions, such as checkups and surgical procedures.
   (D) At a news station, a digital system is used to send locations to reporting teams.

3. Data transmitted across the internet can contain private data like but not limited to social security numbers, credit card information, birth dates, and medical information. Encryption is essential to help protect personal information. Which features of public key encryption (asymmetric) reduce the risk of having a private key comprised? **Select two answers.**
   (A) The sender and receiver use different keys, thus reducing the risk of the private key being discovered.
   (B) The sender and receiver use one public key that is a secret common key.
   (C) The private key algorithm cannot be derived from the public key.
   (D) The sender in public key encryption must exchange the key with the receiver so that the data can be decrypted.

4. A Caesar cipher uses a number that indicates by how much to offset a letter. For example, a Caesar cipher using 2 as a key would change the word "dog" to the scrambled word "fqi." The Caesar cipher is an example of which of the following encryption methods?
   I. Symmetric key encryption
   II. Asymmetric key encryption
   III. Public key encryption
   (A) I only
   (B) II only
   (C) II and III only
   (D) I, II, and III

5. What would pose the greatest security risk when using public key encryption?
   (A) Exposure of the public key
   (B) Exposure of the private key
   (C) Open standards for encrypting data
   (D) The encrypted message being intercepted by a third party

6. What is an example of a way that a "smart grid" could assist with human capabilities?
   (A) The grid could control the temperature of an A/C or heating unit directly.
   (B) The grid could prevent blackouts altogether.
   (C) The grid could distribute power in the most efficient manner possible, maximizing the users that are capable of using power.
   (D) The grid could ensure that all computers on it are properly updated.

7. On which of the following areas has the internet had a major effect?
   (A) Commerce
   (B) Access to information
   (C) Education
   (D) All of the above

8. Which of the following is a **NEGATIVE** effect that the web has on productivity?
   (A) It is harder to communicate with team members efficiently since this requires an exceptionally high-end internet connection.
   (B) It is harder to verify the authenticity of productivity-related communications.
   (C) It is easier to access activities that are unrelated to work, creating potential distractions.
   (D) It is easier to damage the infrastructure (i.e., network) of a workplace or similar environment.

9. The digital divide refers to differing access to computing devices and the internet based on socioeconomic, geographic, or demographic characteristics. Which of the following is affected negatively by the digital divide?
   I. A student unable to access the internet to participate in a distance-learning model put in place by a school district to replace a face-to-face model used for a high school under quarantine.
   II. A citizen keeping up on governmental policy announced on the online computing innovation Twitter.
   III. A citizen looking for work but companies posting job vacancies online.
   (A) I only
   (B) II and III only
   (C) I and III only
   (D) 1, II, and III

10. Which of the following is **NOT** a determining factor in which side of the digital divide a citizen is on?
    (A) Education
    (B) Socioeconomic status
    (C) Location
    (D) Gender

11. Which of the following is **LEAST** likely to be a phishing attack?
    (A) An email claiming to be from the IRS that needs you to update your account by changing a password. The email offers a link to a site that looks identical to the official IRS website.
    (B) Receiving an email from a "friend" asking for a reply that seems off.
    (C) The IRS is emailing you to update your information by going to a link on the site www.irs.gov.scamcentral.com.
    (D) Receiving an email from a hotel asking you to call your credit card company to validate charges made to the hotel.

12. Which of the following is true about a keylogger?
    (A) A keylogger can be a piece of software.
    (B) A keylogger can be a piece of hardware.
    (C) Keyloggers can be installed by malware or can have legitimate uses, such as employers wanting to monitor their employees.
    (D) All of the above.

13. Which of the following would be an example of citizen science that utilizes technology?
    (A) People take pictures of wildlife using an app that sends information about species and location to researchers.
    (B) A specially fitted camera records the hair and eye color of people that are in a certain public square.
    (C) An advertising firm tests several potential commercials among members of a focus group and determines how demographics such as gender and race affect reactions.
    (D) An app sends basic diagnostic information about errors and crashes to its developer.

14. Which of the following are new models of collaboration that have been created through crowdsourcing? **Select two answers.**
    (A) Small teams and businesses can collaborate with the general public to receive financing for projects.
    (B) A moderately sized development team can have members of the general public edit and improve a beta version's source code.
    (C) A development team can invite and pay a small number of potential users to give comments and check for errors on a current beta build.
    (D) A project that used proprietary and secure software that was abandoned can be remade and finished by another group made up of members of the general public.

15. Which of the following describes the human component of phishing?
    (A) An unethical programmer develops a webpage to look identical to an e-commerce site asking for PII data.
    (B) An unethical programmer develops a program to infect a computer to send emails to every person in the victims' email address list.
    (C) An unethical programmer decides which site to impersonate based on current events.
    (D) An unethical programmer sets up a system to collect PII data when an unsuspected victim enters the information in a fraudulent site.

16. How has the rise of mobile computing led to new applications?
    (A) Since mobile devices are typically always on and connected to the internet throughout the day, applications can assume that a user is capable of using it at any time.
    (B) Smartphones make audio-based communication much easier.
    (C) Since mobile devices are much smaller than laptops, they are easier to modify from a hardware perspective.
    (D) By design, it is easier to modify a mobile device's firmware than that of a laptop.

17. Which of the following describes an impact that machine learning has had on its given field?
    (A) Medicine—machine learning can be used to determine the conditions that indicate a disease, leading to better diagnosis.
    (B) Business—algorithms can be produced through machine learning that ensure the efficient use of resources, such as money allocated to advertising.
    (C) Science—machine learning can be used to organize data and determine noteworthy values collected in scientific research.
    (D) All of the above.

18. How does the ability to share information lead to additional innovation?
    (A) Sharing information allows people with identical perspectives to assess and create innovations based on the information.
    (B) Sharing information allows people with different perspectives to assess and create different innovations based on the same information.
    (C) Sharing information enables different people to develop the same innovation, which proves how strong the underlying idea is.
    (D) Sharing information enables people to understand other innovations better.

19. The website Napster was originally created as a hub for peer-to-peer communications that were used to transfer music. The website was shut down after a lawsuit and was later reformatted into a music store. Why might this lawsuit have occurred?
    (A) Napster was unable to regulate the transfers to ensure that they did not allow for music piracy.
    (B) Napster's communications were peer to peer, which are inherently illegal.
    (C) Napster's communications were not run through a government server that ensured a lack of malicious activity.
    (D) Napster was created before music streaming was considered legal.

20. Which of the following is an ethical concern of software and content licensing?
    (A) A license might unfairly damage a buyer's ability to exercise his or her rights regarding ownership.
    (B) A license typically forbids copying the software or content for nonpersonal use.
    (C) A license might forbid the use of the software for illegal purposes such as the creation of malware.
    (D) None of the above.

21. Suppose that a web browser on a mobile device collects information about login information and geolocation. Is this a security concern?

    (A) Yes, because both of these could be used for malicious purposes such as identity theft.
    (B) Only the login information is a security concern because geolocation is meaningless on the internet.
    (C) Only the geolocation is a security concern because login information is unrelated to personal information.
    (D) No, because neither is particularly tied to a person's identity.

22. The web browser Puffin advertises complete anonymity on the internet by having all website requests run through Puffin's servers. How does this enable anonymity?

    (A) The servers compress the data leaving the server, which ensures that the data will not be decrypted.
    (B) The server does not store any information about the client.
    (C) The servers act as a proxy, which means that all interactions within a website are done through Puffin's servers rather than the user's devices.
    (D) The servers are designed to scan data running through them for viruses, which prevents spyware from reaching the client's computer.

23. How does technology enable the collection and use of information about individuals and groups?

    (A) Algorithms translate human thought into information.
    (B) Algorithms are used to translate machine code into English and to collect and store the information.
    (C) Computers collect data about the actions performed by groups and individuals, which can be processed into usable information using algorithms.
    (D) Algorithms can only use text data that is typed by groups and individuals, which then can be processed into usable information using algorithms.

24. Which of the following is an example of targeted advertising being misused?

    (A) Not allowing housing and employment advertisements to be shown to certain minorities, which violates two civil rights laws
    (B) Sending ads designed to scare a viewer to frighten him or her
    (C) Allowing advertisements that deliberately lie to be viewed on the platform
    (D) Determining advertisements for a specific person based on information that was obtained through a privacy policy violation

25. The following email was sent to a user of the new social media site Instatok.

Instatok

Hi Seth
Someone tried to log in to your Instatok account.
If this wasn't you, please use the following code to confirm your identity. Please sign in:

11356

Seth, not wanting his Instatok account used by a hacker, confirmed his identity by typing his password, phone number, and social security number on the linked page. Shortly after confirming his account, Seth's Instatok was taken over by a malicious hacker and new credit cards were opened using his name. What type of cyber attack was most likely used?

(A) Key logger
(B) DDos
(C) TCP
(D) Phishing

26. Ciphers hide the meaning of a message by changing the order of letters. For example, a column cipher writes the message into rows of a matrix. In this case the message "The battle is not lost" is put in a four-column matrix to be encrypted.

1	2	3	4
t	h	e	b
a	t	t	l
e	i	s	n
o	t	l	o
s	t		

The key 2-4-1-3 is used to scramble each row.

2	4	1	3
h	b	t	e
t	l	a	t
i	n	e	s
t	o	o	l
t		s	

Displaying the letters in the scrambled row major order would result in the following scrambled

message. . .

Result . . . . Hbtetlatinestoolts

To decrypt the message the encrypted message back into a four-column matrix and using the same key to decipher the message would result back to the original message.

t	h	e	b
a	t	t	l
e	i	s	n
o	t	l	o
s	t		

Result . . . . "The battle is not lost"

What type of encryption is demonstrated above?

(A) Public key encryption
(B) Symmetric key encryption
(C) Asymmetric key encryption
(D) Brute-force encryption

27. Which of the following is **NOT** a consequence of the disparity in online access?

(A) Rural areas are less likely to receive internet access because of the high cost of laying a connection.
(B) Companies that are not listed online may have a harder time gaining a consumer base.
(C) People who live in poorer regions are less able to communicate because they do not have access to some methods of communication.
(D) Political supporters who are too poor to access the internet are less able to communicate with each other and their representatives.

28. How has the rise of mobile and wireless networking impacted innovation?

(A) Devices can be controlled remotely.
(B) Finished innovations can be distributed to any customer instantaneously.
(C) An innovation that typically requires the use of a wire can be redesigned to be wireless with little effort.
(D) Innovations can be used by more devices in more locations.

29. Which of the following is **NOT** an issue raised by the global distribution of computing resources?

(A) How would a developing computer market be affected if it had less powerful computers than the rest of the world?
(B) What impact does the lack of internet in some areas have on their well-being?
(C) If a country suddenly gains a large amount of computing-related resources, how will that affect the balance of world power?
(D) If a new type of hardware can be created with any computing resources, how will that affect the price of the hardware?

30. Which of the following is an effect that the digital divide has on the given group?

(A) Teachers without computers are unable to grade work at all.
(B) Students without computers have a harder time accessing resources and programs for schoolwork.
(C) Mathematicians without computers cannot evaluate calculus expressions such as integrals.
(D) Taxi and carpool drivers without computers cannot find efficient routes.

31. Which of the following is a method of search refinement that is based on Boolean logic?

(A) Excluding the results of a genre
(B) Filtering results by decade published
(C) Including only results with specific data values
(D) All of the above require Boolean logic

32. Which of the following are ways that technology has affected plagiarism? **Select two answers.**

(A) Copying information verbatim is much easier since it can be done using cut-and- paste commands.
(B) It is easier to plagiarize out of sloth since computers cannot expedite the process of citation.
(C) It is easier to detect plagiarism through the use of services that automatically check text against the web.
(D) Copying information verbatim is much harder due to the use of web scripts that prevent the copying of website material.

33. Which of the following is an example of cybersecurity being implemented through hardware?

(A) To protect against phishing links, an email filter warns users that the email was sent from a suspicious address.
(B) To protect against the Meltdown and Spectre vulnerabilities, Intel redesigned their processors to better separate processes and privilege levels.
(C) To protect against the Heartbleed vulnerability, the cryptography toolkit OpenSSL was redesigned to ignore data requests that would result in a buffer overflow.
(D) To protect against malicious programs, all files downloaded to a computer are scanned for viruses by an antivirus program.

34. Which of the following is an example of the effects that cyber attacks can have on the world at large?

(A) Theft of personal information such as financial information
(B) Interruption of essential governmental services
(C) Loss or theft of confidential business work
(D) All of the above

35. A common way that DDoS attacks are propagated is via botnets. These are networks created by infected machines that secretly perform commands for the malicious purpose without informing their users. Why might using botnets be preferred by cyber criminals to implement a DDoS attack? **Select two answers.**

    (A) A botnet is the only way to ensure that the attack comes from many different IP addresses.

    (B) Botnets do not require the attacker to be revealed since computers in a botnet do not communicate with a centralized server.

    (C) Since botnets can contain many different computers, DDoS attacks can be made much more powerful.

    (D) It is easier to program attacks with botnets as opposed to without them.

36. Which of the following is **NOT** an example of a human component within a cyber attack?

    (A) An advertisement tells users to download a certain antivirus program, which is really a virus or piece of spyware.

    (B) A website, which has been hacked, utilizes backdoor protocols in the browser or operating system to download and run a virus secretly.

    (C) A user is sent an email containing a link to an "interesting article," which is a website that utilizes backdoor protocols in the browser or operating system to download and run malware secretly.

    (D) A user is sent an email with an attached "PDF file," which is really an executable file that installs and runs malware.

37. How is math utilized in cryptography?

    (A) The length of a string determines whether it should be encrypted.

    (B) Individual bits are given new values that are randomly generated using mathematical principles.

    (C) Bits and group of bits (e.g., characters) are modified by using mathematical and algebraic principles.

    (D) Math is not used; cryptographic algorithms are purely logic based.

38. How do open standards ensure the security of encrypted data?

    (A) Open standards have their flaws publicly documented, which means there are more people that can repair or mitigate those flaws.

    (B) Open standards are always backed by large corporations that can ensure the security through resources.

    (C) It is illegal to crack open standards, so security is guaranteed.

    (D) It is impossible to crack open standards because the specifications are private.

39. Suppose that a certain encryption program works by replacing every letter in a message with a letter n places after it. Numbers follow a similar pattern, but other characters such as spaces are unaffected. Thus, "ab d7 %" would become "bc e8 %" if $n = 1$. (If the calculated place number is too high, it rolls over to the beginning.) Could this be decrypted using symmetric encryption? If so, what would be the encryption key?

    (A) Yes, the key would be equal to $n * 1.5$.
    (B) Yes, the key would be equal to n.
    (C) Yes, the key would be equal to the numeric value of the first encrypted character.
    (D) No.

40. What is the advantage of using public key encryption for encrypted communications?

    (A) A message cannot be decrypted without permission from the receiver.
    (B) Anyone can encrypt and decrypt a message, but he or she needs a key from the receiver.
    (C) A message can be encrypted only by someone who knows the receiver, regardless of whether he or she has a key.
    (D) Anyone can encrypt a message to the receiver without having to know how to decrypt it.