

Name: _____ Suggested AnswersStudent No.: _____ P-17-1234-5

Section A (Multiple choice) This section carries 30 marks. Each question of this section carries 1 mark. Circle the letter of the correct answer (like (b)).

1. An explorer, a risk taker, or a system innovator is also called a/an
(a) cracker (b) hacker (c) banker (d) extortionist
2. A program with a benign capability that conceals another, sinister purpose is called a
(a) hack (b) rogue (c) Trojan horse (d) worm
3. A software program that responds to commands sent by a command-and-control program located on an external computer is called a
(a) spoof (b) bot (c) worm (d) vampire
4. Large-scale effort to gain sensitive information from gullible computer users is called
(a) spoofing (b) phishing (c) spooling (d) farming
5. An intentional action designed to prevent legitimate users from making use of a computer service is called a/an
(a) DoS attack (b) bombing run (c) curtain closer (d) electronic overdose
6. The Internet worm was released by
(a) John Barlow (b) Katie Hafner (c) John Markoff (d) Robert Morris, Jr.
7. In the “Albert Gonzalez” cyber crime incident, which method of attack was used?
(a) Phishing (b) SQL injection (c) DDoS (d) Sidejacking
8. Determining that a person is who he or she claims to be on a computer is called
(a) accountability (b) debugging (c) authentication (d) social engineering
9. Computers that process data from sensors as events occur are called
(a) event-driven simulations (b) pseudo-sensory systems
(c) real-time systems (d) time-activated systems
10. The Patriot missile system
(a) was designed to shoot down airplanes
(b) failed to shoot down a Scud missile that killed 28 U.S. soldiers in the Gulf War
(c) failed because of a computer error
(d) All of the above
11. The AT&T long-distance network did not collapse entirely on January 15, 1990, because
(a) MCI loaned some equipment to AT&T
(b) AT&T technicians rapidly fixed the software bug in the routing switches
(c) not all the routing switches had been converted to the latest software
(d) the faulty computers shut themselves off before they could do any further damage

12. Which of these problems was **not** encountered by BAE as it tried to install an automated baggage handling system at Denver International Airport?
- (a) The system misrouted luggage carts
 - (b) Workers painted over electric eyes installed in the underground tunnels
 - (c) The automated baggage handlers shredded some of the luggage
 - ☒ (d) The system encountered all of these problems and more
13. Some computer experts have spoken out against the conversion to touch-screen voting machines because
- (a) there is no evidence that there have been any problems with punched card systems
 - ☒ (b) they do not have a paper audit trail
 - (c) they are made in China, which does not even hold elections
 - (d) a power failure could make it impossible for people to vote
14. By making the PDP 11 minicomputer an integral part of the Therac-25, AECL was able to
- ☒ (a) reduce costs by replacing hardware safety features with software safety features
 - (b) increase the stock price of its subsidiary Digital Equipment Corporation
 - (c) shrink the size of the machine considerably
 - (d) eliminate the need for lead shielding
15. Which mistake was **not** made by AECL, the manufacturer of the Therac-25?
- (a) It did not include software or hardware devices to detect and report overdoses.
 - (b) It reused code without proper testing.
 - (c) It continued to sell the Therac-25 after the FDA declared it to be defective.
 - ☒ (d) AECL made all of these mistakes, and more.
16. Computer simulations can
- (a) accurately predict the weather a month in advance.
 - ☒ (b) save automobile manufacturers time and money as they develop new cars.
 - (c) prove our planet is overpopulated.
 - (d) All of the above
17. The discipline focused on the production of software, as well as the development of tools, methodologies, and theories supporting software production, is most accurately called
- (a) artificial intelligence
 - (b) computer science
 - ☒ (c) software engineering
 - (d) software simulation
18. According to the textbook, which of the following careers is not an example of a mature profession?
- (a) accountant
 - (b) dentist
 - (c) lawyer
 - ☒ (d) software engineer
19. Which of the following is **not** one of the characteristics of a mature profession?
- (a) code of ethics
 - ☒ (c) mandatory drug testing
 - (b) licensing
 - (d) mandatory professional development
20. According to Aristotle, moral virtue results from
- (a) living a long life
 - (c) a good education
 - ☒ (b) repetition of the appropriate acts
 - (d) a happy marriage and loving family

21. According to Aristotle, deriving pleasure from a virtuous act is a sign that you
(a) are egotistical (b) have developed the virtue
(c) are hedonistic (d) have not yet developed the virtue
22. Unlike most professionals, the typical software engineer
(a) does not have a college education
(b) does not make important decisions
(c) does not work directly with individual clients
(d) does not make more than minimum wage
23. The *Software Engineering Code of Ethics and Professional Practice* was developed by
(a) Computer Professionals for Social Responsibility
(b) the Association for Computing Machinery and the IEEE Computer Society
(c) a consortium of computer science departments in the United States, Canada, and Mexico
(d) Immanuel Kant and John Rawls
24. A principal factor contributing to the loss of the space shuttle *Challenger* was that
(a) its payload was too heavy
(b) it was hit by lightning
(c) the weather in Florida was unusually cold
(d) there were no experienced astronauts on board
25. Whistleblowers
(a) enjoy the respect and admiration of their colleagues
(b) are usually financially rewarded by their organizations for their integrity
(c) typically get promoted to management
(d) make an unauthorized disclosure about a harmful situation or fraud
26. One way automation can lead to the creation of new jobs is by
(a) reducing the price of a product, thus increasing people's real income
(b) producing products quicker, thus shortening the work week
(c) consuming fewer resources, thus improving the environment
(d) All of the above
27. In 2016, DeepMind's AlphaGo defeated
(a) Lee Sedol (b) Ke Jie (c) Kobayashi Koichi (d) Nie Wei Ping
28. Globalization is the
(a) creation of international computer networks
(b) adoption of English as the language of business
(c) process of creating a worldwide network of businesses and markets
(d) way that stock exchanges stay open 24 hours a day
29. The process by which a new technology is assimilated into a society is called
(a) IT leverage (b) cultural relativism (c) globalization (d) technological diffusion
30. In some markets a few top performers receive a disproportionate share of the rewards. This phenomenon is called
(a) capitalism (b) liberalism
(c) socialism (d) the winner-take-all effect

Section B (True or False) For each question in this section, write T (for “True”) or F (for “False”) in the blank provided. This section carries 26 marks. Each answer of this section carries 2 marks.

31. A virus is a piece of self-replicating code embedded within another program called the host. T
32. In October 2010, Eric Butler released Firesheep extension to Firefox browser. According to Act Utilitarianism, Butler’s action was wrong. F
33. A bot spider is someone who controls a botnet. F
34. The webpage <http://www.PQRbank.com> is a secure website. F
35. The Ariane 5 was a satellite launch vehicle designed by the French space agency. T
36. A software bug in a trading program at the Tokyo Stock Exchange caused a securities firm to lose US\$225 million in 2004. F
37. Between 1985 and 1987 the Therac-25 linear accelerator administered massive overdoses to six patients, causing the deaths of three of them. T
38. Licensing gives the members of a profession the legal right to practice the profession. T
39. Self-discipline is an example of virtue. T
40. Michael McFarland argues that a team of engineers should be held to a higher level of moral responsibility than any of its members. T
41. “Teleworkers less visible” is one of the disadvantages of telework. T
42. Globalization made possible through decreasing cost of long distance telephone call. F
43. Currently Google DeepMind’s AlphaGo is the strongest computer Go program. F

Section C (Short question) This section carries 20 marks. Each question of this section carries 4 marks.

44. Define the terms (a) “phishing” and (b) “spear-phishing”.

Ans.: (a) Phishing is an effort to gain sensitive information from gullible computer users through the use of a mass emailing.

(b) Spear-phishing is a type of phishing in which the email list is narrowed down to improve the success rate.

[Each definition carries 2 marks.]

45. What is a race condition in software? Why are race conditions difficult to debug?

Ans.: A race condition in software is a situation in which two or more concurrent tasks share a variable, and the order in which they read or write the value of the variable can affect the behavior of a program. Race conditions are difficult to debug, because in order for a failure to occur, the timing of events must be exactly right.

[Each question carries 2 marks.]

46. Give four (and only four) examples of virtue, including one example which is not mentioned in the textbook.

Ans.: (1) Benevolence; (2) civility; (3) compassion; (4) punctuality.

[Other examples: cooperativeness, courage, courteousness, dependability, fairness, friendliness, generosity, honesty, industriousness, justice, loyalty, moderation, patience, prudence, reasonableness, self-discipline, self-reliance, tactfulness, thoughtfulness, tolerance, humbleness, ...]

47. What is “technological diffusion”? Name two relevant models.

Ans.: The first people to adopt a new technology are those who have more money. As the technology matures, its price drops dramatically, enabling more people to acquire it. This process is called technological diffusion. The “normalization model” and the “stratification model” are two relevant models.

48. How does Pippa Norris categorize the digital divide?

Ans.: Norris says the digital divide has two dimensions. The *global divide* refers to the disparity in Internet access between more industrialized nations and less industrialized nations. The *social divide* refers to the difference in access between the rich and poor within a particular country.

Section D (Essay question) This section carries 24 marks.

49. Who launched the “Estonia (2007)” cyber attack? What kind of cyber attack is it? What were the targets of the attack? What is the reason of the attack? (8 marks)

Ans.: (1) The “Estonia (2007)” cyber attack was launched by a group of Russian activists connected with Nashi, a pro-Kremlin youth group.
(2) This is a DDoS attack from nearly a million computers.
(3) The targets were Estonian government ministries and all of Estonia’s major commercial banks, telecommunications companies, and media outlets.
(4) The attack was in retaliation for Estonian government’s removal of a bronze statue of a Soviet soldier which was located in Tallinn.

50. Analyze the “Software Recommendation” case (P. 421) using the list of fundamental principles (PP. 419-420). (8 marks)

Ans.: From the above list of nine fundamental principles, three are most relevant here:

- Be impartial.
- Disclose information others ought to know.
- Share your knowledge, expertise, and values.

Examining the list of clauses identified with these fundamental principles, the following ones are most relevant: Clause 1.06, Clause 1.08, Clause 4.05, Clause 6.02, and Clause 6.05.

Clause 1.06: Prof. Smith was deceptive because she did not tell Mr. Shaw about the “best buy” package.

Clauses 1.08, 6.02: Prof. Smith freely gave valuable information — she was doing a good thing.

Clauses 4.05, 6.05: Prof. Smith did not reveal conflict of interest — she was doing a wrong thing.

Conclusion: Professor Smith should have revealed her conflict of interest to Mr. Shaw.

51. Analyze the “Anti-Worm” case (see P. 424) using the list of fundamental principles (PP. 419-420). (8 marks)

Ans.: From the above list of nine fundamental principles, four are most relevant here:

- Continually improve your abilities.
- Share your knowledge, expertise, and values.
- Respect the rights of others.
- Take responsibility for your actions and inactions.

Examining the list of clauses identified with these fundamental principles, the following ones are most relevant: Clause 1.01, Clause 1.08, Clause 2.03, Clause 8.01, Clause 8.02, and Clause 8.06.

Clause 1.01: Tim did not accept responsibility for his action.

Clause 1.08: The worm was free, but cost system administrators a lot of time.

Clause 2.03: The anti-worm entered computers without permission of their owners.

Clauses 8.01, 8.02, 8.06: Tim improved his knowledge and skills by creating the anti-worm.

Conclusions: (1) Tim’s welfare is less important than the public good; (2) By attempting to hide his identity, Tim refused to accept responsibility for his actions; (3) Tim violated the property rights of the PC owners whose systems were infected by his anti-worm; (4) Tim violated the Code.