Chapter 10
Mobile Commerce and Pervasive Computing

True-False Questions

1. Although based on wireless technology, m-commerce may be done via the Internet, private communication lines, smart cards, or other infrastructures.

    Answer: T   **Reference**: Mobile Commerce: Overview, Benefits, and Drivers

2. M-commerce is simply a variation on existing Internet services.

    Answer: F   **Reference**: Mobile Commerce: Overview, Benefits, and Drivers

3. The third generation of mobile computing was first installed in the United States in 2001.

    Answer: F   **Reference**: M-Commerce Terminology

4. Ubiquity refers to the attribute of being available everywhere at any given time.

    Answer: T   **Reference**: The Specific Attributes of M-Commerce

5. A major advantage of m-commerce is mobile location-based services can provide end users with Internet access with information that is relevant to their locations.

    Answer: T   **Reference**: The Specific Attributes of M-Commerce

6. The number of cell phones exceeded 1.1 billion in the spring of 2002.

    Answer: T   **Reference**: Drivers of M-Commerce

7. Microbrowsers can work in the m-commerce environment because they require limited memory and bandwidth.

    Answer: T   **Reference**: Software

8. The advantage of Bluetooth in m-commerce is that devices connected according to this standard can communicate over distances in excess of 500 meters.

    Answer: F   **Reference**: Software

9. Bluetooth technology can be used in establishing a Wireless Personal Area Network.

    Answer: T   **Reference**: Software

10. Wireless Application Protocol (WAP) divides each cellular telephone into three time slots to increase the amount of data carried.

    Answer: F   **Reference**: Software

11. W-CDMA is a 3G technology.

    Answer: T   **Reference**: Exhibit 10.6

12. Voice XML is an extension of XML designed to accommodate voice.

    Answer: T   **Reference**: Software

13. WAP is currently being challenged as the leading protocol in connecting wireless devices by Java-based applications that provide superior graphics and security features.

    Answer: T   **Reference**: Software

14. A Subscriber Identification Module is a smart card with an embedded antenna which allows the card to communicate with other devices over a WAN.

    Answer: F   **Reference**: Mobile Networks

15. The greatest advantage of m-commerce compared with e-commerce is there has never been a virus for wireless devices.

    Answer: F   **Reference**: M-Commerce Security Issues

16. Because most cell phones today are incapable of storing applications, they are incapable of propagating a worm or virus.

    Answer: T   **Reference**: M-Commerce Security Issues

17. M-commerce is far more secure than e-commerce.

    Answer: F   **Reference**: M-Commerce Security Issues

18. Although SIM technology protects against unauthorized use of a subscriber's account, it doesn't prevent the use of a stolen phone because the thief could replace the card.

    Answer: T   **Reference**: SIM-Based Authentication

19. WTLS enable encrypted communications between a wireless device and a WAP gateway.

    Answer: T   **Reference**: WTSL and WIM

20. One of the major impediments to the development of voice systems in m-commerce is more errors are typically made in voice data entry than in entering data through a keyboard.

    Answer: F   **Reference:** Voice Systems for M-Commerce

21. A Web site with audio interface is called an Interactive Voice Response System.

    Answer: F   **Reference:** Voice Portals

22. Using the Internet to purchase a $250 annual subscription for an ISP is an example of a micropayment.

    Answer: F   **Reference**: Micropayments

23. M-wallet technology allows cell phone users to make purchases with a single click.

    Answer: T   **Reference**: Wireless Wallets

24. Some m-commerce applications allow targeted advertising based not only on preferences as shown by browsing history, but also based on physical location.

    Answer: T   **Reference**: Targeted Advertising

25. Mobile portals have an advantage over traditional online portals because mobile portal services are provided without charge.

    Answer: F   **Reference**: Mobile Portals

26. A vending machine company uses wireless polling to determine when machines are broken and when they need refilling. This is an example of telemetry.

    Answer: T   **Reference**: Mobile B2B and Supply Chain Applications

27. Telemetry integrates wireless communications with telephoto imaging in systems which allow service employees to look at a troubled device and suggest repairs without leaving a centralized office location.

    Answer: F   **Reference**: Mobile B2B and Supply Chain Applications

28. Proximity cards are used to transmit location-sensitive information to cell phone users.

    Answer: F   **Reference**: Non-Internet Consumer Applications

29. Location-based technology could be used to provide a list of restaurants based on the location of a subscriber.

    Answer: T   **Reference**: L-Commerce Technologies

30. A server that manages location information from a GPS-enabled cell phone is an example of a mobile positioning center.

    Answer: F   **Reference**: L-Commerce Technologies

31. Very accurate clocks for both the wireless device and the satellite are key components in global positioning systems.

    Answer: T   **Reference**: Global Positioning Systems

32. GPS locations are stated in terms of longitude and latitude.

    Answer: T   **Reference**: Geographical Information Systems

33. Telematics refers to the integration of computers with wireless communication in order to improve information flow.

    Answer: T   **Reference**: Telematics and Telemetry Applications

34. OnStar is an example of a telemetry application.

    Answer: T   **Reference**: Telematics and Telemetry Applications

35. Pervasive computing devices are not visible to the naked eye.

    Answer: F   **Reference**: Invisible Computing

36. Of the more than 5 billion microprocessors sold in America in 2000, more than 75% were placed in desktop and laptop computers.

    Answer: F   **Reference**: The Technical Foundation of Pervasive Computing

37. Home automation is currently hampered by the independence of various systems and the proprietary control and communications techniques used by each.

    Answer: T   **Reference**: Smart Homes

38. The popularity of smart appliances has been increasing rapidly in recent years.

    Answer: F   **Reference**: Smart Appliances

39. RFID technologies use radio waves to automatically identify individual items.

    Answer: T   **Reference**: Auto-ID

40. The three dimensions of usability are bandwidth, effectiveness, and efficiency.

    Answer: F   **Reference**: The Usability Problem

Multiple Choice Questions

41. A rider consults her cell phone to see what time a bus is due to arrive at the bus stop where she is standing. This is an example of :

    a. bus-commerce.
    b. SMS commerce.
    c. location-based e-commerce.
    d. UMTS commerce.

    Answer: c   **Reference**: Nextbus: A Superb Customer Service

42. Any e-commerce or e-business done in a wireless environment is called:

    a. e-commerce.
    b. m-commerce.
    c. l-commerce.
    d. w-commerce.

    Answer: b   **Reference**: Mobile Commerce: Overview, Benefits, and Drivers

43. The analog-based wireless technology in existence between 1979 – 1992 was called:

    a. 2G.
    b. 2.5G.
    c. 1G.
    d. Web phone.

    Answer: c   **Reference**: M-Commerce Terminology

44. _____ enables the determination of the location of an enabled device.

    a. GPRS
    b. PDA
    c. GPS
    d. SMS

    Answer: c   **Reference**: M-Commerce Terminology

45. The set of rules that allows Internet browsing from a wireless device is called the:

    a. Transmission Control Protocol.
    b. Internet Protocol.
    c. Universal Mobile Telecommunications Systems.
    d. Wireless Applications Protocol.

    Answer: d   **Reference**: M-Commerce Terminology

46. A traveler uses a cell phone to receive e-mail, check stock prices from the Internet, and ask for directions to her next meeting. The device used to conduct such business is called:

a. a smartphone.
b. an analog cell phone.
c. a mobilephone.
d. a pervasive computer.

Answer: a   **Reference**: M-Commerce Terminology

47. The two characteristics of m-commerce that break geographic and time barriers are:

a. mobility and ubiquity.
b. broad reachability and mobility.
c. ubiquity and convenience.
d. localization and mobility.

Answer: b   **Reference**: The Specific Attributes of M-Commerce

48. A teenager carries his cell phone to school and work. He talks to friends from the school bus and even carries it with him when he goes hiking on the weekend. This is an example of the m-commerce characteristic called:

a. agility.
b. ubiquity.
c. mobility.
d. convenience.

Answer: c   **Reference**: The Specific Attributes of M-Commerce

49. A doctor keeps her cell phone on twenty-four hours a day when she is on call. This is an example of the m-commerce characteristic called:

a. broad reachability.
b. ubiquity.
c. mobility.
d. convenience.

Answer: a   **Reference**: The Specific Attributes of M-Commerce

50. Availability of a mobile terminal in the form of a smartphone or PDA can fulfill the need both for real-time information and for communication anywhere. This is the m-commerce characteristic called:

a. broad reachability.
b. ubiquity.
c. mobility.
d. convenience.

Answer: b   **Reference**: The Specific Attributes of M-Commerce

51. A lawyer keeps contact information for all his clients in his PDA. He can also use his PDA to access the phone books of any major U.S. city when trying to contact other lawyers in other locations. This is an example of the m-commerce characteristic called:

    a. localization of products and services.
    b. ubiquity.
    c. mobility.
    d. convenience.

    Answer: d   **Reference**: The Specific Attributes of M-Commerce

52. In the near future, a customer could call a pizza delivery service and have pizza delivered without ever giving a street address. This is an example of the m-commerce characteristic called:

    a. localization of products and services.
    b. ubiquity.
    c. mobility.
    d. convenience.

    Answer: a   **Reference**: The Specific Attributes of M-Commerce

53. The protocols which enable different kinds of wireless devices to communicate with a server on a mobile network is called:

    a. a mobile-client operating system.
    b. WAP.
    c. a mobile application user interface.
    d. application middleware.

    Answer: b   **Reference**: Software

54. _____ is a piece of software that communicates with back-end legacy systems and Web-based applications.

    a. A mobile-client operating system
    b. A microbrowser
    c. A mobile application user interface
    d. Application middleware

    Answer: d   **Reference**: Software

55. The application logic in a handheld PDA, smart phone, Palm or Wintel notebook is called:

    a. a mobile-client operating system.
    b. wireless middleware.
    c. a mobile application user interface.
    d. application middleware.

    Answer: c   **Reference**: Software

56. Software that links multiple wireless networks to application servers is called:

   a. a mobile-client operating system.
   b. wireless middleware.
   c. a mobile application user interface.
   d. application middleware.

   Answer: b   **Reference**: Software

57. A chip technology that enables voice and data communication through low-power, short-range, digital two-way radio frequency is called:

   a. Pentium IV.
   b. Bluetooth.
   c. cellular radio technology.
   d. infrared technology.

   Answer: b   **Reference**: Software

58. A set of wireless communication protocols designed to enable different kinds of wireless devices to talk to a server installed on a mobile network is called:

   a. Wireless Application Protocol (WAP).
   b. Code Division Multiple Access (CDMA).
   c. Time-Division Multiple Access (TDMA).
   d. Wireless Markup Language (WML).

   Answer: a   **Reference**: Software

59. _____ is the scripting language used for creating content in the wireless Web environment.

   a. HTML
   b. XML
   c. WML
   d. VXML

   Answer: c   **Reference**: Software

60. A smart card that holds a user's identity is called a(n):

   a. Transmission Control Protocol.
   b. Subscriber Identification Module.
   c. Universal Mobile Telecommunications Systems.
   d. Wireless Applications Protocol.

   Answer: b   **Reference**: Mobile Networks

61. A protocol used in 1G systems which gives each user a different frequency for communications is called:

    a. Frequency Division Multiple Access.
    b. Time Division Multiple Access.
    c. Code Division Multiple Access.
    d. Wireless Multiple Access.

    Answer: a   **Reference**: Mobile Networks

62. A protocol used in 2G systems which gives users different time slots on a given communications channel is called:

    a. Frequency Division Multiple Access.
    b. Time Division Multiple Access.
    c. Code Division Multiple Access.
    d. Wireless Multiple Access.

    Answer: b   **Reference**: Mobile Networks

63. A protocol used in 3G systems which separates different users by assigning different codes to the segments of each user's communications is called:

    a. Frequency Division Multiple Access.
    b. Time Division Multiple Access.
    c. Code Division Multiple Access.
    d. Wireless Multiple Access.

    Answer: c   **Reference**: Mobile Networks

64. A Web site that allows callers to request information about restaurants in a given area via voice commands is called:

    a. Voice XML.
    b. a voice portal.
    c. a mobile voice application.
    d. v-commerce.

    Answer: b   **Reference**: Voice Portals

65. An example of a micropayment is:

    a. buying a laptop over the Internet.
    b. buying a $3 song over the Internet.
    c. paying a $35 telephone bill over the Internet.
    d. paying a $300 annual bill for Internet access.

    Answer: b   **Reference**: Micropayments

66. A new cell phone allows users to make purchases with a single click. The technology used in this application is the:

    a. smart card.
    b. m-wallet.
    c. voice portal.
    d. micropayment.

    Answer: b **Reference**: Wireless Wallets

67. A server that manages the location information sent from PDEs is called:

    a. a Mobile Positioning Center.
    b. a geographic content server.
    c. a location content server.
    d. a GPS server.

    Answer: a **Reference**: L-Commerce Technologies

68. The server that manages the location information sent from a PDA is called a(n):

    a. a Mobile Positioning Center.
    b. a geographic content server.
    c. a location content server.
    d. location content technology.

    Answer: a **Reference**: L-Commerce Technologies

69. Streets, road maps, addresses, routes, landmarks, land usage, and Zip codes are all considered:

    a. geographic content.
    b. location content.
    c. position content.
    d. mobility content.

    Answer: a **Reference**: L-Commerce Technologies

70. In a geographical information system,:

    a. lists of addresses are cross referenced by the current location of the user.
    b. latitude and longitude are inserted onto electronic maps.
    c. 3D maps are used to spatially describe the location of the user.
    d. key businesses are listed by Zip code and cross referenced with users based on location.

    Answer: b **Reference**: Geographical Information Systems

71. The future technology that will notify the police automatically if an enabled car has an accident is called:

   a. a wreck positioning system (WPS).
   b. wreck locator technology (WLT).
   c. automatic crash notification (ACN).
   d. a collision avoidance system (CAV).

   Answer: c   **Reference**: E-911 Emergency Cell Phone Calls

72. The integration of wireless communication vehicle monitoring systems and vehicle location devices is called:

   a. a global positioning system.
   b. a geographical information system.
   c. a highway response system.
   d. telematics.

   Answer: d   **Reference**: Telematics and Telemetry Applications

73. Mobile visitors to a Web site are typically paying premium rates for connections and are focused on a specific goal. The small screens of current wireless devices make this difficult. This is known as:

   a. the usability problem.
   b. insufficient bandwidth.
   c. a transmission limitation.
   d. the disappointed user problem.

   Answer: a   **Reference**: The Usability Problem

74. All of the following are dimensions of usability **EXCEPT:**

   a. effectiveness.
   b. price.
   c. efficiency.
   d. satisfaction.

   Answer: b   **Reference**: The Usability Problem

75. All of the following are current limitations of WAP applications **EXCEPT:**

   a. fees for mobile phone users are high.
   b. a WAP phone can only access sites written in WML.
   c. connections to WAP sites are slow.
   d. WAP sites are often unreadable.

   Answer: d   **Reference**: WAP Limitations

76. Current health studies of long-term use of mobile technologies indicate:

    a. the risk of cancer increases with increased usage of cell phones.
    b. there is a risk to unborn children when pregnant women use cell phones.
    c. there has been no conclusive evidence that cell phone use causes cancer.
    d. cell phone use has been proven not to cause cancer.

    Answer: c   **Reference**: Potential Health Hazards

Essay Questions

77. List five attributes of m-commerce and explain the significance of each.

    Answer:

    Five of the following:
    1. Mobility – users can carry a wireless device everywhere they go.
    2. Broad reachability – users can be reached any time.
    3. Ubiquity – some devices can fulfill both the needs for real-time information and communication independent of the user's location.
    4. Convenience – devices are always on hand and easy to use.
    5. Instant connectivity – quicker access to the Internet than traditional PC connections.
    6. Personalization – wireless devices provide the possibility for increased personalization.
    7. Localization of products and services – knowing precisely where a user is at a point in time is the key to offering location-relevant products.

    Reference: The Specific Attributes of M-Commerce

78. List four limitations of m-commerce today.

    Answer:
    Four of the following:
    1. Usability
    2. Lack of standardized security protocol
    3. Insufficient bandwidth
    4. Insufficient purchase of 3G licenses
    5. Transmission limitations
    6. Power consumption is high
    7. Health concerns
    8. Many users have experienced problems

    Reference: Limitations of M-Commerce

79. List four current limitations of WAP applications.

   Answer:
   1. A WAP phone can only access WML sites.
   2. Mobile phone users pay high fees.
   3. It takes a long time for a WAP site to build a screen.
   4. Connections to WAP sites are too slow.

   Reference: WAP Limitations

80. List four revenue models for m-commerce.

   Answer:
   Four of the following:
   1. Fixed fees and traffic fees
   2. Point-of-traffic fees
   3. Transaction fees
   4. Content and service charges
   5. Payment clearing
   6. Hosting fees
   7. PKI fees

   Reference: Revenue Models

81. List five drivers of m-commerce:

   Answer:
   Five of the following:
   1. Large numbers of users
   2. No PC needed
   3. Using a cell phone is becoming a culture
   4. Vendors are pushing it
   5. Prices are declining
   6. Bandwidth is increasing
   7. EC is growing rapidly

   Reference: Drivers of M-Commerce