



# I

## Basic Network Concepts

### CERTIFICATION OBJECTIVES

- ☐ **3.1** Categorize standard media types and associated properties.
- ☐ **3.2** Categorize standard connector types based on network media.
- ☐ **3.5** Describe different network topologies.
- ☐ **3.7** Compare and contrast different LAN technologies.

# QUESTIONS

To manage a computer network effectively, you must have a solid understanding of the infrastructure on which it works. Many different types of cabling have been commonly used over the years to build networks. You need to be familiar with the various media types and how the cables are physically run. Media connectors are used to connect the network cabling to network devices, such as network interface cards, hubs, switches, and routers. You need to be able to identify these connectors by sight. Many different LAN technologies have also been implemented in computer networks over the years. You need to be familiar with how each technology works along with its limitations in terms of transmission distance and speed. Finally, you need a basic level of familiarity with wiring distribution components.

1. You manage a network within an office suite composed of three Windows 7 workstations configured to work together in a workgroup. Each system is connected to the same network switch using Gigabit Ethernet network interfaces and drop cables. What type of network is this? (Choose two.)
  - A. Local area network
  - B. Wide area network
  - C. Metropolitan area network
  - D. Client/server network
  - E. Peer-to-peer network
2. Which of the following are characteristics of a client/server network? (Choose three.)
  - A. Each host maintains its own set of user accounts that must be kept synchronized with each other.
  - B. All hosts on the network can use a common set of user and group accounts stored on a dedicated host for authentication.
  - C. Printers and data folders on each network host are shared with other network hosts.
  - D. Files are stored on and shared from a dedicated host on the network.
  - E. All network hosts running a version of Windows are configured to be members of the same workgroup.
  - F. All network hosts running a version of Windows are configured to be members of the same domain.
3. You are responsible for managing a 10Base-2 Ethernet network. The hosts on this network are connected together by a single run of coaxial cable, from system to system to system, with terminators on each end. The network does not use a hub or switch. What type of physical topology does this network use?
  - A. Ring
  - B. Star
  - C. Bus
  - D. Mesh

4. You are working with a Token Ring network, which uses token passing from host to host to control access to the network media. The network uses twisted-pair wires to connect each network host to a multistation access unit (MSAU), which manages the passing of the token. What type of physical topology does this network use?
  - A. Ring
  - B. Star
  - C. Bus
  - D. Mesh
5. You need to copy files from one Windows 7 laptop to a second one. To do this, you configured both workstations to connect to each other using an ad-hoc wireless infrastructure. What type of topology is used by this network?
  - A. Wireless star
  - B. Point-to-multipoint
  - C. Wireless ring
  - D. Point-to-point
6. Which type of connector is typically used to connect thinnet (RG-58) coaxial cabling to a network interface card?
  - A. BNC
  - B. AUI
  - C. RJ-11
  - D. RJ-45
7. A client has hired you to implement a Gigabit Ethernet network using unshielded twisted-pair cabling. Which category of cable can you use? (Choose two.)
  - A. Category 2
  - B. Category 3
  - C. Category 5
  - D. Category 5e
  - E. Category 6
8. You are making a straight-through Gigabit Ethernet drop cable using UTP and RJ-45 connectors that will be used to connect a desktop system to your network switch. Which pin on the switch should be connected to the TX+ pin on the host's network interface board?
  - A. TX+
  - B. TX-
  - C. RX+
  - D. RX-

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9. You are making a 568B UTP crossover cable that will be used to cascade two switches on an Ethernet network. You've attached an RJ-45 connector to one end of the cable and inserted the white with orange stripe wire into pin 1 of the connector. The orange wire has been inserted into pin 2 of the connector. Which wire should be inserted into pin 1 of the RJ-45 connector on the other end of the cable?
- A. White with green stripe
  - B. Green
  - C. White with orange stripe
  - D. Orange
10. Which of the following is true about singlemode fiber-optic network cabling?
- A. The central core is composed of braided plastic or glass fibers.
  - B. The central core is smaller than that of multimode fiber-optic cabling.
  - C. It transmits multiple rays of light concurrently.
  - D. It doesn't support segment lengths as long as those supported by multimode fiber-optic cabling.
11. Which media access method is used by twisted-pair Ethernet networks?
- A. CSMA/CD
  - B. CSMA/CA
  - C. Token passing
  - D. OFDMA
12. Which network signaling method uses digital signals and consumes the entire available bandwidth of the network media as a single transmission channel?
- A. Broadband
  - B. Wideband
  - C. Ultra-wideband
  - D. Baseband
13. You are planning the implementation of a new Ethernet network. The layout of the office complex will require some runs between workstations and the network switches to be up to 90 meters long. In addition, the client has requested that the network be capable of Gigabit or faster data transfers. Which Ethernet standards could you consider using in your implementation plan? (Choose two.)
- A. 10Base-5
  - B. 10Base-T
  - C. 1000Base-CX
  - D. 1000Base-T
  - E. Fast Ethernet

- 14.** Which Ethernet standards use fiber-optic cabling? (Choose two.)
- A. 10GBase-SR
  - B. 100Base-TX
  - C. 1000Base-CX
  - D. 10Base-FL
  - E. 10Base-5
- 15.** Which device is used as a central connecting point in a Token Ring network wired with UTP in a physical star topology?
- A. Bridge
  - B. Multistation access unit
  - C. Switch
  - D. Hub
- 16.** Which network service is employed by network operating systems such as Microsoft Windows Server 2008 and Novell Open Enterprise Server to store user accounts and manage access to network resources?
- A. Directory Services
  - B. Network Information Services (NIS)
  - C. Group policies
  - D. Windows Internet Name Service (WINS)
- 17.** Which terms refer to the ability to split a Novell eDirectory database into smaller logical portions that are copied redundantly to various servers in the network? (Choose two.)
- A. Partitioning
  - B. Synchronization
  - C. Replication
  - D. Compartmentalization
  - E. Redirection
- 18.** You are developing an implementation plan for a network in a startup financial services firm. They are very concerned about security and have asked you to implement the most secure network media available. Which should you choose?
- A. 802.11g wireless
  - B. 1000Base-TX
  - C. 10Base-5
  - D. 1000Base-SX

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19. Which response best describes how token passing works?
- A. The transmitting host checks the wire to see if it is in use. If so, it will wait to transmit; if not, the host will transmit.
  - B. The transmitting host checks the wire to see if it is in use. Then it sends a dummy transmission to see if it collides with any other data.
  - C. If a collision is detected, each host will wait a variable length of time before retransmitting.
  - D. The transmitting host waits until a circulating empty packet is free. When it is, the host grabs it and is allowed to transmit.
20. Which of the following are disadvantages of using a physical star topology when implementing a network that uses copper wiring? (Choose two.)
- A. The cabling used in a star topology is usually more expensive than that used in bus topologies.
  - B. A star topology requires more cabling than bus and ring topologies.
  - C. The cabling used with most physical star topologies is somewhat rigid and inflexible.
  - D. If one computer fails or the cable link is broken, the entire network could go down.
  - E. Failure of the central connecting point results in the failure of all hosts connected to it.
21. Which type of cable is used by networks that still use thinnet cabling?
- A. RG-58
  - B. RG-8
  - C. Category 3
  - D. Category 5e
22. When using a straight-through UTP cable in an Ethernet network, which pin in the jack on the hub or switch should be connected to the RX- pin in the jack on the network interface card?
- A. TX+
  - B. TX-
  - C. RX-
  - D. RX+
23. You are creating a straight-through Ethernet UTP cable for connecting a network host to your network switch. Assuming you are using 568B standards, which wire should be connected to pin 3 on both ends of the cable?
- A. White with orange stripe
  - B. Blue
  - C. White with green stripe
  - D. Orange

24. Which connector is used to connect coaxial cabling for cable TV to your television set?
  - A. LC
  - B. F-type
  - C. AUI
  - D. BNC
25. Which standard defines specifications for a hot-swappable electrical interface that converts fiber-optic Gigabit Ethernet to copper wiring?
  - A. GBIC
  - B. 568B
  - C. 568A
  - D. IEEE 802.3z
26. When creating a T1 crossover cable, which of the following describes the correct way in which the pins should be crossed over?
  - A. Pins 1, 2, 3, and 4 are connected to pins 4, 3, 2, and 1.
  - B. Pins 1, 2, 4, and 5 are connected to pins 4, 3, 1, and 2.
  - C. Pins 1, 2, 3, and 4 are connected to pins 4, 5, 1, and 2.
  - D. Pins 1, 2, 4, and 5 are connected to pins 4, 5, 1, and 2.
27. What frequency range is used by broadband over powerline (BPL) to piggy-back digital network signals though standard AC electrical distribution wiring?
  - A. 1.6 to 80 MHz
  - B. 50 to 100 MHz
  - C. 110 to 220 MHz
  - D. 230 to 300 MHz
28. Which network connectors can be used with fiber-optic cabling? (Choose three.)
  - A. RJ-48
  - B. RJ-45
  - C. BNC
  - D. ST
  - E. SC
  - F. MT-RJ
29. Which connector on a PC can be used to establish a point-to-point serial connection? (Choose two.)
  - A. MT-RJ
  - B. F-type
  - C. RS-232
  - D. IEEE 1394

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- 30.** Which type of network typically uses shielded twisted-pair (STP) cabling?
- A. Token Ring
  - B. 10Base-T
  - C. 10Base-5
  - D. 10GBase-T
- 31.** You need to connect your 1000Base-FX network switch to a singlemode fiber-optic backbone. Which type of media converter should you use?
- A. Singlemode fiber to UTP
  - B. Multimode fiber to UTP
  - C. Multimode fiber to coaxial
  - D. Singlemode fiber to multimode fiber
- 32.** Which networking technology creates virtual links between two remote network end points by prefixing packets with a header containing one or more labels?
- A. ATM
  - B. Ethernet
  - C. MPLS
  - D. Frame Relay
- 33.** Which 10 Gigabit Ethernet standards encapsulate Ethernet data within SDH/SONET frames, allowing Ethernet equipment to work with SDH/SONET networking equipment? (Choose three.)
- A. 10GBase-SW
  - B. 10GBase-LRM
  - C. 10GBase-LW
  - D. 10GBase-ER
  - E. 10GBase-EW
  - F. 10GBase-LX4
- 34.** Which technology groups multiple physical network interfaces into a single virtual interface, distributing the networking I/O load between the interfaces?
- A. Bonding
  - B. Multiplexing
  - C. Inverse multiplexing
  - D. Port mirroring





## QUICK ANSWER KEY

- |            |          |             |
|------------|----------|-------------|
| 1. A, E    | 13. C, D | 25. A       |
| 2. B, D, F | 14. A, D | 26. D       |
| 3. C       | 15. B    | 27. A       |
| 4. B       | 16. A    | 28. D, E, F |
| 5. D       | 17. A, C | 29. C, D    |
| 6. A       | 18. D    | 30. A       |
| 7. D, E    | 19. D    | 31. D       |
| 8. C       | 20. B, E | 32. C       |
| 9. A       | 21. A    | 33. A, C, E |
| 10. B      | 22. B    | 34. A       |
| 11. A      | 23. C    |             |
| 12. D      | 24. B    |             |

## IN-DEPTH ANSWERS

1. You manage a network within an office suite composed of three Windows 7 workstations configured to work together in a workgroup. Each system is connected to the same network switch using Gigabit Ethernet network interfaces and drop cables. What type of network is this? (Choose two.)

- A. Local area network
- B. Wide area network
- C. Metropolitan area network
- D. Client/server network
- E. Peer-to-peer network

- ☒ **A and E.** Because all three workstations are connected to the same network switch, they all are connected to the same network segment without routing and are considered a local area network (LAN). In addition, because all three systems are running workstation operating systems in a Microsoft Windows workgroup without a server, the network can be classified as a peer-to-peer network.
- ☒ **B, C, and D are incorrect.** **B** is incorrect because the network in this scenario is composed of a single segment without a router and all of the systems are located in the same geographical location. **C** is incorrect because all of the systems are located in the same geographical location. **D** is incorrect because all three hosts are running a Windows workstation operating system in a workgroup configuration. No system is designated to fill the server role in the network, so this cannot be classified as a client/server network.

2. Which of the following are characteristics of a client/server network? (Choose three.)
- A. Each host maintains its own set of user accounts that must be kept synchronized with each other.
  - B. All hosts on the network can use a common set of user and group accounts stored on a dedicated host for authentication.
  - C. Printers and data folders on each network host are shared with other network hosts.
  - D. Files are stored on and shared from a dedicated host on the network.
  - E. All network hosts running a version of Windows are configured to be members of the same workgroup.
  - F. All network hosts running a version of Windows are configured to be members of the same domain.

- ☑ **B, D, and F.** In a client/server network, all hosts on the network can use a common set of user and group accounts stored on a dedicated host for authentication (such as a domain controller). In addition, shared files are stored on a dedicated host (a file server). If the network is composed of Windows hosts, they can be configured to be members of the same domain, allowing them to share resources and a common set of user accounts.
- ☒ **A, C, and E** are incorrect. **A** is incorrect because a client-server network typically uses a common set of user accounts in a domain or directory service. **C** is incorrect because printers and folders on each network host are not typically shared with other network hosts in a client/server network. **E** is incorrect because Windows workgroups are typically configured only in a peer-to-peer network.

- 3.** You are responsible for managing a 10Base-2 Ethernet network. The hosts on this network are connected together by a single run of coaxial cable, from system to system to system, with terminators on each end. The network does not use a hub or switch. What type of physical topology does this network use?
- A. Ring
  - B. Star
  - C. Bus
  - D. Mesh

- ☑ **C.** Because all of the hosts are connected to the same physical network cable segment and don't use a central connecting point (such as a hub or switch), this network uses a physical bus topology.
- ☒ **A, B, and D** are incorrect. **A** is incorrect because a physical ring topology would require the network media to be connected in a ring without terminators on each end. **B** is incorrect because a physical star topology would require each host to have its own network cable and all would interconnect using a central hub or switch. **D** is incorrect because a physical mesh topology would require a dedicated link from each host to every other host on the network.

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4. You are working with a Token Ring network, which uses token passing from host to host to control access to the network media. The network uses twisted-pair wires to connect each network host to a multistation access unit (MSAU), which manages the passing of the token. What type of physical topology does this network use?

- A. Ring
- B. Star
- C. Bus
- D. Mesh

- ☒ **B.** Even though this network uses a *logical* ring topology (token passing), it is wired as a *physical* star. Each host has its own network cable that connects it to a central connection point (the MSAU).
- ☒ **A, C, and D** are incorrect. **A** is incorrect because this network is physically wired as a star, even though a Token Ring network operates logically as a ring. **C** is incorrect because a bus topology would require all of the hosts to connect to the same network cable segment, which isn't the case in this scenario. **D** is incorrect because a physical mesh topology would require a dedicated link be established from each host to every other host on the network.

5. You need to copy files from one Windows 7 laptop to a second one. To do this, you configured both workstations to connect to each other using an ad-hoc wireless infrastructure. What type of topology is used by this network?

- A. Wireless star
- B. Point-to-multipoint
- C. Wireless ring
- D. Point-to-point

- ☒ **D.** An ad-hoc wireless network connects network hosts together without the use of a wireless access point. As such, the two laptops in this scenario are connected directly to each other, creating a point-to-point network.
- ☒ **A, B, and C** are incorrect. **A** is incorrect because a wireless star network would require the use of a wireless access point. **B** is incorrect because a point-to-multipoint network would also require the use of a wireless access point. **C** is incorrect because a wireless ring network would require data to be passed from host to host until it reached the correct destination host.

6. Which type of connector is typically used to connect thinnet (RG-58) coaxial cabling to a network interface card?
- A. BNC
  - B. AUI
  - C. RJ-11
  - D. RJ-45

- ☒ **A.** A BNC connector is typically used to connect a host's network interface card to an RG-58 coaxial cable segment. For example, it is the type of connector used to connect a workstation to a 10Base-2 Ethernet network that uses RG-58 coaxial cabling.
- ☒ **B, C, and D** are incorrect. **B** is incorrect because an AUI connector is typically used to connect thicknet (RG-8) coaxial cable to a network interface board. **C** is incorrect because RJ-11 connectors are used for telephone jacks, not network connections. **D** is incorrect because RJ-45 connectors are used to connect unshielded twisted pair cables to a network interface boards.

7. A client has hired you to implement a Gigabit Ethernet network using unshielded twisted-pair cabling. Which category of cable can you use? (Choose two.)
- A. Category 2
  - B. Category 3
  - C. Category 5
  - D. Category 5e
  - E. Category 6

- ☒ **D and E.** Because Gigabit Ethernet runs at 1000 Mbps, you must use Category 5e or Category 6 UTP to transfer data reliably at full speed.
- ☒ **A, B, and C** are incorrect. **A** is incorrect because CAT 2 UTP is rated only to 4 Mbps and unlikely to be used in a modern network. **B** is incorrect because CAT 3 UTP is rated only to 10 Mbps. **C** is incorrect because CAT 5 UTP is rated only to 100 Mbps.

8. You are making a straight-through Gigabit Ethernet drop cable using UTP and RJ-45 connectors that will be used to connect a desktop system to your network switch. Which pin on the switch should be connected to the TX+ pin on the host's network interface board?
- A. TX+
  - B. TX-
  - C. RX+
  - D. RX-

- ☒ **C.** In a straight-through UTP cable, the TX+ pin on the network interface card should be connected to the RX+ pin on the switch (and vice-versa).
- ☒ **A, B, and D** are incorrect. **A** is incorrect because the RX+ pin on the switch is connected to the TX+ pin on the network board. **B** is incorrect because the TX- pin on the switch is connected to the RX- pin on the network board. **D** is incorrect because the RX- pin on the switch is connected TX- pin on the network board.

**9.** You are making a 568B UTP crossover cable that will be used to cascade two switches on an Ethernet network. You've attached an RJ-45 connector to one end of the cable and inserted the white with orange stripe wire into pin 1 of the connector. The orange wire has been inserted into pin 2 of the connector. Which wire should be inserted into pin 1 of the RJ-45 connector on the other end of the cable?

- A.** White with green stripe
- B.** Green
- C.** White with orange stripe
- D.** Orange

- ☒ **A.** 568B specifications for a UTP crossover cable require that the white with green stripe wire be inserted into pin 1 of one connector if the white with orange wire has been inserted into pin 1 of the connector on the other end of the cable.
- ☒ **B, C, and D** are incorrect. **B** is incorrect because the green wire on the opposite end should be connected to pin 2. **C** is incorrect because the white with orange strip wire should be connected to pin 3 on the opposite end. **D** is incorrect because the orange wire should be connected to pin 6 on the opposite end.

**10.** Which of the following is true about singlemode fiber-optic network cabling?

- A.** The central core is composed of braided plastic or glass fibers.
- B.** The central core is smaller than that of multimode fiber-optic cabling.
- C.** It transmits multiple rays of light concurrently.
- D.** It doesn't support segment lengths as long as those supported by multimode fiber-optic cabling.

- ☒ **B.** Singlemode fiber-optic cabling transmits a single ray (or mode) of light through glass or plastic fiber. It supports longer transmission distances than multimode fiber-optic cable and is also more expensive. It also has a central core that is much smaller than that of multimode fiber-optic cabling.
- ☒ **A, C, and D** are incorrect. **A** is incorrect because the central core of singlemode fiber-optic cabling is not braided. **C** is incorrect because singlemode fiber-optic cabling transmits a single ray (or mode) of light through glass or plastic fiber. **D** is incorrect because singlemode fiber-optic cabling supports longer transmission distances than multimode fiber-optic cable and is also more expensive.

**11.** Which media access method is used by twisted-pair Ethernet networks?

- A.** CSMA/CD
- B.** CSMA/CA
- C.** Token passing
- D.** OFDMA

- ☒ **A.** Twisted-pair Ethernet networks use Collision Sense Multiple Access with Collision Detection (CSMA/CD) to regulate how multiple network hosts use the same network medium and to detect errors (collisions) that occur when two hosts try to transmit simultaneously.
- ☒ **B, C, and D** are incorrect. **B** is incorrect because CSMA/CA is not used by wired Ethernet networks, but is instead used by WiFi (802.11) wireless networks. **C** is incorrect because token passing is used by Token Ring and FDDI networks, not Ethernet networks. **D** is incorrect because OFDMA is used only in WiMAX (802.16) wireless networks.

**12.** Which network signaling method uses digital signals and consumes the entire available bandwidth of the network media as a single transmission channel?

- A.** Broadband
- B.** Wideband
- C.** Ultra-wideband
- D.** Baseband

- ☒ **D.** Baseband signaling uses digital signals and treats the entire bandwidth of the network media as a single transmission channel, unlike broadband signaling which divides the bandwidth of the network media into multiple channels. As a result, baseband signaling allows only one signal at a time on the network medium.

- ☒ **A, B, and C** are incorrect. **A** is incorrect because broadband signaling uses only a portion of the available media bandwidth (allowing multiple transmissions simultaneously). **B** is incorrect because wideband is a signaling technology used with wireless (radio) technologies. **C** is incorrect because ultra-wideband is also used with wireless (radio) technologies.

**13.** You are planning the implementation of a new Ethernet network. The layout of the office complex will require some runs between workstations and the network switches to be up to 90 meters long. In addition, the client has requested that the network be capable of Gigabit or faster data transfers. Which Ethernet standards could you consider using in your implementation plan? (Choose two.)

- A. 10Base-5
- B. 10Base-T
- C. 1000Base-CX
- D. 1000Base-T
- E. Fast Ethernet

- ☒ **C and D.** Both 1000Base-CX and 1000Base-T are capable of transferring data at 1000 Mbps.
- ☒ **A, B, and E** are incorrect. **A** is incorrect because 10Base-5 is an older Ethernet standard that is limited to 10 Mbps transfers. **B** is incorrect because 10Base-T is also limited to 10 Mbps transfers. **E** is incorrect because Fast Ethernet standards are limited to 100 Mbps data transfers.

**14.** Which Ethernet standards use fiber-optic cabling? (Choose two.)

- A. 10GBase-SR
- B. 100Base-TX
- C. 1000Base-CX
- D. 10Base-FL
- E. 10Base-5



- ☒ **A and D.** Both the newer 10GBase-SR and the older 10Base-FL Ethernet standards employ fiber-optic cabling.
- ☒ **B, C, and E** are incorrect. **B** is incorrect because 100Base-TX uses UTP copper cabling. **C** is incorrect because 1000Base-CX uses coaxial copper cabling. **E** is incorrect because 10Base-5 also uses coaxial copper cabling.

**15.** Which device is used as a central connecting point in a Token Ring network wired with UTP in a physical star topology?

- A. Bridge
- B. Multistation access unit
- C. Switch
- D. Hub

- ☒ **B.** A Token Ring network that is wired with UTP in a physical star topology uses a multistation access unit (MSAU) as a central connecting point for all hosts.
- ☒ **A, C, and D** are incorrect. **A** is incorrect because bridges are used to connect two network segments together. **C** is incorrect because switches are used in Ethernet networks, which use CSMA/CD for media access control instead of token passing. **D** is incorrect because hubs are also used in Ethernet networks, which use CSMA/CD for media access control instead of token passing.

**16.** Which network service is employed by network operating systems such as Microsoft Windows Server 2008 and Novell Open Enterprise Server to store user accounts and manage access to network resources?

- A. Directory Services
- B. Network Information Services (NIS)
- C. Group policies
- D. Windows Internet Name Service (WINS)

- ☒ **A.** Directory services is a service used on Microsoft Windows, Novell Open Enterprise Server, and even Linux servers to store user accounts and manage access to network resources (such as shared folders).

- ☒ **B, C, and D** are incorrect. **B** is incorrect because, while NIS is used by Linux systems to share user accounts among multiple systems, it isn't a true directory service and it isn't commonly implemented on Microsoft or Novell servers. **C** is incorrect because group policies are used on Windows servers to define policies applied to users or machines, but they aren't used on Novell servers. **D** is incorrect because WINS is a basic network name resolution service used by NetBIOS hosts.

**17.** Which terms refer to the ability to split a Novell eDirectory database into smaller logical portions that are copied redundantly to various servers in the network? (Choose two.)

- A. Partitioning
- B. Synchronization
- C. Replication
- D. Compartmentalization
- E. Redirection

- ☒ **A and C.** Partitioning the eDirectory database involves dividing it up into logical "chunks." Replication occurs when you place copies of these partitions on multiple network servers.

- ☒ **B, D, and E** are incorrect. **B** is incorrect because synchronization refers to the process of keeping replicas up to date, such as when updates from a master copy of a partition are copied to its replicas. However, it does not refer to the process of partitioning and placing replicas. **D** is incorrect because compartmentalization is not a directory services-related term. **E** is incorrect because redirection refers to the process used by network clients to redirect requests for network resources to a server instead of the local operating system.

**18.** You are developing an implementation plan for a network in a startup financial services firm. They are very concerned about security and have asked you to implement the most secure network media available. Which should you choose?

- A. 802.11g wireless
- B. 1000Base-TX
- C. 10Base-5
- D. 1000Base-SX

- ☒ **D.** 1000Base-SX networks use fiber-optic cabling, which is the most immune to eavesdropping of the choices listed.
- ☒ **A, B, and C** are incorrect. **A** is incorrect because wireless networks can transmit information outside of your physical facility and are considered the least secure type of network, even with encryption enabled. **B** is incorrect because 1000Base-TX uses copper wiring and is less immune to eavesdropping than fiber-optic cable. **C** is incorrect because 10Base-5 also uses copper wiring and is less immune to eavesdropping than fiber-optic cable.

**19.** Which response best describes how token passing works?

- A.** The transmitting host checks the wire to see if it is in use. If so, it will wait to transmit; if not, the host will transmit.
- B.** The transmitting host checks the wire to see if it is in use. Then it sends a dummy transmission to see if it collides with any other data.
- C.** If a collision is detected, each host will wait a variable length of time before retransmitting.
- D.** The transmitting host waits until a circulating empty packet is free. When it is, the host grabs it and is allowed to transmit.

- ☒ **D.** With token passing, an empty packet (the token) circulates around the ring. To place data on the wire, a host must first wait for the token. Once a host has the token and it is free of data, the host can place its data on the wire. Because there is only one token and a host needs to have it to transmit, it is impossible to have collisions in a token-passing environment.
- ☒ **A, B, and C** are incorrect. **A** and **C** are incorrect because they both describe how the CSMA/CD media access scheme works. **B** is incorrect because it describes how the CSMA/CA media access scheme works.

**20.** Which of the following are disadvantages of using a physical star topology when implementing a network that uses copper wiring? (Choose two.)

- A.** The cabling used in a star topology is usually more expensive than that used in bus topologies.
- B.** A star topology requires more cabling than bus and ring topologies.
- C.** The cabling used with most physical star topologies is somewhat rigid and inflexible.
- D.** If one computer fails or the cable link is broken, the entire network could go down.
- E.** Failure of the central connecting point results in the failure of all hosts connected to it.

- ☒ **B and E.** A physical star topology typically requires more cabling than bus and ring topologies because each host requires its own dedicated cable. In addition, the failure of the central hub or switch will result in the failure of all the network hosts connected to it.
- ☒ **A, C, and D** are incorrect. **A** is incorrect because the UTP cabling used in a physical star topology is typically less expensive than that used in other topologies. **C** is incorrect because UTP also tends to be much more flexible than fiber-optic or coaxial cabling. **D** is incorrect because each host has its own cable in a star topology. Therefore, the failure of one cable does not affect any other host on the network.

**21.** Which type of cable is used by networks that still use thinnet cabling?

- A. RG-58
- B. RG-8
- C. Category 3
- D. Category 5e

- ☒ **A.** Thinnet uses RG-58 coaxial cabling. This is typically used with older 10Base-2 networks.
- ☒ **B, C, and D** are incorrect. **B** is incorrect because RG-8 coaxial cabling is used with thicknet networks, such as older 10Base-5 implementations. **C** and **D** are incorrect because Category 3 and 5e UTP cabling are used with physical star Ethernet networks that use UTP and are not used in thinnet networks.

**22.** When using a straight-through UTP cable in an Ethernet network, which pin in the jack on the hub or switch should be connected to the RX- pin in the jack on the network interface card?

- A. TX+
- B. TX-
- C. RX-
- D. RX+

- ☒ **B.** The RX- pin in the jack on the network interface card should be connected to the TX- pin in the jack on the hub or switch.
- ☒ **A, C, and D** are incorrect. **A** is incorrect because the TX+ pin on the hub/switch should be connected to the RX+ pin on the network card. **C** is incorrect because the RX- pin on the hub/switch should be connected to the TX- pin on the network card. **D** is incorrect because the RX+ pin on the hub/switch should be connected to the TX+ pin on the network card.

**23.** You are creating a straight-through Ethernet UTP cable for connecting a network host to your network switch. Assuming you are using 568B standards, which wire should be connected to pin 3 on both ends of the cable?

- A. White with orange stripe
- B. Blue
- C. White with green stripe
- D. Orange

- ☒ **C.** When using the 568B wiring scheme to create a straight-through Ethernet cable, the white with green striped wire should be connected to pin 3 on both ends of the cable.
- ☒ **A, B, and D** are incorrect. **A** is incorrect because the white with orange wire should be connected to pin 1. **B** is incorrect because the blue wire should be connected to pin 4. **D** is incorrect because the orange wire should be connected to pin 2.

**24.** Which connector is used to connect coaxial cabling for cable TV to your television set?

- A. LC
- B. F-type
- C. AUI
- D. BNC

- ☒ **B.** The F-type connector is used to connect coaxial cabling for cable TV to your television set.
- ☒ **A, C, and D** are incorrect. **A** is incorrect because the LC connector is used with fiber-optic cabling. **C** and **D** are incorrect because the AUI and BNC connectors are used with coaxial network cabling.

**25.** Which standard defines specifications for a hot-swappable electrical interface that converts fiber-optic Gigabit Ethernet to copper wiring?

- A. GBIC
- B. 568B
- C. 568A
- D. IEEE 802.3z

- ☒ **A.** The gigabit interface converter (GBIC) is a standard for transceivers commonly used with Gigabit Ethernet that offers a standard interface that can support physical media such as copper and optical fiber.
- ☒ **B, C, and D** are incorrect. **B** and **C** are incorrect because 568A and 568B define standards for straight-through and crossover copper Ethernet cables. **D** is incorrect because IEEE 802.3z defines Gigabit Ethernet that runs over fiber-optic cabling or coaxial cabling.

- 26.** When creating a T1 crossover cable, which of the following describes the correct way in which the pins should be crossed over?
- A.** Pins 1, 2, 3, and 4 are connected to pins 4, 3, 2, and 1.
  - B.** Pins 1, 2, 4, and 5 are connected to pins 4, 3, 1, and 2.
  - C.** Pins 1, 2, 3, and 4 are connected to pins 4, 5, 1, and 2.
  - D.** Pins 1, 2, 4, and 5 are connected to pins 4, 5, 1, and 2.

- ☒ **D.** T1 cabling follows T568B standards, so a T1 crossover cable should connect pins 1, 2, 4, and 5 to pins 4, 5, 1, and 2.
- ☒ **A, B, and C** are incorrect. **A** is incorrect because it does not connect the TX+/- pins to the RX+/- pins, so the transmit signals will never reach the reception pins. **B** is incorrect because it also fails to connect the TX+/- pins to the RX+/- pins. **C** is incorrect because it also does not connect the TX+/- pins to the RX+/- pins.

- 27.** What frequency range is used by broadband over powerline (BPL) to piggy-back digital network signals though standard AC electrical distribution wiring?
- A.** 1.6 to 80 MHz
  - B.** 50 to 100 MHz
  - C.** 110 to 220 MHz
  - D.** 230 to 300 MHz

- ☒ **A.** Broadband over powerline (BPL) uses the 1.6 to 80 MHz frequency range to piggy-back digital network signals though standard AC electrical distribution wiring.
- ☒ **B, C, and D** are incorrect. **B** is incorrect because standard AC wiring has limited ability to carry high-frequency signals and the frequency range 50 to 100 MHz exceeds the maximum frequency supported by such wiring. **C** is incorrect because the 110 to 220 MHz frequency range also exceeds the maximum frequency supported by AC wiring. **D** is incorrect because the 230 to 300 MHz frequency range also exceeds the maximum frequency supported by AC wiring.

**28.** Which network connectors can be used with fiber-optic cabling? (Choose three.)

- A. RJ-48
- B. RJ-45
- C. BNC
- D. ST
- E. SC
- F. MT-RJ

- ☒ **D, E, and F.** ST, SC, and MT-RJ connectors are designed to transmit light instead of electricity and are used to connect fiber-optic cabling to fiber-optic devices.
- ☒ **A, B, and C** are incorrect. **A** is incorrect because RJ-48 connectors are used with T1 and ISDN copper network cabling. **B** is incorrect because RJ-45 connectors are used with UTP copper network cabling. **C** is incorrect because BNC connectors are used with coaxial copper network cabling.

**29.** Which connector on a PC can be used to establish a point-to-point serial connection? (Choose two.)

- A. MT-RJ
- B. F-type
- C. RS-232
- D. IEEE 1394

- ☒ **C and D.** The RS-232 connection can be used to establish a point-to-point serial connection between two computer systems. You can also use USB and FireWire (IEEE 1394) connectors to establish a serial point-to-point connection between computers.
- ☒ **A and B** are incorrect. **A** is incorrect because MT-RJ connectors are used with fiber-optic cabling and aren't typically used to establish serial point-to-point connections between computers. **B** is incorrect because F-type connectors are used with coaxial cable TV connections and aren't used for computer network connections.

**30.** Which type of network typically uses shielded twisted-pair (STP) cabling?

- A. Token Ring
- B. 10Base-T
- C. 10Base-5
- D. 10GBase-T

- ☒ **A.** Many Token Ring implementations use IBM Type-1 shielded twisted-pair (STP) network cabling. The extra shielding within the cable helps protect it from external electromagnetic interference (EMI) and can be used in deployments where environmental EMI would disrupt communications on unshielded twisted-pair (UTP) cabling.
- ☒ **B, C, and D** are incorrect. **B** is incorrect because 10Base-T specifies the use of UTP. **C** is incorrect because 10Base-5 uses RG-8 coaxial cabling. **D** is incorrect because 10GBase-T uses Category 6a UTP.

**31.** You need to connect your 1000Base-FX network switch to a singlemode fiber-optic backbone. Which type of media converter should you use?

- A. Singlemode fiber to UTP
- B. Multimode fiber to UTP
- C. Multimode fiber to coaxial
- D. Singlemode fiber to multimode fiber

- ☒ **D.** 1000Base-FX networks use multimode fiber-optic cabling. Therefore, to connect your 1000Base-FX switch to a singlemode fiber backbone, you must use a media converter to switch from multimode to singlemode fiber. Remember that singlemode fiber uses a single ray of light (a mode) while multimode fiber uses multiple rays of light (modes) simultaneously.
- ☒ **A, B, and C** are incorrect. **A** and **B** are incorrect because 1000Base-FX networks use multimode fiber-optic cabling, not copper UTP. **C** is incorrect because 1000Base-FX networks do not use coaxial cabling.

**32.** Which networking technology creates virtual links between two remote network end points by prefixing packets with a header containing one or more labels?

- A. ATM
- B. Ethernet
- C. MPLS
- D. Frame Relay



- ☒ **C.** Multiprotocol Label Switching (MPLS) creates virtual links between two remote network end points by prefixing packets with a header containing one or more labels. With MPLS, routing is determined by the contents of each packet's label. This allows you to create an endpoint-to-endpoint virtual circuit across a variety of network media. For example, some Cisco hardware uses MPLS to establish a virtual private network (VPN) between remote sites.
- ☒ **A, B, and D** are incorrect. **A** and **D** are incorrect because MPLS is a successor to both ATM and Frame Relay technologies, which served a similar endpoint-to-endpoint connectivity function back in the 1980s and 1990s. **B** is incorrect because Ethernet networking doesn't use packet labels or virtual endpoint-to-endpoint connections.

**33.** Which 10 Gigabit Ethernet standards encapsulate Ethernet data within SDH/SONET frames, allowing Ethernet equipment to work with SDH/SONET networking equipment? (Choose three.)

- A. 10GBase-SW
- B. 10GBase-LRM
- C. 10GBase-LW
- D. 10GBase-ER
- E. 10GBase-EW
- F. 10GBase-LX4

- ☒ **A, C, and E.** 10GBase-SW, 10GBase-LW, and 10GBase-EW are 10 Gigabit Ethernet standards that encapsulate Ethernet data within SDH/SONET frames. This allows 10 Gigabit Ethernet equipment to work with networking equipment designed to carry SDH/SONET frames.
- ☒ **B, D, and F** are incorrect. **B** and **D** are incorrect because 10GBase-LRM and 10GBase-ER are fiber-optic Ethernet standards that use multimode cabling. **F** is incorrect because 10GBase-LX4 is also a fiber-optic Ethernet standard that uses two pairs of legacy multimode cabling to provide 10 Gigabit Ethernet speeds.

**34.** Which technology groups multiple physical network interfaces into a single virtual interface, distributing the networking I/O load between the interfaces?

- A. Bonding
- B. Multiplexing
- C. Inverse multiplexing
- D. Port mirroring

- ☑ **A.** Bonding allows you to group multiple network adapters together and have them behave as if they were a single network interface. A single IP address is assigned to the bonded interface. The network I/O load is balanced between the network boards in a manner similar to the way striping works in a RAID 0 hard disk array.
- ☒ **B, C, and D** are incorrect. **B** is incorrect because multiplexing combines multiple data streams into a single signal on a shared medium. **C** is incorrect because inverse multiplexing is the opposite of traditional multiplexing, dividing one signal among multiple transmission channels. **D** is incorrect because port mirroring allows a network switch to send a copy of data that reaches certain ports to a monitored port, allowing the administrator to monitor network traffic.