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## Chapter 3 Solutions

### Review Questions

1. Of the following cabling elements, which does not commonly occur in coaxial cable?  
d. cladding
2. Which of the following is a common media characteristic? (Choose all that apply.)  
a. bandwidth rating  
b. interference susceptibility  
d. maximum segment length
3. What surrounds the center conductor in a coaxial cable to separate it from the wire braid?  
d. insulating layer
4. Which of the following types of fiber-optic connectors provides high density and requires only one connector for two cables?  
c. MT-RJ
5. The condition that requires cables not to exceed a recommended maximum length is called \_\_\_\_\_.  
d. attenuation
6. Which of the following is not a wireless networking standard?  
d. 802.17b
7. The space between a false ceiling and the true ceiling where heating and cooling air circulates is called the \_\_\_\_\_.  
d. plenum
8. Cable sheathed with \_\_\_\_\_ material should not be routed in the plenum or walls.  
d. PVC (polyvinyl chloride)
9. The fire-resistant cable specified by fire and building codes is rated as which of the following?  
d. plenum-rated
10. To build the network in your New York City headquarters, you must run a cable through the elevator shaft from the customer service center on the second floor all the way up to corporate offices on the 37th floor. The distance is 550 meters. What type of cable must you use?  
d. fiber-optic cable
11. Which of the following cables is not suitable for network use of any kind?  
a. Category 1
12. What type of connector is used most commonly with TP network wiring?  
b. RJ-45
13. Both Category 3 and Category 5 cable can be used for 100 Mbps Ethernet. True or False?  
False

14. You have been hired to install a network at a large government agency that wants to reduce the likelihood of electronic eavesdropping on its network. What kind of cable should you use?  
d. fiber-optic
15. You're preparing to install a conventional Ethernet network in your new office building, but your boss tells you to be ready to handle a switchover to 1 Gbps Ethernet next year. What two types of cable could you install? (Choose two answers.)  
b. fiber-optic  
d. Category 6
16. When two cables run side by side, signals traveling down one wire might interfere with signals traveling on the other wire. What is this phenomenon called?  
d. crosstalk
17. What characteristic of twisted-pair cabling helps mitigate the effects of crosstalk?  
a. differential signals
18. Which of the following cabling elements does not occur in fiber-optic cable?  
c. wire braid
19. What benefits does shielding confer on shielded twisted-pair cable? (Choose all that apply.)  
b. lowers susceptibility to interference  
c. supports higher bandwidth over longer distances
20. If you want to share an Internet connection among three home computers but find it difficult to run cables, what type of network should you use?  
d. 802.11b
21. Currently, you're using 802.11b wireless in your LAN but are considering an upgrade to 54 Mbps speed. For best compatibility, which wireless standard should you choose for this higher bandwidth?  
a. 802.11g
22. Baseband transmission sends signals in which of the following forms?  
b. digital
23. Broadband transmission sends signals in which of the following forms?  
a. analog
24. What are the devices used to manage transmission and reception of data between a wired LAN and wireless components?  
a. access points
25. What is the wireless device used to link buildings without cable?  
d. bridge
26. Which of the following technologies might be used in wireless communications? (Choose all that apply.)  
a. narrowband radio  
b. microwave transmission  
c. infrared  
d. laser

27. Which of the following is a wiring standard for twisted-pair cable connections? (Choose all that apply.)
  - b. TIA/EIA 568A
  - d. TIA/EIA 568B
28. Which of the following wireless technologies isn't appropriate for linking two buildings? (Choose all that apply.)
  - a. reflective infrared
  - e. low-power single-frequency radio
29. Which new wireless standard can be used in place of a wired last mile?
  - b. 802.16-2004 WiMax
30. What is the distance limitation for Category 5e UTP running 100 Mbps Ethernet?
  - a. 100 m

## Hands-on Projects

### Hands-on Project 3-3

If any kind of conductive cable has to pass through an interference-rich environment—and the shop floor at XYZ sounds extremely “noisy”—it must be routed through metal conduit to deflect most of the interference. Even so, close proximity to intense sources of interference could still impede network traffic, so care must be taken when routing the conduit to avoid coming closer than 25 feet to intense sources of interference, such as arc welders or metal stampers. The only medium guaranteed to be immune to this interference is, of course, fiber-optic cable. In this kind of environment, it should still be run through conduit to protect it from errant forklifts and heavy machinery.

### Hands-on Project 3-4

Although a segment of 10Base5 would do the job, coaxial cable, particularly thicknet, is long obsolete in most networking applications. The best, and only reasonable, choice for this network is fiber-optic cable.

### Hands-on Project 3-5

Given that most interfloor gaps in office buildings seldom exceed more than 20 feet, the maximum distance from the 9th to 11th floor is around 60 feet. Figuring an additional 40 feet at both ends for elevator shaft to wiring closet runs, UTP cabling could work, but it must be routed through conduit because of the elevator shaft's electrically noisy environment. (Elevators can be rich, if intermittent, sources of EMI and even RFI.) Fiber-optic is the best solution, however, because of its relative immunity to interference. Because of the temperature and humidity conditions in elevator shafts, fiber-optic cable should still be run through conduit. In addition, nothing beats fiber-optic cable for open-ended bandwidth.

### Hands-on Project 3-6

The wireless solution for VBISP is WiMax, which can provide bandwidth up to 70 Mbps at distances up to 30 miles. Fiber-optic cable could work, but the distance would make it an expensive solution.

### Hands-on Project 3-7

Given that the distance to be spanned is global in scope, the only feasible technology covered in the chapter is satellite microwave, which can literally span the entire planet. The reason that laying cable isn't feasible is that the distance between Des Moines and Malaysia is on the order of 10,000 to 12,000 miles. Not only would the expense be astronomical—many billions of dollars—but also laying cable across the United States, international waters, and into Malaysia is not something most private organizations such as MarTexCo would be willing to undertake.

## Case Projects

### Case Project 3-1

Whenever cables go through the ground, differences in ground potential between one location and another can cause current to flow. Because this will interfere with, if not block, networked communications, most network engineers recommend using fiber-optic cable for in-ground cable runs. Likewise, only fiber can accommodate increasingly large amounts of bandwidth, leaving room for higher-speed technologies to use the existing in-ground cable. Therefore, of the possible answers to this case project, both c and d are correct, but c is the most compelling technical justification for using fiber-optic cable rather than thinwire.

### Case Project 3-2

TVBCA is moving to new facilities, where it wants to use a fiber-optic backbone to interlink all three buildings. Because fiber-optic cable easily meets the 100 Mbps speed requirement, the proposed solution achieves the required result. Because fiber-optic cable is as immune from eavesdropping as it's possible to get, it also meets the first optional desired result. Fiber-optic cable and the associated backbone access equipment are expensive, however, so this solution fails to meet the second optional desired result of creating a network that's as inexpensive as possible. Therefore, answer b is correct.

### Case Project 3-3

The correct answer is b. The advertising firm's decision to use Category 6 wiring certainly delivers the required result of providing a network that can operate at speeds up to 1 Gbps. However, to reach 10 Gbps in a few years, fiber-optic cable is the only option. Therefore, only the required result is met.

### Case Project 3-4

XYZ Corp's quest for mobile computing for its field engineers depends on use of cellular modems to connect remote computers with the organization's LAN. Because the plan also includes encryption fees, even though the traffic is broadcast, it's safe to assume that encryption makes eavesdropping a waste of time. However, because cellular technologies are not the cheapest, the solution fails to meet the requirement that it be as inexpensive as possible. Therefore, the answer is b because the required result and one of the optional desired results have been met.

### Case Project 3-5

The answer is a because the proposed solution delivers the required results and both optional desired results. 802.11a provides wireless bandwidth up to 54 Mbps.