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## Chapter 2 Solutions

### Review Questions

1. Which of the following is a limitation of early networks that used a daisy-chain method of connecting computers? (Choose all that apply.)
  - a. Total number of computers that could be connected
  - c. Cable length
2. Which of the following is true of a repeater?
  - c. Receives bit signals and strengthens them
3. Which of the following is true of a hub? (Choose all that apply.)
  - b. Transmits regenerated signals to all connected ports
  - c. Usually has four or more ports
4. Which of the following is the unit of measurement by which a hub's bandwidth is usually specified?
  - b. Bits per second
5. Which of the following describes how devices connected to a hub use the speed at which the hub can transmit data?
  - c. Bandwidth sharing
6. Which of the following is a likely indicator light on a hub? (Choose all that apply.)
  - b. Link status
  - c. Connection speed
  - d. Activity
7. Which of the following describes how devices connected to a switch use the speed at which the switch can transmit data?
  - a. Dedicated bandwidth
8. What does a switch use to create its switching table?
  - d. Source MAC addresses
9. What purpose does the timestamp serve in a switching table?
  - c. Tells the switch when to delete an entry
10. What feature of a switch allows devices to effectively communicate at 200 Mbps on a 100 Mbps switch?
  - b. Full-duplex mode
11. To which device is a wireless access point most similar in how it operates?
  - a. Hub
12. What's the purpose of an RTS signal in wireless networking?
  - c. It allows a client to notify the AP that it's ready to send data.
13. Which of the following is a common operational speed of a wireless network?
  - d. 11 Mbps

14. Which of the following is a task performed by a NIC and its driver? (Choose all that apply.)
  - a. Provides a connection to the network medium
  - c. Receives packets from the network protocol and creates frames
  - e. Adds error-checking data to the frame
15. Which of the following best describes a MAC address?
  - b. Two 24-bit numbers, in which one is the OUI
16. Under which circumstances does a NIC allow inbound communications to pass through the interface? (Choose all that apply.)
  - b. The destination MAC address matches the built-in MAC address.
  - c. The destination MAC address is all binary 1s.
17. How does a protocol analyzer capture all frames?
  - c. It configures the NIC to operate in promiscuous mode.
18. In Windows 7, which of the following displays information about currently installed NICs?
  - a. Network Connections
19. Which of the following is the purpose of an SSID?
  - d. Identifies a wireless network
20. Which of the following describe the function of routers? (Choose all that apply.)
  - b. Connect LANS
  - d. Work with packets and IP addresses
21. What information is found in a routing table?
  - b. Network addresses and interfaces
22. You currently have 15 switches with an average of 20 stations connected to each switch. The switches are connected to one another so that all 300 computers can communicate with each other in a single LAN. You have been detecting a high percentage of broadcast frames on this LAN. You think the number of broadcasts might be having an impact on network performance. What should you do?
  - c. Reorganize the network into smaller groups and connect each group to a router.
23. Review the routing table in Figure 2-29. Based on this figure, where will the router send a packet with the source network number 1.0 and the destination network number 3.0?
  - c. WAN B
24. If a router receives a packet with a destination network address unknown to the router, what will the router do?
  - b. Discard the packet.
25. Which of the following is true about routers? (Choose all that apply.)
  - b. Use default routes for unknown network addresses
  - c. Forward unicasts

## Challenge Labs

### Challenge Lab 2-1

- What filter options (if any) did you configure in Wireshark?

Students should have created an ICMP filter for Wireshark.

- What commands did you use to generate packets on the network?

Students should ping each other to create traffic.

- What IP addresses did you attempt to communicate with?

Students should use IP addresses so that some ping traffic is directed to their computers and other pings are going to other computers on the network.

- What was your result? Is your computer attached to a hub or switch? Why did you come to this conclusion?

If all traffic was captured by Wireshark, including ping packets that weren't sent to the student's computer, a hub is being used. If only packets addressed to the student's computer were captured, a switch is being used.

### Challenge Lab 2-2

- What type of packets does Trace Route use?

Tracert in Windows uses ICMP packets; some Trace Route programs use UDP packets.

- What is the response each router sends back to your computer?

Each router sends a "TTL expired" message.

- How does your computer get a response from each router between your computer and the destination?

The TTL starts with a value of 1 and is incremented by 1 for each set of packets that's sent. The packet's TTL is decremented by each router encountering it. When the TTL reaches 0, the router that has the packet sends a "TTL expired" message back to the sending machine. In this way, the first set of packets with TTL=1 get to the first router, which decrements the TTL to 0 and sends a "TTL expired" message back to the sender. The second set of packets has a TTL of 2, so it gets to the second router before expiring and so on, until the destination device is reached. Chapter 5 covers more on TTL and ICMP.

## Case Projects

### Case Project 2-1

Because the main problem is caused by collisions, replacing some or all hubs with 10/100 Mbps switches should solve the problem. Switches would prevent most collisions, and the faster speed would also help with overall network response times. In addition, a switch can operate in full-duplex mode, allowing machines to send and receive data at the same time. NICs might have to be upgraded to take advantage of the faster speed and full-duplex mode. Cabling might need to be upgraded if it's not at least Category 5.

A router could also be added to divide the LAN into two smaller LANs, but this extra expense might be overkill to solve the problem. The problem doesn't seem to be excessive broadcast traffic, which is one of the key problems routers solve. Adding a router to this network wouldn't be incorrect—perhaps just unnecessary.

### Case Project 2-2

Because broadcast traffic is a key problem, a router should be configured to divide the LAN into two or more smaller LANs. In addition, the router must be configured correctly with IP addresses and the workstations configured with default gateways. Also, the workstations and servers on each IP network need to be configured with IP addresses suitable for the network they're on. Chapter 5 covers more on IP addressing.

### **Case Project 2-3**

Answers will vary. Students should write a two- to three-sentence description of each term.