Network Hardware Essentials
Chapter 2

TRUE/FALSE

1. When a NIC is in "promiscuous" mode, it will process only the frames in which the destination MAC address matches its own MAC address.

   ANS: F PTS: 1 REF: Page 69

2. Routers do not forward broadcast packets.

   ANS: T PTS: 1 REF: Page 90

3. If a router receives a packet and it does not have an entry in its routing table for the destination network, it will send the packet to its default route, if configured.

   ANS: T PTS: 1 REF: Page 95

4. The function of a repeater is to extend the range of an existing network.

   ANS: T PTS: 1 REF: Page 62

5. You cannot connect a hub to another hub unless it has an uplink port.

   ANS: F PTS: 1 REF: Page 66

MULTIPLE CHOICE

1. When a frame is received, which component reads the source and destination MAC addresses, looks up the destination to determine where to send the frame, and forwards it out the correct port?

   a. router
   b. switch
   c. repeater
   d. hub

   ANS: B PTS: 1 REF: Page 67

2. Why would you need to use a repeater?

   a. You need to connect two networks together to make an internetwork.
   b. Your network is too large, and you need to decrease the size of the broadcast domain.
   c. You want to maximize the available bandwidth.
   d. You need to add a group of computers to your network, and the distance is too far for normal means of communication.

   ANS: D PTS: 1 REF: Page 63

3. Which of the following is NOT a function of a hub?

    a. cleans up the signal
    b. transmits the signal to the correct port
    c. receives the signal from a connected computer on one of its ports
    d. regenerates the signal

    ANS: B PTS: 1 REF: Page 64

4. How does a switch “learn” MAC addresses?

    a. All the MAC addresses must be entered manually.
    b. The switch comes loaded with the most frequently used addresses.
    c. The switch reads each frame and makes a note of where each MAC address came from.
    d. The switch uses a mathematical formula to determine what the MAC address would be for each computer connected to it.

    ANS: C PTS: 1 REF: Page 66

5. Why is the use of a switch preferred over a hub?

    a. Devices on a hub have to share the available bandwidth.
    b. Switches are intelligent; they read the frame and determine where to send it.
    c. Switches can operate in full-duplex mode.
    d. All of the above.

    ANS: D PTS: 1 REF: Pages 66-68

6. What does a switch store in its switching table?

    a. the source MAC address of a frame and the port it was received on
    b. the destination MAC address of a frame and the port it was received on
    c. the source IP address of a frame and the port it was received on
    d. the destination IP address of a frame and the port it was received on

    ANS: A PTS: 1 REF: Page 67

7. What is a packet called that is intended for only one individual computer?

    a. broadcast
    b. unicast
    c. multicast
    d. anycast

    ANS: B PTS: 1 REF: Page 81

8. Just as a switch keeps records of MAC addresses that it has learned, so does your computer. What protocol does your computer use to learn MAC addresses?

    a. ARP
    b. ICMP
    c. DHCP
    d. IP

    ANS: A PTS: 1 REF: Page 74

9. What does it usually mean when the activity light on a switch is blinking?

    a. It is malfunctioning.
    b. It is ready to receive data.
    c. It is communicating with the network.
    d. A collision is imminent.

    ANS: C PTS: 1 REF: Page 76

10. What component of the computer provides it with a MAC address?
    a. motherboard
    b. NIC
    c. CPU
    d. BIOS

    ANS: B PTS: 1 REF: Page 80

11. A MAC address is composed of two 24-bit numbers. What does the first 24-bit number represent?

    a. It's a unique serial number assigned by the manufacturer.
    b. It's the address it uses for a multicast packet.
    c. It's the decryption key used for security purposes.
    d. It's the organizationally unique identifier for the manufacturer of the device.

    ANS: D PTS: 1 REF: Page 81

12. What command issued from the command prompt will show the route that a packet travels from the issuing computer to another computer?

    a. route
    b. tracert
    c. ipconfig
    d. arp

    ANS: B PTS: 1 REF: Page 98

13. What is the purpose of the default route?

    a. It serves as a guideline for how to configure routes.
    b. It's a route set by Microsoft so that all information comes to their servers first.
    c. It's where the router sends all packets with destinations of which it has no knowledge.
    d. None of the above

    ANS: C PTS: 1 REF: Page 95

14. A wireless access point is most like which other network device, in that all computers send signals through it to communicate with other computers?

    a. switch
    b. router
    c. hub
    d. modem

    ANS: C PTS: 1 REF: Page 77

15. When referring to network bandwidth, what is the basic unit of measurement?

a. bytes per second
b. bits per second
c. bandwidth per second
d. bytes per minute

ANS: B PTS: 1 REF: Page 64

16. Before a computer can transmit data on a wireless network in some cases, it must send What type of signal to the AP?

a. RTS
b. ARP
c. CTS
d. DNS

ANS: A PTS: 1 REF: Page 78

17. The SSID is configured on which of the following so that it can be distinguished from other available wireless networks?

a. router
b. access point
c. switch
d. repeater

ANS: B PTS: 1 REF: Page 84

18. What command would you issue from the command prompt to test whether your computer has connectivity to the network?

a. ping *IPaddress*
b. arp -d *IPaddress*
c. ipconfig *IPaddress*
d. ipconfig /all

ANS: A PTS: 1 REF: Page 73

MULTIPLE RESPONSE

1. Which of the following are features of a router? (Choose all that apply)

a. connects computers to the LAN
b. connects LANs to one another
c. works with MAC addresses
d. forwards broadcast packets
e. works with packets instead of frames

ANS: B, E PTS: 1 REF: Page 90

2. What type of indicator lights would you find on a hub?

a. network activity
b. link status
c. signal strength

d. uplink
e. collision

ANS: A, B, E PTS: 1 REF: Page 65

COMPLETION

1. The “Locally Administered Address” can be used to override the burned-in _____ address.

   ANS: MAC

   PTS: 1 REF: Page 88

2. In a computer’s IP address settings, the _____ gateway is the address of the router to which a computer sends all packets that are intended for networks outside of its own.

   ANS: default

   PTS: 1 REF: Page 96

3. A _____ frame is a message that is intended to be processed by all devices on the LAN.

   ANS: broadcast

   PTS: 1 REF: Page 81

4. The network _____ is a measurement of the amount of data that can pass through a network in a certain period of time.

   ANS: bandwidth

   PTS: 1 REF: Page 64

5. A switch operating in _____ mode can send and receive data at the same time.

   ANS: full-duplex

   PTS: 1 REF: Page 68

MATCHING

Match each item with a statement below:
a. switch
b. hub
c. half-duplex mode
d. router
e. bandwidth sharing
f. repeater
g. dedicated bandwidth

h. network interface card
i. access point
j. network bandwidth

1. device that uses MAC addresses to determine the destination of frame
2. device that connects LANs
3. device that connects a computer with the network medium
4. device that only regenerates incoming signals
5. communication in which a device can send and receive signals but not at the same time
6. device that connects wireless computers
7. device that connects multiple computers but regenerates signals out all ports
8. amount of data that can be transferred on a network
9. how devices connected to a hub use network bandwidth
10. how devices connected to a switch use network bandwidth

1. ANS: A PTS: 1 REF: Page 66
2. ANS: D PTS: 1 REF: Page 88
3. ANS: H PTS: 1 REF: Page 79
4. ANS: F PTS: 1 REF: Page 62
5. ANS: C PTS: 1 REF: Page 68
6. ANS: I PTS: 1 REF: Page 77
7. ANS: B PTS: 1 REF: Page 64
8. ANS: J PTS: 1 REF: Page 64
9. ANS: E PTS: 1 REF: Page 65
10. ANS: G PTS: 1 REF: Page 68

SHORT ANSWER

1. Why is the NIC considered the "gatekeeper"?

   ANS:
   The NIC's responsibility is to examine every frame that is received and either allow it access to the computer or reject it. In order for the frame to be accepted, the destination MAC address must match the NIC's MAC address, or it is refused. There are two exceptions to this rule. If the destination MAC address is a broadcast, then the NIC accepts it. If the NIC is put in promiscuous mode, then it will accept all frames.

   PTS: 1 REF: Page 81

2. What are the major differences between a hub and a switch?

   ANS:
   The major difference is that switches are intelligent. They examine each frame that they receive for the destination MAC address and then send the frame out the correct port for that address. A hub simply accepts a frame from one of its ports and then sends it out all ports. A switch also keeps a table of MAC addresses so that it knows where to send a frame. Because a switch can control where it sends a frame, devices that are connected to a switch can communicate at the same time, allowing each device to access the full network bandwidth. With a hub, only one device can transmit at a time so the bandwidth is shared among all connected devices. Also, because a switch controls the flow of frames, there is little chance of a collision. In a hub, collisions might occur frequently when under heavy use.

   PTS: 1 REF: Pages 66-69

3. List the steps that a switch performs for each frame.

   ANS:
   First, the switch receives a frame. It examines the frame for the source and destination MAC addresses. Then the switch looks up the destination MAC address in its switching table. In the switching table, the MAC address will be listed with the port number where the destination device can be found. The switch then will forward the frame out the appropriate port. The switch also updates its switching table with the source MAC address.

   PTS: 1 REF: Page 67

4. What is a broadcast frame?

   ANS:
   A broadcast frame is a frame that has a destination MAC address of all binary 1s, which in hexadecimal notation reads as FF-FF-FF-FF-FF-FF. Broadcast frames carry messages that are intended for all devices on a network. Broadcast frames are forwarded by hubs and switches but not by routers.

   PTS: 1 REF: Page 81

5. What is the difference between a switch and a router?

   ANS:
   Routers are used to connect LANs together. A switch is used to connect computers and other devices together to form a LAN. Routers are intelligent just like a switch, but routers deal with IP addresses instead of MAC addresses and packets instead of frames. Switches forward broadcast messages to all devices on a LAN, but routers separate LANs so they do not forward broadcast messages.

   PTS: 1 REF: Page 88-93

6. What does a router keep in its routing table?

   ANS:
   Each interface of a router is a connection to a different network. The router needs to keep a record of the networks that are attached to it so that it can forward the packets it receives to the correct network. So, a routing table consists of a list of what network is available via which interface.

   PTS: 1 REF: Page 93

7. What is the importance of a default route?

   ANS:
   When a router receives a packet, it looks at the destination IP address to determine where to send the packet. If the router has an entry for the network that the packet is intended for, then everything is fine, and it forwards the packet. However, if there is no entry in the routing table and no default route, then the router does not keep the packet; it simply discards it. If a default route is entered, then the router forwards the packet out the interface listed in the routing table so the packet is not discarded.

   PTS: 1 REF: Page 95

8. What is a default gateway?

ANS:
A computer on a LAN can communicate with other devices on the same LAN because a switch uses the computer's physical address. However, when a computer wants to communicate with a device on another network, it must send the packet to the router so the computer needs to know the address of the router. The address of the router is considered the default gateway. It is where all packets sent from the computer to destinations other than its own network are sent. This address is included in a computer's IP configuration.

PTS: 1 REF: Page 96

9. What are the major tasks that a NIC performs?

ANS:
A NIC, along with its driver, provides your computer with a connection to the network medium. When a NIC receives a packet from the network protocol, it encapsulates the packet with the source and destination in a new header and the CRC in a trailer. Then it converts the frame into bits and sends it to the network medium. When the NIC receives a message, it does the reverse, converts the bits into a frame. Then the NIC checks the destination MAC to make sure that it is the same as its own or a broadcast address. It then removes the header and trailer and sends the packet on up to the network protocol.

PTS: 1 REF: Page 79

10. What is the MAC address of a computer?

ANS:
The MAC address is a number that is burned into the memory of each NIC. It is a unique number assigned by the manufacturer. It is 48 bits and is usually expressed in six two-digit hexadecimal numbers. The first 24 bits are an ID number for the manufacturer, called the OUI, and the last 24 bits are a serial number assigned by the manufacturer.

PTS: 1 REF: Pages 80-81