Network Essentials Review 5

Name _____

1. Ethernet is a protocol. It allows data transmission between devices in a computer network.

2. It is one of the most widely used LAN technologies. It operates in the data link layer and the physical layer. It is part of family of networking technologies that are defined in the IEEE 802.2 and 802.3 standards . It supports data bandwidths of 10, 100, 1000, 10,000, 40,000, and 100,000 Mbps (100 Gbps).

3. The Data Link Layer (DLL) has two sublayers. The upper layer, Logical Link Control, communicates with the Network Layer. The Media Access Control sublayer communicates with the Physical Layer.

4. The Logical link Control (LLC) sublayer of the Data Link Layer handles communication with the Network layer. It takes the network protocol data and adds control information to help deliver the packet to the destination.

MAC Layer

5. The Media Access Control Layer carries out data encapsulation,

6. Its three primary functions are:
frame delimiting, addressing and error detection. It controls frame placement and performs media recovery.

7. Frame delimiting identifies a group of bits that make up a frame.

8. Addressing refers to adding a Ethernet header to a frame. This header contains a MAC address. The frame will be sent to this address.

9. Each Ethernet frame also has a trailer, which contains a cyclic redundancy check (CRC) used for error detection.

10. When a PDU (protocol data unit) is received from the Network Layer, MAC layer adds a header and a trailer to it.

11. Frames are assembled before transmission from source device

12. Data are transmitted using Ethernet frames, and disassembled upon reception by destination device.

13. This layer places frames on a media, and also removes frames from a media.

14. This layer controls how nodes share access using Carrier Sense Multiple Access (CSMA) technology.

15. CSMA

a. CSMA is used in a multiple access method network, where devices share a common transmitting channel

b. A carrier signal is present when a device/node is sending data

c. a device/node can send data only when it senses that there is no carrier signal in the channel

d. data are transmitted only when the transmitting channel is 'idle';

e. there are risks of data collision; there are two methods used to resolve data collision
   - CMSA/Collision Detection (CSMA/CD)
   - CSMA/Collision Avoidance (CSMA/CA)

16. CSMA/Collision Detection

a. Device/node monitors media (cables/wireless) for presence of carrier signal.

b. If carrier signal is present, device waits. If carrier signal is absent, device transmits data.

c. Ethernet networks are designed with CSMA/CD technology.

17. CSMA/Collision Avoidance

a. device examines media for presence of carrier signal.

b. if there is none, device sends a notification of its intent to use the carrier signal, and send its data.

c. 802.11 wireless networking uses this method.

18. MAC Address

a. MAC stands for Media Access Control.

b. Devices like servers, printers, switches and routers have MAC addresses assigned to them. This address is fixed for each hardware. It is also known as the physical address.

c. Layer 2 ethernet MAC address is a 48-bit binary value, expressed as 12 hexadecimal digits, eg,

   00-05-9A-3C-78-00 , 00:05:9A:3C:78:00

d. OUI stands for Organizationally Unique Identifier.

e. The header of a frame contains the source and destination MAC address.

f. NIC stands for Network Interface Card.

g. Each NIC views information to see if the destination MAC address in the frame matches the device's physical MAC address stored in RAM. If there is no match found, the device discards the frame. If a match for the destination MAC of the frame is found, the NIC passes the frame up the OSI layers, where the de-encapsulation process takes place.

h. Ethernet II and IEEE 802.3 standards define the minimum frame size as 64 bytes and the maximum as 1518 bytes. 1 byte is 8 bits. Frames that are Less than 64 bytes in length is considered a "collision fragment" or "runt frame" . If size of a frame is outside the 64 – 1518 bytes range, the receiving device drops the frame.

i.

There are 3 ways of representing MAC Addresses.	DASHES	00-60-2F-3A-07-BC
	COLON	00:60:2F:3A:07:BC
	PERIOD	0060.2F3A.07BC

j. Information stored in an ethernet frame depends on the delivery option, namely, Unicast , Multicast , Broadcast.

k. A unicast frame contains one MAC address.
   A broadcast frame contains the destination MAC address and IP.
   A multicast frame contains the destination MAC address, source IP, destination IP, and user data.

19. IP Address

a. This is not fixed for a device, and is also known as the logical address.

b. It is assigned by a network administrator.

20. Both the MAC address and and IP address are required for a device to communicate with other devices. A switch reads the MAC address of an Ethernet frame and sends the frame to its destination. A router reads the IP address/addresses of an Ethernet frame, and sends the frame to the destination IP address.

-