Chapter 2: How LAN and WAN Communications Work

TRUE/FALSE

1. Analog signals are the basis of the most common signaling method used on LANs and high-speed WANs.

   ANS: F   PTS: 1   REF: 45

2. In a connectionless service, there is no acknowledgment that a frame has been received.

   ANS: T   PTS: 1   REF: 51

3. The Ethernet protocol permits only one node to transmit at a time.

   ANS: T   PTS: 1   REF: 65

4. Class A nodes in FDDI networks are servers or workstations.

   ANS: F   PTS: 1   REF: 70

5. The smallest T-carrier service is T-1, offering 1.544 Mbps bandwidth.

   ANS: T   PTS: 1   REF: 72

MULTIPLE CHOICE

1. The OSI model consists of _____ distinct layers stacked on one another.
   a. two   c. five
   b. three   d. seven

   ANS: D   PTS: 1   REF: 43

2. A(n)_____ signal can vary continuously, as in a wave pattern with positive and negative voltage levels.
   a. discrete   c. digital
   b. analog   d. binary

   ANS: B   PTS: 1   REF: 45

3. One task of the _____ layer in a LAN is to handle error detection using a CRC.
   a. Network   c. Data Link
   b. Transport   d. Physical

   ANS: C   PTS: 1   REF: 47

4. Which layer can route data on different paths by creating virtual circuits?
   a. Physical   c. Network
   b. Data Link   d. Transport

   ANS: C   PTS: 1   REF: 52

5. Which layer provides flow control and ensures data reliability from source to destination?
   a. Physical   c. Network

b. Data Link   d. Transport

ANS: D   PTS: 1   REF: 52

6. Which layer is responsible for establishing and maintaining the communications link between nodes?
   a. Layer 2   c. Layer 4
   b. Layer 3   d. Layer 5

ANS: D   PTS: 1   REF: 53

7. Two-way alternate (TWA) mode for dialog control is used in _____ communications.
   a. simplex   c. half duplex
   b. complex   d. full duplex

ANS: C   PTS: 1   REF: 54

8. _____ is a process that scrambles the data so that it cannot be read if intercepted by unauthorized users.
   a. Encryption   c. Deciphering
   b. Decryption   d. Decoding

ANS: A   PTS: 1   REF: 54

9. Which layer governs a user's access to network services?
   a. Presentation   c. Session
   b. Application   d. Transport

ANS: B   PTS: 1   REF: 57

10. The term _____ refers to wrapping the information in one layer inside the information within the next layer.
    a. encase   c. encapsulate
    b. enclose   d. envelope

ANS: C   PTS: 1   REF: 61

11. Information from one layer is transferred to the next by means of commands called _____.
    a. primitives   c. primaries
    b. pointers   d. messages

ANS: A   PTS: 1   REF: 61

12. The information from one layer that is transferred to the next is called which of the following?
    a. PDU   c. bit
    b. packet   d. peer

ANS: A   PTS: 1   REF: 61

13. The _____ field in an Ethernet frame synchronizes frame transmission and consists of an alternating pattern of zeroes and ones.
    a. data and pad   c. start of frame delimiter (SOF)
    b. frame check sequence (FCS)   d. preamble

ANS: D   PTS: 1   REF: 65

14. Which of the following is NOT a field in an Ethernet frame?
    a. Destination address   c. port
    b. Length   d. FCS

ANS: C   PTS: 1   REF: 66

15. The token ring transport method uses a physical ____ topology along with the logic of a ring topology.
    a. bus   c. mesh
    b. star   d. grid

    ANS: B   PTS: 1   REF: 68

16. Which of the following is an address associated with a NIC?
    a. IP   c. session
    b. port   d. MAC

    ANS: D   PTS: 1   REF: 65

17. If no broadcasts are detected from the active monitor or any one of the standby monitors, a ring goes into a ____ condition.
    a. signaling   c. messaging
    b. beaconing   d. broadcasting

    ANS: B   PTS: 1   REF: 69

18. ____ communications in FDDI networks are used for time-sensitive transmissions requiring continuous transmission.
    a. Synchronous   c. Modulated
    b. Asynchronous   d. Amplified

    ANS: A   PTS: 1   REF: 69

19. A(n) ____ line is a dedicated telephone line that can be used for data communications to connect two different locations for continuous point-to-point communications.
    a. DSL   c. T-carrier
    b. LATA   d. IXC

    ANS: C   PTS: 1   REF: 71

MULTIPLE RESPONSE

1. Which of the following are common switching techniques used in WANs? (Choose all that apply.)
   a. Packet switching   c. Port multi-access
   b. Circuit switching   d. TDMA

   ANS: A, B, D   PTS: 1   REF: 77

2. Which of the following are 4G wireless network technologies? (Choose all that apply.)
   a. CDMA 2000   c. EDGE
   b. 3GPP LTE   d. WiMax

   ANS: B, D   PTS: 1   REF: 77

3. Which of the following are components of a Cable TV WAN? (Choose all that apply.)
   a. headend   c. distribution point
   b. trunk line   d. 56K analog modem

   ANS: A, B, C   PTS: 1   REF: 73

4. Which of the following are Ethernet transmission rates? (Choose all that apply.)
   a. 100 Mbps
   b. 40 Mbps
   c. 40 Gbps
   d. 100 Kbps

   ANS: A, C   PTS: 1   REF: 64

COMPLETION

1. LAN and WAN communications have been generally guided by a network communications model called the _____ reference model.

   ANS:
   Open Systems Interconnection
   OSI
   Open Systems Interconnection (OSI)
   OSI (Open Systems Interconnection)

   PTS: 1   REF: 42

2. The _____ layer of the OSI model controls the passage of packets along routes on the network.

   ANS: Network

   PTS: 1   REF: 51

3. The Microsoft Windows _____ is a service that makes one computer visible to another for access through the network.

   ANS: redirector

   PTS: 1   REF: 57

4. _____ is the part of the CSMA/CD media access method in which a node listens for packet traffic before sending data. (Please do not abbreviate the answer.)

   ANS: Carrier sense

   PTS: 1   REF: 65

5. The _____ switching technique divides channels into distinct time slots.

   ANS:
   Time Division Multiple Access
   TDMA
   Time Division Multiple Access (TDMA)
   TDMA (Time Division Multiple Access)

   PTS: 1   REF: 77

MATCHING

Match each term with the correct statement below.

a. Transport
b. peer protocols
c. digital signal
d. Physical
e. Service access point (SAP)

f. frame
g. packet radio
h. multistation access unit (MAU)
i. Network

1. uses distinct voltages to generate binary ones or zeroes.
2. discrete unit of data containing control and address information corresponding to OSI Data Link layer.
3. the OSI model layer that is responsible for tracking ports or sockets
4. the OSI model layer where packets are forwarded
5. enable an OSI layer on a sending node to communicate with the same layer on the receiving node.
6. enables Network layer to determine which network process at the destination should accept a frame.
7. a specialized hub that ensures
    the packet is transmitted around the ring of computers.
8. form of wireless WAN communication that takes place at very high radio frequencies.
9. the OSI model layer which involves network connectors and media

1. ANS: C   PTS: 1   REF: 45
2. ANS: F   PTS: 1   REF: 47
3. ANS: A   PTS: 1   REF: 52
4. ANS: I   PTS: 1   REF: 51
5. ANS: B   PTS: 1   REF: 61
6. ANS: E   PTS: 1   REF: 67
7. ANS: H   PTS: 1   REF: 68
8. ANS: G   PTS: 1   REF: 74
9. ANS: D   PTS: 1   REF: 44

SHORT ANSWER

1. Describe the function of the Network layer of the OSI model.

    ANS:
    The Network layer controls the passage of packets along routes on the network.   The Network layer reads packet protocol address information and forwards each packet along the most expedient route, physical and logical, for efficient transmission. This layer also permits packets to be sent from one network to another, through routers.

    PTS: 1   REF: 51

2. What are electromagnetic interference (EMI) and radio frequency interference (RFI)?

    ANS:
    Electromagnetic interference (EMI) and radio frequency interference (RFI) are two sources of Physical layer interference.EMI is caused by magnetic force fields that are generated by electrical devices such as fans, elevator motors, portable heaters, and air-conditioning units. RFI is caused by electrical devices that emit radio waves at the same frequency used by network signal transmissions. These transmissions include cable TV components, radio and television stations, nearby amateur radio operators, ballast devices in fluorescent lights, inexpensively built computer or TV equipment, and CB radios.

    PTS: 1   REF: 46

3. What is the role of the media access control (MAC) sublayer of the Data Link layer?

ANS:
The MAC sublayer examines the physical address or device address—sometimes called the MAC address—information contained in each frame.For example, the MAC sublayer on a workstation examines each frame received by the workstation and sends the frame to the next higher layer, if the address matches. The frame is discarded if the address is not a match. The MAC sublayer also regulates how multiple devices share communications on the same network.

PTS: 1   REF: 48

4. Explain how the Transport layer uses several reliability measures.

ANS:
The Transport layer use several reliability measures.   Class 0 is the simplest protocol. It performs no error checking or flow control and relies on the Network layer to perform these functions. Class 1 protocol monitors for packet transmission errors, and if an error is detected, it notifies the sending node's Transport layer to resend the packet. Class 2 protocol monitors for transmission errors and provides flow control between the Transport layer and the Session layer. Flow control ensures that one device does not send information faster than can be received by the network or by the receiving device. Class 3 protocol provides the functions of Classes 1 and 2 along with the option to recover lost packets in certain situations. Finally, Class 4 protocol performs the same functions as Class 3, along with more extensive error monitoring and recovery.

PTS: 1   REF: 52

5. Describe the relationship between the service data unit (SDU) and protocol data unit (PDU).

ANS:
At each OSI layer,an SDU is encapsulated with control and transfer information to form a PDU. After the PDU is formed at a particular layer on computer A, for instance, it is then sent to the same layer on computer B. Also, if the layered communications are going down the stack on computer A, for example, then the PDU is sent to the next lower layer in the stack. The control and transfer information is stripped out of the PDU to leave only the SDU. That layer then adds control and transfer information.

PTS: 1   REF: 62

6. What is a Request for Comment (RFC)?

ANS:
An RFC is a document prepared and distributed by any individual or group as a way to further networking, Internet, and computer communications. RFCs help ensure that network standards and conventions are provided so one network can talk to another. Every RFC is assigned a number to distinguish it from other RFCs and to provide a way to track it. Older RFCs are sometimes clarified, built upon, or replaced by newer ones. RFCs build cooperation in a community of equals and play a significant role in advancing network technologies.

PTS: 1   REF: 63

7. Define and describe the media access control method used by Ethernet.

ANS:

Ethernet uses a control method known as Carrier Sense Multiple Access with Collision Detection (CSMA/CD).   All nodes that wish to transmit a frame on the cable are in contention with one another. No single node has priority over another node. The nodes listen for any packet traffic on the cable. If a packet is detected, the nonsending nodes go into "defer" mode.   The Ethernet protocol permits only one node to transmit at a time. Transmission is accomplished by sending a carrier signal. Carrier sense is the process of checking communication media for a specific voltage level indicating the presence of a data-carrying signal. When no signal traffic is detected on the communications medium for a given amount of time, any node is eligible to transmit.   Occasionally, more than one node transmits at the same time, which results in a collision.   A transmitting node uses the collision detection software algorithm to recover from packet collisions. This algorithm causes the stations that have transmitted to continue their transmission for a designated time. The continued transmission is a jam signal of all binary ones that enables all listening nodes to determine that a collision has occurred. The software at each node then generates a random number, which is used as the amount of time to wait until transmitting. This ensures that no two nodes attempt to transmit again at the same time.

PTS: 1   REF: 65

8. Compare and contrast FDDI to the token ring access method.

ANS:
FDDI is similar to the token ring access method because it uses token passing for network communications. It differs from standard token ring in that it uses a timed token access method. An FDDI token travels along the network ring from node to node. If a node does not need to transmit data, it picks up the token and sends it to the next node. If the node possessing the token does need to transmit, it can send as many frames as desired for a fixed amount of time, called the target token rotation time (TTRT). Because FDDI uses a timed token method, it is possible for several frames from several nodes to be on the network at a given time, providing high-capacity communications.

PTS: 1   REF: 69

9. Describe the role of the headend in the star topology of a Cable TV WAN.

ANS:
The focal point in the star is the headend, which is the central receiving point for signals from various sources, including satellite, other major cable sources, and local television sources. The headend is a grouping of antennas, cable connections, microwave towers, and satellite dishes, and it distills all incoming signal sources and transfers them to remote distribution centers through trunk lines.

PTS: 1   REF: 73

10. Describe the packet switching WAN transmission method.

ANS:
Packet switching is a combination of circuit and message switching. It establishes a dedicated circuit between the two transmitting nodes, but the circuit is a logical connection and not a physical one. Although there may be several different physical routes used during the session,
each node is aware of only a single, dedicated channel. The advantage of this technique is that the best route can be established for the type and amount of data sent, thus creating an opportunity for high-speed transmissions. Packet switching works like a periscope, which supplies an image that travels from point to point along a nonlinear path.

PTS: 1   REF: 78