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AN AUTONOMOUS INSTITUTION

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai

DATA LINK LAYER

1. **What is the primary function of the Data Link Layer?**
   - A) Routing of packets
   - B) Establishing, maintaining, and terminating connections
   - C) Framing and error detection
   - D) Data encryption

   Answer: C) Framing and error detection

2. **Which OSI layer is responsible for data link control and network interface functions?**
   - A) Application Layer
   - B) Transport Layer
   - C) Data Link Layer
   - D) Physical Layer

   Answer: C) Data Link Layer

3. **What type of addressing does the Data Link Layer use?**
   - A) IP addressing
   - B) MAC addressing
   - C) Port addressing
   - D) Logical addressing

   Answer: B) MAC addressing

4. **Which of the following protocols operates at the Data Link Layer?**
   - A) IP
   - B) TCP
   - C) Ethernet
   - D) HTTP

   Answer: C) Ethernet

5. **What is a frame in the context of the Data Link Layer?**
   - A) A unit of data at the Network Layer
   - B) A unit of data at the Transport Layer
   - C) A unit of data at the Data Link Layer

- D) A unit of data at the Application Layer

Answer: C) A unit of data at the Data Link Layer

Frame Structure

6. **Which field in an Ethernet frame identifies the sender's MAC address?**
   - A) Destination MAC Address
   - B) Source MAC Address
   - C) EtherType
   - D) Data

   Answer: B) Source MAC Address

7. **In an Ethernet frame, what does the EtherType field indicate?**
   - A) The size of the frame
   - B) The destination MAC address
   - C) The type of payload data
   - D) The frame check sequence

   Answer: C) The type of payload data

8. **What is the purpose of the Frame Check Sequence (FCS) in an Ethernet frame?**
   - A) To provide encryption
   - B) To verify frame integrity
   - C) To identify the frame's source
   - D) To control data flow

   Answer: B) To verify frame integrity

9. **Which of the following fields is used for error detection in Ethernet frames?**
   - A) Frame Check Sequence (FCS)
   - B) Source MAC Address
   - C) Destination MAC Address
   - D) EtherType

   Answer: A) Frame Check Sequence (FCS)

10. **What is the maximum frame size for an Ethernet frame, including the header and trailer?**
    - A) 128 bytes
    - B) 512 bytes
    - C) 1518 bytes
    - D) 4096 bytes

    Answer: C) 1518 bytes

Protocols and Technologies

11. **Which protocol is used for error handling and flow control in the Data Link Layer?**
    - A) IP
    - B) ARP
    - C) PPP
    - D) HTTP

    Answer: C) PPP

12. **What is the main function of the Address Resolution Protocol (ARP)?**
    - A) Mapping IP addresses to MAC addresses
    - B) Routing packets to their destination
    - C) Error detection in frames
    - D) Fragmentation of packets

    Answer: A) Mapping IP addresses to MAC addresses

13. **Which layer of the OSI model uses the Point-to-Point Protocol (PPP)?**
    - A) Application Layer
    - B) Transport Layer
    - C) Data Link Layer
    - D) Network Layer

    Answer: C) Data Link Layer

14. **What type of network topology uses the Data Link Layer for collision detection and avoidance?**
    - A) Star topology
    - B) Ring topology
    - C) Bus topology
    - D) Mesh topology

    Answer: C) Bus topology

15. **Which technology is used to create a virtual local area network (VLAN)?**
    - A) Ethernet
    - B) Wi-Fi
    - C) MPLS
    - D) ATM

    Answer: A) Ethernet

Error Detection and Correction

16. **Which method is used for error detection at the Data Link Layer?**

- A) Checksums
- B) CRC (Cyclic Redundancy Check)
- C) Encryption
- D) Compression

Answer: B) CRC (Cyclic Redundancy Check)

17. **What does CRC stand for in the context of Data Link Layer error checking?**
    - A) Cyclic Redundancy Check
    - B) Coded Redundancy Check
    - C) Cyclic Repetition Check
    - D) Controlled Redundancy Check

    Answer: A) Cyclic Redundancy Check

18. **What happens if a frame fails the CRC check?**
    - A) The frame is forwarded to the next device
    - B) The frame is discarded
    - C) The frame is encrypted
    - D) The frame is compressed

    Answer: B) The frame is discarded

19. **Which technique is used to avoid collisions in Ethernet networks?**
    - A) CSMA/CD (Carrier Sense Multiple Access with Collision Detection)
    - B) CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance)
    - C) Token Passing
    - D) Frequency Division Multiplexing

    Answer: A) CSMA/CD (Carrier Sense Multiple Access with Collision Detection)

20. **In Ethernet networks, what is the purpose of a backoff algorithm?**
    - A) To ensure data integrity
    - B) To manage bandwidth allocation
    - C) To handle collisions and retry transmission
    - D) To encrypt data

    Answer: C) To handle collisions and retry transmission

Switching and MAC Addressing

21. **What is the primary function of a network switch at the Data Link Layer?**
    - A) To route packets between networks
    - B) To provide network access control
    - C) To filter and forward frames based on MAC addresses
    - D) To manage network congestion

Answer: C) To filter and forward frames based on MAC addresses

22. **How does a switch learn MAC addresses?**
    - A) Through ARP requests
    - B) By inspecting incoming frames and building a MAC address table
    - C) By querying DNS servers
    - D) Through routing tables

Answer: B) By inspecting incoming frames and building a MAC address table

23. **What is a MAC address?**
    - A) A unique identifier for network devices at Layer 2
    - B) An IP address assigned to a device
    - C) A protocol used for routing
    - D) A security mechanism for network devices

Answer: A) A unique identifier for network devices at Layer 2

24. **Which address is used by switches to determine how to forward frames?**
    - A) IP address
    - B) Port number
    - C) MAC address
    - D) VLAN ID

Answer: C) MAC address

25. **What is the purpose of VLAN tagging in Ethernet frames?**
    - A) To encrypt frame data
    - B) To identify and segregate different VLANs
    - C) To compress frame size
    - D) To increase frame size

Answer: B) To identify and segregate different VLANs

Protocols and Encapsulation

26. **What does the acronym IEEE stand for in the context of networking standards?**
    - A) International Electrical and Electronic Engineers
    - B) Institute of Electrical and Electronics Engineers
    - C) International Engineering and Electrical Experts
    - D) Institute of Electrical and Electronic Engineers

Answer: B) Institute of Electrical and Electronics Engineers

27. **Which IEEE standard defines Ethernet for wired LANs?**
    - A) 802.11

- B) 802.3
- C) 802.5
- D) 802.15

Answer: B) 802.3

28. **What does the term "encapsulation" refer to in the Data Link Layer?**
    - A) Encrypting data packets
    - B) Wrapping data with a frame for transmission
    - C) Compressing data packets
    - D) Routing data across networks

    Answer: B) Wrapping data with a frame for transmission

29. **Which protocol is used to encapsulate multiple Layer 2 frames into a single Layer 3 packet?**
    - A) IP
    - B) PPP
    - C) ARP
    - D) HTTP

    Answer: B) PPP

30. **What is the main function of the Point-to-Point Protocol (PPP) at the Data Link Layer?**
    - A) To provide routing capabilities
    - B) To handle error correction and framing
    - C) To encapsulate Layer 3 packets for transmission
    - D) To manage network traffic

    Answer: C) To encapsulate Layer 3 packets for transmission

Media Access Control and Topologies

31. **Which method is used to prevent collisions in a shared network medium?**
    - A) Token Passing
    - B) Frequency Hopping
    - C) Time Division Multiplexing
    - D) Cyclic Redundancy Check

    Answer: A) Token Passing

32. **What is the primary characteristic of a Token Ring network topology?**
    - A) Devices are connected in a linear fashion
    - B) Each device has a unique token for sending data
    - C) Devices are connected in a star configuration

- D) Devices use a shared bus for communication

Answer: B) Each device has a unique token for sending data

33. **In a star topology, what is the role of the central hub or switch?**
    - A) To manage data collisions
    - B) To route packets to different networks
    - C) To connect all devices and facilitate communication
    - D) To encrypt data transmitted across the network

    Answer: C) To connect all devices and facilitate communication

34. **Which technology uses Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA)?**
    - A) Ethernet
    - B) Wi-Fi
    - C) PPP
    - D) ATM

    Answer: B) Wi-Fi

35. **What is the main difference between CSMA/CD and CSMA/CA?**
    - A) CSMA/CD is used in wired networks, while CSMA/CA is used in wireless networks
    - B) CSMA/CA is used for error detection, while CSMA/CD is used for collision avoidance
    - C) CSMA/CD is used in token-based networks, while CSMA/CA is used in Ethernet networks
    - D) There is no significant difference

    Answer: A) CSMA/CD is used in wired networks, while CSMA/CA is used in wireless networks

Addressing and Routing

36. **What is the purpose of the MAC address table in a network switch?**
    - A) To route packets between different networks
    - B) To store IP addresses of devices
    - C) To map MAC addresses to switch ports
    - D) To handle encryption and decryption

    Answer: C) To map MAC addresses to switch ports

37. **How does a switch handle a frame destined for an unknown MAC address?**
    - A) It drops the frame
    - B) It broadcasts the frame to all ports

- C) It forwards the frame to a default gateway
- D) It encrypts the frame

Answer: B) It broadcasts the frame to all ports

38. **What is a broadcast frame in Ethernet networks?**
    - A) A frame sent to a specific MAC address
    - B) A frame sent to all devices on the network
    - C) A frame containing encrypted data
    - D) A frame with a larger payload

    Answer: B) A frame sent to all devices on the network

39. **Which type of address is used to identify a device on a network segment uniquely?**
    - A) IP address
    - B) MAC address
    - C) Port number
    - D) VLAN ID

    Answer: B) MAC address

40. **What does VLAN stand for?**
    - A) Virtual Local Area Network
    - B) Very Large Area Network
    - C) Variable Local Area Network
    - D) Virtualized Large Network

    Answer: A) Virtual Local Area Network

Security and Management

41. **What is the purpose of the Spanning Tree Protocol (STP) in Ethernet networks?**
    - A) To detect and prevent network loops
    - B) To encrypt data frames
    - C) To manage VLANs
    - D) To handle routing between different networks

    Answer: A) To detect and prevent network loops

42. **Which protocol is used for managing network devices and monitoring their performance at the Data Link Layer?**
    - A) SNMP (Simple Network Management Protocol)
    - B) ICMP (Internet Control Message Protocol)
    - C) HTTP (Hypertext Transfer Protocol)
    - D) FTP (File Transfer Protocol)

Answer: A) SNMP (Simple Network Management Protocol)

43. **What is port security in the context of network switches?**
    - A) A method for controlling physical access to switch ports
    - B) A technique for preventing unauthorized MAC addresses from connecting to switch ports
    - C) A protocol for encrypting switch port data
    - D) A method for routing data between different ports

    Answer: B) A technique for preventing unauthorized MAC addresses from connecting to switch ports

44. **What does MAC address spoofing involve?**
    - A) Changing a device's IP address
    - B) Altering a device's MAC address to impersonate another device
    - C) Encrypting MAC address data
    - D) Redirecting network traffic

    Answer: B) Altering a device's MAC address to impersonate another device

45. **What is the primary goal of network segmentation using VLANs?**
    - A) To increase network speed
    - B) To enhance security and reduce broadcast domains
    - C) To simplify network configuration
    - D) To eliminate network congestion

    Answer: B) To enhance security and reduce broadcast domains

Advanced Topics

46. **What is a trunk port in the context of VLANs?**
    - A) A port that carries traffic for multiple VLANs
    - B) A port that connects to external networks
    - C) A port used for network management
    - D) A port that only carries traffic for one VLAN

    Answer: A) A port that carries traffic for multiple VLANs

47. **What is the purpose of a frame relay in Data Link Layer networking?**
    - A) To provide a protocol for handling network congestion
    - B) To offer a method for high-speed data transmission
    - C) To manage VLAN traffic
    - D) To handle error correction in Ethernet frames

    Answer: B) To offer a method for high-speed data transmission

48. **In which scenario would you use the Link Aggregation Control Protocol (LACP)?**
    - A) To increase bandwidth by combining multiple network links
    - B) To encrypt data frames
    - C) To manage VLANs
    - D) To handle error detection

    Answer: A) To increase bandwidth by combining multiple network links

49. **What is the purpose of a MAC address filter?**
    - A) To encrypt data for secure transmission
    - B) To control access based on device MAC addresses
    - C) To manage IP address allocation
    - D) To route packets between different networks

    Answer: B) To control access based on device MAC addresses

50. **Which standard specifies the operation of Gigabit Ethernet?**
    - A) 802.3af
    - B) 802.3az
    - C) 802.3z
    - D) 802.3ae

    Answer: C) 802.3z