ADDRESSING IN NETWORK INTERVIEW QUESTIONS

1.What is data transmission in networking?

Answer: Data transmission is the process of sending digital or analog data over a communication channel from one device to another.

2.Differentiate between simplex, half-duplex, and full-duplex transmission.

Answer: In simplex transmission, data flows in only one direction. In half-duplex, data can flow in both directions, but not simultaneously. In full-duplex, data can flow in both directions simultaneously.

3.Explain the OSI model and its layers.

Answer: The OSI (Open Systems Interconnection) model is a conceptual framework that standardizes the functions of a telecommunication or computing system into seven abstraction layers, from physical to application layer.

4.What are the responsibilities of the physical layer in the OSI model?

Answer: The physical layer is responsible for transmitting raw data bits over a physical medium. It deals with the electrical, mechanical, and procedural characteristics of the interface and transmission medium.

5.Discuss the techniques used for physical layer implementation.

Answer: Physical layer implementation involves modulation techniques like amplitude modulation (AM), frequency modulation (FM), and phase modulation (PM) for analog signals, and techniques like Manchester encoding, differential Manchester encoding, and NRZ encoding for digital signals.

6.What is a MAC Address?

Answer: A MAC (Media Access Control) address is a unique identifier assigned to network interfaces for communications on the physical network segment.

7.How long is a MAC address?

Answer: A MAC address is 48 bits long, typically represented as 12 hexadecimal digits.

8.Explain the significance of MAC addresses in networking.

Answer: MAC addresses are used for uniquely identifying devices in a network at the data link layer. They ensure that data packets are delivered to the correct destination.

9.How is a MAC address assigned to a network interface?

Answer: MAC addresses are usually burned into the network interface hardware during manufacturing, though some interfaces allow for the modification of the MAC address through software.

10.Differentiate between MAC address and IP address.

Answer: A MAC address is a hardware address assigned to a network interface for communication on the local network, while an IP address is a logical address assigned to devices for communication across networks.

11.What is ARP (Address Resolution Protocol)?

Answer: ARP is a protocol used for mapping an IP address to a MAC address within a local network segment.

12.Explain the process of ARP resolution.

Answer: When a device needs to send data to another device on the same network, it broadcasts an ARP request containing the target IP address. The device with the corresponding IP address responds with its MAC address.

13.What is Ethernet?

Answer: Ethernet is a family of computer networking technologies commonly used in local area networks (LANs) for wired connections.

14.Discuss the Ethernet frame structure.

Answer: An Ethernet frame consists of a preamble, start frame delimiter, destination MAC address, source MAC address, EtherType or Length field, data payload, and Frame Check Sequence (FCS).

15.What is the purpose of the Frame Check Sequence (FCS) in an Ethernet frame?

Answer: The FCS is used for error detection in Ethernet frames. It contains a checksum computed over the frame's data payload and is used to verify the integrity of the received data.

16.Explain the concept of collision detection in Ethernet networks.

Answer: Collision detection is a process used in Ethernet networks to detect when two or more devices transmit data simultaneously, resulting in a collision. When a collision is detected, devices follow a backoff algorithm to retransmit data after a random time interval.

17.What is CSMA/CD (Carrier Sense Multiple Access with Collision Detection)?

Answer: CSMA/CD is a protocol used in Ethernet networks to regulate access to the network medium. Before transmitting data, devices listen for the presence of a carrier signal. If no signal is detected, the device begins transmission. If a collision is detected, the device stops transmitting and initiates a collision resolution process.

18.Discuss the role of the data link layer in the OSI model.

Answer: The data link layer is responsible for the reliable transmission of data frames between nodes over a physical medium. It handles framing, error detection, and flow control.

19.What are the common protocols operating at the data link layer?

Answer: Common data link layer protocols include Ethernet, Point-to-Point Protocol (PPP), High-Level Data Link Control (HDLC), and IEEE 802.11 (Wi-Fi).

20.How does a switch differ from a hub in terms of data transmission?

Answer: A switch operates at the data link layer and forwards data frames only to the intended recipient based on MAC addresses, while a hub operates at the physical layer and broadcasts data to all connected devices. Switches offer better performance and security compared to hubs.