Chirag Panchal Module 7 Network fundamentals •

Advance Question

1. **Explain Network Topologies**

**ANS- Network topologies common types include bus, star, ring, mesh, tree, and hybrid, each with distinct advantages and disadvantages**

1. **Explain TCP/IP Networking Model**

**ANS- The TCP/IP networking model of four layers—Application, Transport, Internet, and Link—providing a standardized framework for communication on the internet with protocols like HTTP, TCP, IP, and Ethernet**

1. **Explain LAN and WAN Network**

**ANS- LAN (Local Area Network) is a network confined to a limited geographic area, typically within a building, while WAN (Wide Area Network) covers a broader geographical scope, connecting multiple LANs across cities or countries**

1. **Explain Operation of Switch**

**ANS- A switch operates by intelligently forwarding network traffic based on the destination MAC address, enhancing network efficiency by creating point-to-point connections between devices in the same network**

1. **Describe the purpose and functions of various network devices**

**ANS- \*Router Directs data between different networks**

**\*Switch Efficiently forwards data within a local network based on MAC addresses**

**\*Hub Broadcasts data to all devices in a network**

**\*Firewall Monitors and controls incoming Access point Connects wireless devices to a wired network**

**\* Brige Connects two similar network segments**

1. **Make list of the appropriate media, cables, ports, and connectors to connect switches t**

**ANS- Media Ethernet cables media Ethernet cables Ethernet ports (RJ-45) on the switches connectors RJ-45 connectors for Ethernet cables**

1. **Define Network devices and hosts**

**ANS- Network devices are hardware components that enable communication and include routers, switches, hubs, and gateways, while hosts are end devices such as computers and printers connected to a network**

1. **What are Ethernet Standard (802.3) and Frame Formats**

**ANS- Ethernet Standard (802.3) is a set of protocols and standards defining wired network communication, and its frame format specifies the structure of data packets for Ethernet networks**

• Intermediate Question

1. **Comparison between UTP, MM and SM Ethernet Cabling**

**ANS- UTP (Unshielded Twisted Pair) is cost-effective and commonly used for short-distance connections, MM (Multimode) is suitable for moderate distances with higher bandwidth, while SM (Single Mode) provides long-distance, high-bandwidth communication in fiber optic Ethernet cabling**

1. **Make Cross cable**

**ANS- To make a cross cable, swap the positions of the wires at one end using the T568A or T568B wiring standard**

1. **Make Straight-Through Cable**

**ANS- To make a straight-through cable, use the same wiring standard (T568A or T568B) on both ends, ensuring corresponding wire positions match**

1. **Differentiate between LAN/WAN operation and features**

**ANS- LANs (Local Area Networks) operate within a limited geographic area, offering high data transfer rates and low latency, while WANs (Wide Area Networks) cover larger distances, connecting LANs across cities or countries, with slower data rates and higher latency due to extended transmission paths**

1. **Explain ARP, ICMP and Domain name**

**ANS- ARP (Address Resolution Protocol): Resolves IP addresses to MAC addresses in a local network**

**ICMP (Internet Control Message Protocol): Manages error messages and network diagnostics in IP networks**

**Domain Name: A human-readable name associated with an IP address, facilitating user-friendly identification of resources on the internet**

1. **Describe the components required for network and Internet communications**

**ANS- Components required for network and Internet communications include devices (e.g., computers, routers), communication protocols (e.g., TCP/IP), and physical mediums (e.g., cables, wireless signals)**

1. **Explain Encapsulation and DE capsulation in OSI Reference mode**

**ANS- Encapsulation involves adding protocol-specific headers to data as it moves down the OSI layers, while decapsulation removes these headers as data moves up, ensuring proper communication between network devices**

1. **Explain network segmentation and basic traffic management concepts**

**ANS- Network segmentation divides a network into smaller segments to enhance performance and security, while basic traffic management involves controlling data flow and optimizing network resources for efficiency**

1. **What is flow control and acknowledgment**

**ANS- Flow control regulates data transmission speed between sender and receiver, and acknowledgment is a signal sent by the receiver to confirm successful receipt of data, ensuring reliable communication**

• Advance question

1. **Use the OSI and TCP/IP models and their associated protocols to explain how data Flows in a network**

**ANS- Data flows through a network by following the OSI or TCP/IP model layers, with each layer handling specific tasks such as encapsulation, addressing, routing, and application support, utilizing protocols like HTTP, TCP, IP, and Ethernet for seamless communication**

1. **Identify and explain at layers 1, 2, 3, and 7 using a layered model approach**

**ANS- Layer 1 (Physical): Deals with physical connections and raw data transmission over the physical medium**

**Layer 2 (Data Link): Manages access to the physical medium, framing, and MAC addressing for local network communication**

**Layer 3 (Network): Involves routing, logical addressing (IP), and packet forwarding between different networks**

**Layer 7 (Application): Focuses on end-user services, providing network services directly to applications and interacting with software applications**

1. **Explain CSMA/CD and CSMA/CA**

**ANS- CSMA/CD (Carrier Sense Multiple Access with Collision Detection) is used in wired Ethernet networks to manage access, detect collisions, and handle them**

**CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance) is used in wireless networks, where devices listen before transmitting to avoid collisions proactively**

1. **Explain this frame and find layer**

**ANS- To explain a frame, we need specific information about its content, but generally, a frame is a data unit at the data link layer (Layer 2) of the OSI model or the Link Layer in the TCP/IP model, encapsulating data with headers and trailers for transmission over a network**

1. **Draw and explain Cisco hierarchical model**

**ANS- The Cisco hierarchical model consists of three layers—Access, Distribution, and Core—providing a structured approach for designing and managing scalable and efficient network architectures**

1. **Drawing of a typical wired and wireless enterprise LAN**

**ANS- I can't draw, but in a typical enterprise LAN, wired devices connect to switches via Ethernet cables, while wireless devices connect to Wi-Fi access points, all integrated with routers for network connectivity**

1. **Describe the uses of straight-through and crossover Ethernet cables**

**ANS- Straight-through Ethernet cables are used to connect different types of devices, like a computer to a router, while crossover cables are employed to connect similar devices, such as two computers directly**

1. **Identifying Collision and Broadcast Domains**

**ANS- A collision domain is a network segment where collisions can occur, typically within a hub-connected network, while a broadcast domain is a segment where broadcast messages are shared, usually within a switch-connected network**

**9 . Explain Spanning Tree Protocol**

**ANS- Spanning Tree Protocol (STP) prevents loops in Ethernet networks by identifying and blocking redundant paths, ensuring a loop-free topology**

1. **Explain uncast Multicast and Broadcast**

**ANS- Unicast sends data from one sender to one receiver, multicast to a selected group, and broadcast to all devices in a network**

1. **Explain CAM (Ternary Content Addressable Memory)**

**ANS- CAM (Ternary Content Addressable Memory) is a specialized type of memory used in network switches to store and quickly retrieve forwarding information, primarily MAC addresses in Ethernet networks**

1. **Which command use of Show MAC TABLE**

**ANS- The "show mac-address-table" command is used to display the MAC address table on a network switch**