Assignment:

<u>Module -7:   CCNA Network fundamental -</u>

1- Which of the following messages in the DHCP process are broadcasted? (Choose two)

Ans: A. Request

      B. Offer

Ans: C. Discover

      D. Acknowledge

2- Which command would you use to ensure that an ACL does not block web-based TCP traffic?

      A. permit any

 Ans: B. permit tcp any any eq 80

      C. permit tcp any eq 80

      D. permit any any eq tcp

3-Explain Network Topologies

Ans: Network Topology is the layout or arrangement of different devices like computers, switches, and routers in a network. It shows how devices are connected and how data flows between them

There are two type of topologies

1. Physical topology

2.Logical topology

1. Physical Topology

➢ Actual physical layout of devices (Cables, wires, devices)

2. Logical Topology

➢ How data flows between devices

These **Network Topologies are part of physical and logical**

1. Bus Topology

➢ All devices are connected to a single cable (Backbone).

2. Star Topology

➢ All devices are connected to a central device (Switch/Hub).

3.Ring Topology

➢ Devices connected in a circular path

4.Mesh Topology

➢ Every device is connected to every other device

5.Tree Topology

➢ Combination of Bus and Star Topology

6. Hybrid Topology

  ➢ Combination of two or more topologies

4.Explain TCP/IP Networking Model

Ans: TCP/IP is a **4-layer model** that defines how data is transmitted between computers across different networks.

It was developed by **DARPA (U.S. Department of Defense)** in 1980.

TCP/IP Model is divided into **4 Layers**:

1. Application layer
2. Transport Layer
3. Internet layer
4. Network Access

   . Data link layer
   . Physical layer

1. Application layer

  ➢ It is provide user interface and data services
    Protocols (HTTP, FTP, DNS, SMTP, POP3, DHCP)

2.Transport Layer

  ➢ Data Delivery (End-to-End Communication)

    Protocols (TCP and UDP)

3. Internet layer

> Data Routing (Packet Forwarding)
>   Protocols (IP, ICMP, ARP

4. Network Access Layer (Link Layer)

> Physical transmission of data
>   Protocols (Ethernet, Wi-Fi, PPP

5-Explain LAN and WAN Network

LAN Local Area Network

Ans: A **LAN** is a network of devices (computers, printers, etc.) that are connected within a small geographical area, such as a home, office, or school.

- **Scope**: LANs are typically limited to a single building or a group of nearby buildings.
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- **Speed**: LANs are known for being fast and efficient, with high data transfer speeds.
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- **Connection Type**: Devices in a LAN are usually connected through cables (Ethernet) or wirelessly (Wi-Fi).
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- **Example**: In your home, all devices like your laptop, smartphone, and smart TV may connect to a central router through Wi-Fi, creating a LAN.

WAN: Wide Area Network

- **Ans**: A **WAN** is a much larger network that connects devices or LANs across a wide geographical area, such as cities, countries, or even continents.

- **Scope**: WANs cover large areas and are used to connect multiple smaller networks (like LANs) together.

- **Speed**: WANs tend to be slower than LANs due to the larger distances and the technologies involved in connecting remote locations.

- **Connection Type**: WANs often rely on leased lines, satellite links, or the internet to connect distant locations.

- **Example**: The **Internet** is the biggest example of a WAN, as it connects computers and networks all over the world.

6-Explain Operation of Switch

Ans: Operation of Switch

A switch is a networking device that is use to connects multiple devices like

(Computers, printers , servers) in a network to transfer data and resources.

How Switch Works

- **Device Connection**

  - All devices are connected to the switch using Ethernet cables.

- **MAC Address Learning**

  - Every device has a unique address called **MAC Address**.
  - When a device sends data, the switch reads the MAC address and stores it in a table called the **MAC Address Table**.

- **Forwarding Data (Filtering)**

  - When data comes, the switch checks the destination MAC address.
  - If the destination MAC is in the table, the switch sends data only to that specific device (Port).

- This process is called **Unicast**.

- **Broadcasting**

  - If the MAC address is not in the table, the switch sends data to all devices. This is called **Broadcast**.

- **Updating MAC Table**

  - Once the switch learns the MAC address, it updates the table and sends data only to that device next time.

7-Describe the purpose and functions of various network devices

Ans: In networking, different devices work together to connect computers and transfer resources.

 The purpose and functions of common network devices

1. **Router**

Purpose:

- Connects different networks (like Home Network to the Internet).

Functions:

- Sends data between networks.
- Chooses the best path for data.
- Provides **IP Address** using DHCP.
- Acts as a firewall for security.

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2. **Switch**

Purpose:

- Connects multiple devices inside the same network (LAN).

Functions:

- Forwards data based on **MAC Address**.
- Reduces network traffic by sending data to the correct device only.
- Improves network speed.

3. **Hub**

Purpose:

- Connects multiple devices but without smart filtering.

Functions:

- Sends data to all devices (Broadcast).
- Used in small networks (Old Technology). ✖ Not commonly used now because it's slower.

4. **Modem**

Purpose:

- Connects your home network to the **Internet Service Provider (ISP)**.

Functions:

- Converts Analog signals to Digital signals and vice versa.
- Provides internet connection via telephone line or fiber optic.

5. **Access Point (AP)**

Purpose:

- Provides **Wireless Internet (Wi-Fi)** to devices.

Functions:

- Extends Wi-Fi coverage.
- Connects wireless devices to the main network.
- Acts as a bridge between wired and wireless networks.

6. **Firewall**

Purpose:

- Protects your network from hackers and viruses.

Functions:

- Blocks unauthorized access.
- Filters incoming and outgoing traffic.
- Provides security rules.

7. **Repeater**

Purpose:

- Boosts the network signal.

Functions:

- Extends the network range.
- Helps to cover long distances.

8. **Network Interface Card (NIC)**

Purpose:

- Allows a device (Laptop/PC) to connect to a network.

Functions:

- Provides MAC Address.

- Connects device via Ethernet or Wi-Fi.

7-Make list of the appropriate media, cables, ports, and connectors to 8 8-connect switches to other

Ans: the list of different media, cables, ports, and connectors used to connect Switches to other devices

1. Media Types

Media means the physical way data travels from one device to another.

Media Type	Purpose	Example
Copper (Wired)	Short-distance connection	Ethernet
Fiber Optic	High-speed, long distance	Internet Backbone
Wireless	Wi-Fi Connectivity	Access Points

2. Cables Types

Cables are used to transmit data between switches and other devices.

Cable Type	Use Case	Speed
Ethernet (Cat5e/Cat6)	Connect Switch to Switch, PC to Switch	1Gbps - 10Gbps
Fiber Optic	Long-distance Switch Connection	10Gbps - 100Gbps
Console Cable	Configure Switch (CLI Mode)	Low Speed
Coaxial Cable	CCTV or Old Network	10Mbps

3. **Ports on Switch**

Ports are the place where you plug the cable into the switch.

Port Name	Purpose	Connector Type
Fast Ethernet	Connect PC or Switch	RJ45
Gigabit Ethernet	High-Speed Network	RJ45
SFP Port	Fiber Connection	LC/SC Connector
Console Port	Configure Switch	RJ45 + Serial

4. **Connectors**

Connectors are used at the end of cables.

Connector Name	Used For	Cable Type
RJ45	Ethernet	Cat5e, Cat6
LC	Fiber Optic	Fiber Cable
SC	Fiber Optic	Fiber Cable
BNC	Coaxial Cable	CCTV
USB	Console Configuration	Console Cable

5. **Switch to Switch Connection Types**

Connection Type	Cable Needed	Port
Copper Connection	Ethernet (Cat6)	RJ45
Fiber Connection	Fiber Cable	SFP Port

Connection Type	Cable Needed	Port
Wireless Bridge	Wireless Media	AP Port

8-Define Network devices and hosts

1. Network Devices:

Network devices are hardware equipment used to connect computers and other devices in a network to transfer data.

Types of Network Devices with Explanation:

- **Router:**
  It connects different networks and transfers data from one network to another. It works with IP addresses to choose the best path for data transmission.
  Example: TP-Link, Cisco.

- **Switch:**
  It connects multiple devices in the same network and sends data only to the correct device using MAC addresses.
  Example: Cisco, D-Link.

- **Hub:**
  It connects multiple devices but sends data to all devices, not just the destination device. It is slower and not used much anymore.

- **Modem:**
  It connects your home or office network to the internet by converting analog signals into digital signals and vice versa.
  Example: BSNL, Airtel Modem.

- **Firewall:**
  It protects the network by blocking unauthorized access and filtering data packets.

- **Access Point (AP):**
  It provides wireless internet (Wi-Fi) to devices in the network.

- **Repeater:**
  It boosts weak signals to extend the range of the network.

2.**Hosts:**

A **Host** is any device that sends, receives, or stores data in the network.

Types of Hosts with Explanation:

- **Computer:**
  Laptops and desktops are the most common hosts that send or receive data.

- **Mobile Devices:**
  Smartphones and tablets are hosts that use the network wirelessly.

- **Printer:**
  Network printers receive data from computers and print documents.

- **Servers:**
  Servers store and share data or applications with other devices in the network.
- **IP Cameras:**
  CCTV cameras that send video data over the network.