Assignment:

Module -7: CCNA Network fundamental -

**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)

1. 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). |

1. 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)**

1. **Internet layer**

|  |
| --- |
| * Data Routing (Packet Forwarding) |

|  |
| --- |
| Protocols (IP, ICMP, ARP |

1. 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. * **Speed**: LANs are known for being fast and efficient, with high data transfer speeds. * **Connection Type**: Devices in a LAN are usually connected through cables (Ethernet) or wirelessly (Wi-Fi). * **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.

### 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 |
| 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.