Name :- Naitrik Solanki

Assignments :-

Module – 5 :- Network Fundamentals and Building Networks

Section 1: Multiple Choice

1. What is the primary function of a router in a computer network?

a) Assigning IP addresses to devices

b) Providing wireless connectivity to devices

c) Forwarding data packets between networks

d) Managing user authentication and access control

Ans. C) Forwarding data packets between networks

Note :- A router primary function is to connect multiple networks together and forward data packets between them, ensuring that data reaches its intended destination. It is routing tables and algorithms that determine the best path of data transmission.

2. What is the purpose of DHCP (Dynamic Host Configuration Protocol) in a computer network?

a) Assigning static IP addresses to devices

b) Resolving domain names to IP addresses

c) Managing network traffic and congestion

d) Dynamically assigning IP addresses to devices

Ans. D) Dynamically assigning IP addresses to devices

Note :- DHCP (Dynamic Host Configuration Protocol) is a network management protocol used to automatically assign IP addresses and other network configuration parameters (like subnet mask, default gateway, and DNS server) to devices on a network.

3. Which network device operates at Layer 2 (Data Link Layer) of the OSI model and forwards data packets based on MAC addresses?

a) Router

b) Switch

c) Hub

d) Repeater

Ans. B) Switch

Note :- A Switch operates at Layer 2 (Data Link Layer) of the OSI model. It forwards data packets based on MAC addresses, improving network efficiency by sending data directly to the intended recipient rather than broadcasting it to all devices.

4. Which network topology connects all devices in a linear fashion, with each device connected to a central cable or backbone?

a) Star

b) Bus

c) Ring

d) Mesh

Ans. A) Bus

Note :- In a Bus topology all devices (nodes) are connected to a single central cable known as the backbone. This backbone acts as a shared communication medium. When a device sends a signal all devices on the network.

Section 2: True or False

5. True or False: A VLAN (Virtual Local Area Network) allows network administrators to logically segment a single physical network into multiple virtual networks, each with its own broadcast domain.

Ans. True

Note :- VLAN enable flexible network management without requiring physical reconfiguration. Devices within a VLAN communicate as if they're on the same physical network segment, while traffic between VLANs requires routing.

6. True or False: TCP (Transmission Control Protocol) is a connectionless protocol that provides reliable, ordered, and error-checked delivery of data packets over a network.

Ans. False

Note :- TCP (Transmission Control Protocol) is not a connectionless protocol. It is a connection-oriented protocol. This means that before any data is transferred, TCP establishes a reliable connection between the sender and receiver using a process called the three-way handshake.

7. True or False: A firewall is a hardware or software-based security system that monitors and controls incoming and outgoing network traffic based on predetermined security rules.

Ans. True

Note :- A firewall is indeed a hardware or software-based security system. It enforces determine security rule to block unauthorized access, protect against threats, and malicious activity. Firewalls can be implement in various forms, including network firewalls, host-based firewalls, or a part of security systems.

Section 3: Short Answer

8. Describe the steps involved in setting up a wireless network for a small office or home office (SOHO) environment.

Ans. The Steps SOHO :-

1. Choose the right router :-

- Select a wireless router suitable for your environment, considering factors like coverage area, number of devices, and internet speed requirements.

2. Connect the router :-

- Connect the router to your modem using an Ethernet cable. Ensure the modem is connected to your Internet Service Provider (ISP) infrastructure.

3. Configure the router :-

- Access the router web interface (usually through its IP address, e.g., 192.168.0.1 or 192.168.1.1).
- Set up the router with a strong admin password and change the default SSID (network name).
- Configure the wireless settings (e.g., Wi-Fi channel, encryption method like WPA2 or WPA3).

4. Secure the network :-

- Set up a strong Wi-Fi password.
- Enable WPA2 or WPA3 encryption.
- Disable WPS (Wi-Fi protected setup) if not needed.

5. Optimize Wi-Fi settings.

- Adjust the Wi-Fi channel to minimize interference.
- Enable Quality of Service (QoS) if you need to prioritize certain devices or applications.

6. Connect devices :-

- Connect your devices (laptops, smartphones, etc.) to the Wi-Fi network using the SSID and password.

7. Test the Network :-

- Ensure all devices can connect and access the internet properly. Test the network speed and coverage.

8. Regular Maintenance :-

- Regularly update the router firmware and monitor network performance to ensure security and efficiency.

Section 4: Practical

9. Demonstrate how to configure a router for Internet access using DHCP (Dynamic Host Configuration Protocol).

Ans. Configure a Router for internet Access using DHCP step by step.

Step 1: Connect the Router

- Connect your computer to the router using an ethernet cable or Wi-Fi.
- Open a web browser and enter the router IP address (usually 192.168.0.1 or 192.168.1.1).

- Log in with the default admin credentials (often printed on the router or in the manual).

Step 2: Configure WAN settings

- Navigate to the WAN or internet settings section.
- Select DHCP as the Internet Connection Type.
- Save the setting, The router will now obtain an IP address from your ISP DHCP server.

Step 3: Verify the Connection

- Check the router WAN or Internet status page to ensure it has obtained an IP address from the ISP.
- Test internet connectivity by accessing a website on a connected device.

Step 4: Configure LAN settings

- Navigate to the LAN settings section.
- Ensure the DHCP Server is enabled to assign IP addresses to devices on your local network.
- Set the IP address range (e.g., 192.168.1.100 to 192.168.1.200).
- Save the settings.

Step 5: Test Devices

- Connect devices (laptops, smartphones, etc.) to the router network.
- Verify that devices receive IP addresses and can access the internet.

Section 5: Essay

10. Discuss the importance of network documentation in the context of building and managing networks.

Ans. The importance of network documentation :-

1. Troubleshooting :-

- Accurate documentation helps identify and resolve issues quickly, reducing downtime and improving network reliability.

2. Change Management :-

- Documentation ensures that changes are planned, implemented, and tracked properly, minimizing disruptions and errors.

3. Security :-

- Documentation helps track security configurations, vulnerabilities, and patches, ensuring the network remains secure.

4. Scalability :-

- Documentation facilitates planning and implementation of network upgrades and expansions.

5. Compliance :-

- Documentation helps meet regulatory and compliance requirements by providing a record of network configurations and changes.

6. Knowledge Sharing :-

- Documentation serves as a knowledge base for network administrators, reducing dependence on individual expertise.