Assignment
Module-5
Network Fundamentals and Building Networks

Section-1 : Multiple Choice

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

Ans: *C) Forwarding data packets between networks.*

2. **What is the purpose of DHCP(Dynamic Host Configuration p-rotocol) in a computer network?**

Ans: *D) Dynamically assigning IP addresses to devices.*

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

Ans: *B) Switch*

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

Ans : *B) Bus*

Section-2: True or False

1. **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*

2. **TCP (Transmission Control Protocol) is a connectionless protocol that provides reliable, ordered, and error-checked delivery of data packets over a network.**

Ans : *False*

3. **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*

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 : ***SOHO NETWORK*** : SOHO full form is small office/ home office ,this network designed for personal operating and small businesses limited workspaces, such as homes or small offices. It provides good connectivity and facilitates the sharing of resources among a small number of employees , ranging from 1 to 10 m.SOHO network support 1 to 10 users. with easy setup and usability.

We need to follow below steps

1***.Choose the right equipment***

- Firstly we choose the right equipment for our needs and budget .We will need a wireless router, which is the device that connects our network to the internet and

broadcasts the wireless signal, and wireless adapters, which are the devices that allow our computers and other devices to access the wireless signal.we look for equipment that support the latest wireless standards, such as wi-fi 6 or 802.11ax,which offer faster speeds, lower latency,and better security than older standards.

2. ***Find the best location***
   - ➢ The second step to setting up a wireless network in a small office is to find the best location for our wireless router. The location of our router can affect the strength and quality of our wireless signal,as well as the coverage of our network.we should place our router in a central position, away from walls, metal objects,and other sources of interference,such as microwaves and bluetooth devices. We should avoid placing our router near windows or doors,
3. ***Configure the settings***
   - ➢ The third step in setting up a wireless network in a small office is to configure the setting of our router and adapters.we should access our router's web interface, typically done by typing its IP address into a web browser,and log in with the default username and password; it's important to change this immediately for security reasons. The configuration should include the network name(SSID), Which should be a unique detail label.we need to give security by choosing the strongest encryption, like WPA3 OR WPA2, and give a robust password. We need to regularly update router firmware to patch vulnerabilities,enable MAC address filtering for added security,and consider implementing a guest network to isolate visitor performance and adjust settings as needed for an efficient and secure wireless environment.
4. ***Network test***
   - ➢ Our fourth step to setting up a wireless network in a small office is to test the network and make sure it is working properly and securely. We should connect our devices to the network and assess signal strength,speed, and security.. We can measure signal strength by a tool such as wi-fi signal strength metre , also we can test with Speedtest.
5. ***Troubleshoot for the issues***
   - ➢ Our fifth step to setting up a wireless network in a small office is to troubleshoot the issues that may arise and affect our network's performance and security. We also identify the source and cause of the problem, and give the appropriate solution.
   - ➢ We can restarting our router and devices is a simple and effective way to resolve many common issues, like slow speed, poor connection etc.we also updating our firmware and drivers can ensure that our router and adapters have latest features.
6. ***Maintain the network***
   - ➢ The sixth and final step to setting up a wireless network in a small office is to maintain the network and keep it running smoothly and with security. We regularly monitor our network with tools such as wi-fi monitor or wi-fi manager to check signal strength, speed ,security, and usage.
   - ➢ We also take a backup of our data to the cloud or an external storage device and encrypt it to prevent unauthorised access .

Section-4: practical answer

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

ans:DHCP Full name is Dynamic Host Configuration Protocol.

- It is provide automatic Ip address to network computer
- Port no: 67
- Work on DORA

➔ DHCP Discover
➔ DHCP Offer
➔ DHCP Request
➔ DHCP ACK

Here, we try these steps:

- Firstly we need to open a web browser on a computer then,
- log in to our router's setup page then,
- we go to the network or LAN setup section then,
- we find the DHCP setting and check if it's enabled then,
- we save our changes then,
- We restart our router for the changes to take effect

We can also do configure DHCP by :

- Firstly we create a pool of assignable IP addresses ; we can specify the default gateway, subnet mask, and domain name for the pool.
- We are specifying that the IP configuration will be obtained using DHCP on the client .
- We are verifying DHCP operation: "we can use the show Ip dhcp binding" command to see a list of all IP addresses to MAC address bindings.

Section : 5

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

- Firstly we see what is network documentation ?

➔ It is the drawings, charts, flowcharts,records ,and also instructions of network procedures,
➔ It is an online document with detailed information about our company's network and all the devices connected to it .
➔ It can help with time- consuming research to fix recurring problems .
➔ We can say when we get all things in place and everyone follows the same processes and procedures, consistency across the network helps to reduce problems and errors.
➔ We don't lose important information when a knowledgeable employee leaves the company.
➔ The documentation helps us to onboard new hires much more quickly.
➔ We can troubleshoot our network faster when issues come up.
➔ Providing detailed documentation, we also try to make it a practice to ensure that more than one employee has all the knowledge. That is why, we are double- covered

when our knowledgeable employee leaves because we have a reliable set of documentation as our backup.