NETWORK FUNDAMENTALS AND BUILDING NETWORKS

SECTION 1 : MCQ

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

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

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

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: b) Bus

SECTION : 2 TRUE OR FALSE

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

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

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

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

ANS: **1. Choose a Suitable Wireless Router**

* Purchase a reliable **wireless router** with features like dual-band Wi-Fi, WPA3 security, and enough LAN ports.
* For a larger area, consider a **mesh Wi-Fi system** or a router with high range.

**2. Connect the Router to the Internet**

* Plug the **router's WAN/Internet port** into your **modem** using an Ethernet cable.
* Power on both the **modem and router**.
* Wait for the router to boot and establish a connection (indicator lights will show this).

**3. Access the Router’s Configuration Interface**

* Connect a computer or mobile device to the router via Ethernet or default Wi-Fi.
* Open a web browser and enter the router’s default **IP address** (commonly 192.168.0.1 or 192.168.1.1).
* Log in using the default **username and password** (found in the manual or on a sticker on the router).

**4. Configure the Wireless Network Settings**

* **Change the default SSID** (Wi-Fi network name) to something unique but not personally identifying.
* **Enable WPA2 or WPA3 encryption** (WPA3 is preferred if supported).
* Set a **strong Wi-Fi password** (avoid using defaults).
* Choose a suitable **Wi-Fi channel** (especially important in crowded areas)

**5. Set Up Admin Credentials and Security**

* **Change the default admin password** for the router interface.
* Optionally, disable **remote management** if not needed.
* Enable a **firewall** (often enabled by default).

**6. Connect Devices to the Wireless Network**

* Use the SSID and password to connect laptops, phones, printers, etc.
* Ensure devices get IP addresses via **DHCP** (usually enabled by default).

**7. Test the Network**

* Check signal strength and speed in different rooms.
* Move or reposition the router if coverage is weak in some areas.
* Run a speed test to verify performance.

SECTION 4 : PRACTICAL

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

ANS:

**Plug everything in**

* Connect your **modem** to the **router’s Internet/WAN port** using an Ethernet cable.
* Then, connect your **computer or phone** to the router using Wi-Fi or a LAN cable.

**Turn on the devices**

* Power on the modem first, then the router.
* Wait a minute or two for the lights to stabilize.

**Login to the router setup page**

* Open a browser and type in the address like 192.168.0.1 or 192.168.1.1
* Log in using the default username and password (often both are “admin”).

**Set Internet type to DHCP**

* Find a menu called **“Internet Setup”**, **“Network Setup”**, or **“WAN Settings”**.
* Choose **DHCP** or **Dynamic IP** as the connection type.
* No need to fill in IP addresses — the router will get them automatically from your ISP.

**Save the settings**

* Click **Save** or **Apply** and wait a few seconds.

**Check if you’re online**

* Open a new browser tab and try visiting a website (like www.google.com).
* If it loads — you’re all set!

SECTION 5:

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

ANS:

1.**Helps You Fix Problems Faster**  
If the internet goes down or something breaks, documentation shows you what’s connected where — so you don’t waste time guessing.

2.**Makes Changes Easier**  
Want to add a new computer or printer? With documentation, you already know what IP addresses are taken, what cable goes where, and what settings to use.

3. **Saves Time for Everyone**  
If someone else takes over the network (or you forget what you did months ago), good documentation helps them understand everything quickly.

4. **Prevents Mistakes**  
It’s easy to mess something up if you don’t remember how it was set up. Documentation keeps things clear and avoids confusion.

5. **Good for Security**  
You’ll know who has access to what, what devices are on the network, and how everything is protected.