Experiment-1

Familiarization with networking devices

1. **Router**

Router is a physical or virtual internetworking device that is designed to receive, analyze and forward data packets between computer networks. It examines destination IP address of a given data packet, and uses the headers and forwarding tables to decide the best way to transfer the packet.

- **Switch**

Switch is a networking device that groups all the devices over the network to transfer the data to another device.

- **Hub**

Hub is a central device that splits the network connection into multiple devices. When computer requests for information from a computer, it sends the request to the hub and hub distributes this request to all the connected computers.

- **Modem**

Modem connects the computer to the internet over existing telephone line.
it is not integrated with computer motherboard but a seperate port on the PC slot found on the motherboard.

- **Cables & connectors**

cable is a transmission media that transmits the communication signals.

Steps :-

5) 1) Plug one end of an ethernet cable into computer's NIC.
2) connect the other end to an available port on the switch
3) Connect the switch to a router or modem.
4) Ensure the switch & router are powered on.
5) verify the connection.

6) 1) open control panel → networks and sharing center.
2) click change adapter settings.
3) right click ethernet / wifi connections → properties.
4) select Internet protocol version → properties.

7)

Managed	Unmanaged
• Allows configuration monitoring and control.	• no configuration needed
• Supports VLANS.	• Basic data forwarding.
• advanced security options	• Basic.
• more expensive	• less expensive.

8) Functions :-
- extends wireless coverage by connecting a wired network.
- Allows wireless devices to connect to the network via wifi
- Helps improve signal strengths in large areas.

9) 1. Router - directs internet traffic and manages network.
2. Switch - connects multiple devices in the office.
3. Firewall - protects against cyber threats by filtering traffic.
4. Access points - provides wireless connectivity for office users.
5. VPN gateway - ensures secure remote access for employees

there are three types of cables:
- twisted pair cable
- coaxial cable
- fibre optic cable

2.

Switch	Hub
• sends data only to the intended recipient.	• broadcast data to all connected devices.
• More efficient due to reduced collisions	• less efficient.
• learns MAC address for data forwarding	• no intelligence

3. Role of :-
- Router distributes internet connection to multiple devices manage traffic and enables network security features like firewalls.
- Modem converts signals between digital and analog formats to provide internet access from an ISP

4. Role of network interface card (NIC) in a computer system is :-
- acts as an interface between computer & networks.
- Provides unique MAC address.
- Supports ethernet (wired) or wireless (wi-fi) connections.

10.) Firewall is important because:
- it blocks unauthorized access to network.
- protects against malware, hackers and cyber attacks.
- filters and control network traffic

⇒ Working -
Packet filtering - examine data packet whether to allow or block them.
→ stateful inspection - Keep tracks of active connections
→ proxy service - middleman btw. user & internet
→ Deep packet inspection - analyse packet content.
→ application layer filtering - control traffic.