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Lab Practical #02:

Study of different network devices in detail.

Practical Assignment #02:

1. Give difference between below network devices.
   - Hub and Switch
   - Switch and Router
   - Router and Gateway
2. Working of below network devices:
   - Repeater :-

     A repeater is a network device that amplifies and retransmits a signal to extend the range of a network. It doesn't change the signal, just boosts it to maintain connectivity.
   - Modem((DSL and ADSL) :-

     A modem (DSL and ADSL) converts digital data into a format that can be transmitted over a phone line. It establishes an internet connection by dialing into the internet service provider (ISP).
   - Hub :-

     A hub is a simple network device that connects multiple devices together. When a device sends data to the hub, the hub broadcasts the data to all connected devices, which can cause network congestion.
   - Bridge :-

     A bridge connects two or more network segments, allowing devices on each segment to communicate with each other. It filters and forwards data, but doesn't provide any additional features like routing or switching.
   - Switch :-

     A switch is a network device that connects multiple devices together and forwards data packets between them based on their MAC addresses. It improves network efficiency by only forwarding data to the intended recipient.
   - Router :-

     A router connects multiple networks together and routes data packets between them based on their IP addresses. It provides network address translation (NAT) and can also act as a firewall to secure the network.
   - Gateway :-

     A gateway is a network device that connects two or more networks together and provides a single point of access to the internet. It can be a router, a modem, or a combination of both.

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Hub and Switch

No.	Hub	Switch
1	A **Hub** is a simple network device that connects multiple devices together and broadcasts incoming data to all connected devices.	A **Switch**, on the other hand, is a more advanced network device that connects multiple devices together and forwards data packets between them based on their MAC addresses.
2	More network collisions	Reduces network collisions
3	Slower and less efficient	Faster and more intelligent
4	No MAC address learning	Learns and stores MAC addresses
5	Basic networking device that **broadcasts** incoming data packets to **all ports**, regardless of the destination.	Networking device that **forwards data only to the device** it is intended for, using MAC addresses.

Switch and Router

No.	Switch	Router
1	Connects multiple devices (like computers, printers) **within the same local network (LAN)** and allows them to communicate.	Connects **different networks** together (e.g., LAN to the internet), and **routes data between them**.
2	Connects devices in a LAN	Connects multiple networks
3	Does not assign IP addresses	Can assign IP addresses
4	Only forwards within same network	Forwards data between different networks
5	Uses MAC addresses for data forwarding	Uses IP addresses for data forwarding

Router and Gateway

No.	Router	Gateway
1	Routes data between devices on the same or different networks	Converts data between **different protocols or network architectures**
2	Works mostly within the **same type** of network	Bridges **two different types** of networks
3	Connects your home devices to the internet	A device that connects a private network to the public internet
4	Home networks, offices, ISPs, etc.	Enterprises, cloud services, protocol conversion setups
5		

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