

Assignment - I

Sec - A

- ① Network topology refers to the arrangement of various elements (nodes, links, devices) in a computer network. It defines how devices are interconnected and how data flows between them.

There are five main types of network topologies.

- Bus topology
- Star topology
- Ring topology
- mesh topology
- Hybrid topology

- ② Flow control is mainly handled by the Data link layer (Layer 2) and Transport layer (Layer 4) of the OSI model.

- Data link layer: Manages flow control between directly connected nodes.
- Transport layer: Ensures end-to-end flow control between sender and receiver.

- ③ There are three types of data transfer modes in networking.

- Simplex mode: Data flows in one direction only.
- Half duplex mode: Data flows in both directions but only one direction at a time.
- full-Duplex mode: Data flows in both directions simultaneously.

4. • Logical Address :

- Assigned by Software
- Used for identifying devices globally in a network.
- Can change dynamically.

• Physical Address :

- Burned into network interface hardware.
- Used for identifying devices within a local network.
- Fixed for a device unless changed manually.

Sec-B

① Bus Topology :

Advantages: Simple, cost effective, easy to install.

Disadvantages: Single point of failure.

Star Topology:

Advantages: Centralized management, easy troubleshooting.

Disadvantages: Failure of the central hub disrupts the network.

Ring Topology:

Advantages: No data collision, Predictable Performance.

Disadvantages: A single node failure can break the network.

Mesh Topology:

Advantages: High redundancy, reliable communication.

Disadvantages: Expensive and complex to implement.

Hybrid Topology:

- Advantage: Combines benefits of multiple topologies.
- Disadvantages: Complex to design and maintain.

② Twisted pair Cable:

- Speed: Up to 10 Gbps.
- Advantages: Cheap, widely used in LANs.
- Disadvantages: Susceptible to electromagnetic interference (EMI).

Coaxial Cable:

- Speed: Up to 10 Gbps.
- Advantages: Better shielding, used for cable TV and broadband.
- Disadvantage: More expensive than twisted pair, harder to install.

Optical fiber:

- Speed: Up to 100 Tbps.
- Advantages: High speed, long distance, immune to EMI.
- Disadvantage: Expensive and fragile.

Sec - C

① Transmission media:- It refers to the physical pathways through which data is transmitted in a network.

Types of transmission media:-

(i) Guided media (wired):

- Twisted Pair: Cheap but limited distance.
- Coaxial cable: Better shielding but expensive.
- Fiber Optic: High speed but costly.

- (iii) Unguided media (wireless)
- Radio Waves: Good range but susceptible to interference.
 - microwaves: High bandwidth but needs line of sight.
 - Infrared: Secure but limited range.

- ② The OSI (Open System Interconnection) model consists of seven layers, each with specific functions:
- Layer 1: Physical layer: Deals with hardware transmission (cables, signals)
 - Layer 2: Data link layer: Handles error detection, MAC addressing.
 - Layer 3: Network layer: Manages logical addressing (IP), routing.
 - Layer 4: Transport layer: Ensures reliable data transfer, flow control.
 - Layer 5: Session layer: Manages session between applications.
 - Layer 6: Presentation layer: Data encryption, compression and translation.
 - Layer 7: Application layer: Interfaces for user applications (HTTP, FTP, SMTP).