Q1. Discuss the concept of Networking, advantages, disadvantages and applications.

Ans1. Networking refers to process of connecting multiple computers or devise to share resources, information and services. It enables communication, resource sharing, remote access and use of centralized data storage among interconnected systems.

Advantages of Networking:

- Resource Sharing
- Centralized Data Storage
- Improved Communication
- Remote Access
- Scalability and Flexibility
- Security through Authorization

Disadvantages of Networking:

- Cost
- Maintenance and Management
- Security Risks
- Dependency on Server and Network

Applications of Networking:

- Business
- Education
- Healthcare
- Entertainment
- Banking and Finance
- IoT and Smart Devices

Q2. Discuss the peer-to-peer connections and multipoint connection.

Ans2. Peer-to-peer (P2P) connections

A peer-to-peer (P2P) network is a decentralized architecture where each device (peer) in the network can act as a server or a client. In this model, peers communicate directly with each other to share resources, such as files, processing power, or bandwidth, without the need for a central server.

Multipoint Connection

A multipoint connection also called as multicast connection is a network model in which multiple devices are interconnected so that data transmission can occur among three or more devices simultaneously. In this setup, each device can communicate with multiple other devices, either directly or via a shared network medium.

Q3. Discuss the components required to make a computer network.

Ans3. A computer network requires several key components both hardware and software, to enable connectivity, communication and resource sharing among devices.

Hardware Components:

- Network Interface Card (NIC)
- Hub/Switch
- Router
- Repeater
- Modem
- Bridge
- Server and Clients

Software Components:

- Network Protocols
- Network Operating System

Q4. Discuss the types of networks as LAN, WAN and MAN.

Ans4. LAN (Local Area Network)

LAN is confined to a small geographic area such as building, office, home or a campus and has high speed data transfer (typically from 100 Mbps to several Gbps). Typically used in offices, schools, campuses and homes.

MAN (Metropolitan Area Network)

MAN covers a region larger than a single building typically spans a city. Has high speed data transfer but less than LAN. Maybe operated by a single entity or a large organization. Used in a city, government office etc.

WAN (Wide Area Network)

WAN covers a large geographic area cities, countries or even continents. Connect multiple LANs often across vast distances. Data transfer speed is moderate to high. Internet itself is a global WAN.

Q5. Differentiate between physical and logical topologies.

Ans5. Physical Topology

It is the arrangement of network devices and cables. It determines how hardware is physically installed and is tangible. Example:- Star, Bus, Ring, Mesh etc.

Logical Topology

It is the path and flow of data between devise in the network. It determines how data is logically routed, addressing and protocol-driven flow control. Example: - Logical Bus, Logical Ring etc.

Q6. List the different types of networks from surroundings as client-server network, distributed networks, peer-to-peer networks and cloud-based networks.

Ans6. Client-Server networks centralize resources on a server. Distributed networks spread resources across multiple nodes. Peer-to-peer networks treat all nodes as equals and cloud-based networks leverage cloud infrastructure for network services.

Q7. Discuss the concept of Network Topologies.

Ans7. Network Topology is the arrangement or layout of different elements (nodes, servers) in a computer network, describing how devices are connected and how data flows through the network. There are different types of network topology available:

- Point-to-Point Topology
- Bus Topology
- Ring Topology
- Star Topology
- Mesh Topology
- Tree Topology
- Hybrid Topology

Q8. Protocols and their usage e.g. TCP/IP, http, https, ftp.

Ans8. Protocols in networking are standardized rules that define how data is transmitted, received and interpreted across networks. They govern communication between devices and ensure reliable, secure and organized data exchange.

1. TCP/IP (Transmission Control Protocol/Internet Protocol): TCP/IP is a suite of protocols fundamental for network communication. TCP breaks down data into packets and sends these packets randomly to the connected devices. IP is responsible for handling the rerouting of packets at receiver side so that message is sent correctly and not randomly.

2. HTTP (Hypertext Transfer Protocol): Used for transferring web pages on the World Wide Web. It operates at the application layer over TCP/IP. Facilitates communication between web browsers and web servers.

3. HTTPS (Hypertext Transfer Protocol Secure): A secure version of HTTP. Adds encryption via TLS/SSL to secure data during transmission sensitive data.

4. FTP (File Transfer Protocol): A standard network protocol for transferring files between client and server. Often used for uploading/ downloading large files or website files. Works on application layer and uses TCP for reliable transfer.