

CHAPTER 5

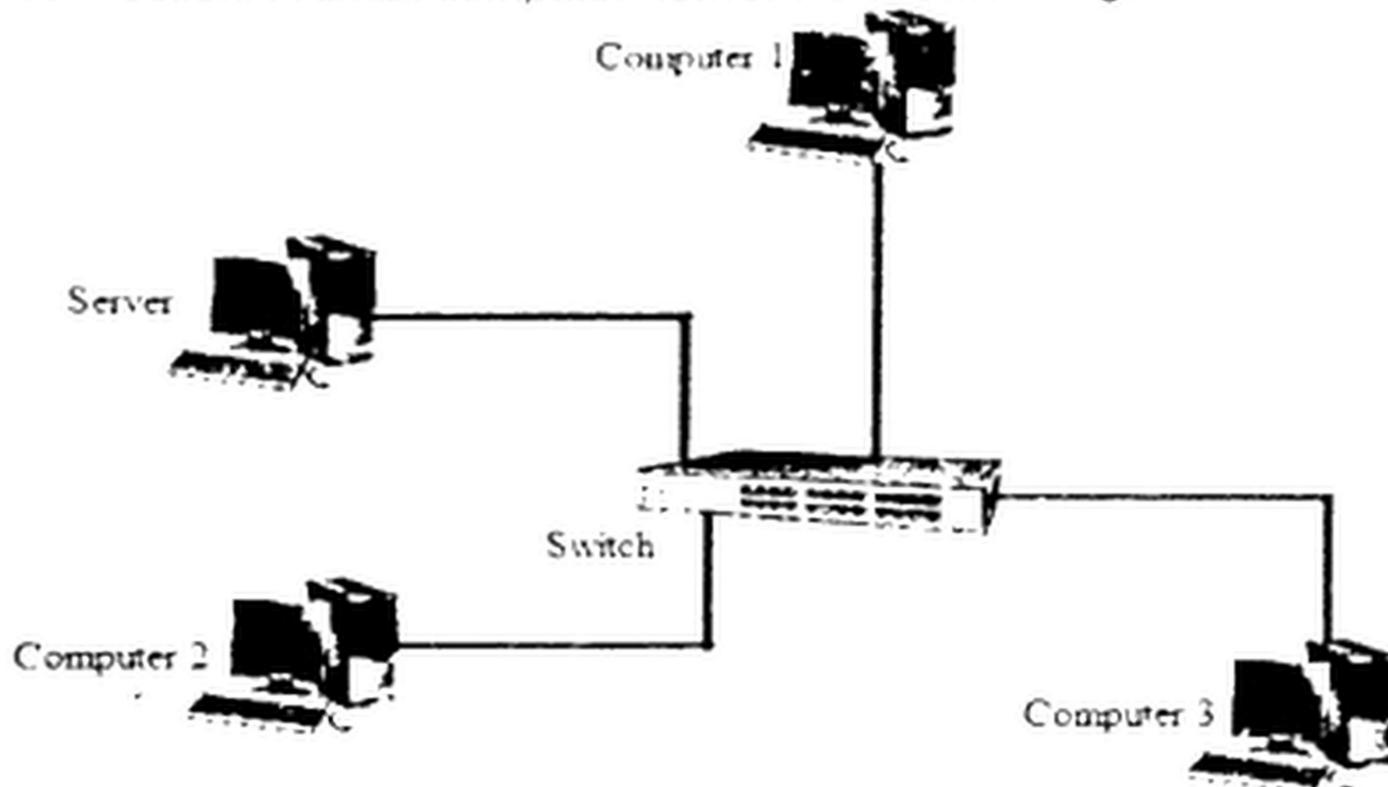
COMPUTER NETWORKS

SHORT AND LONG QUESTIONS

Q.1 What is meant by computer network?

Ans: **Computer Network:**

A computer network can be defined as an interconnection of two or more computers to share data and other resources such as documents, printers and Internet connection. A small computer network is shown in Fig.



A Small Computer Network

For Your Information

Internet is a world-wide network that interconnects millions of computers and provides information and communication facilities

Q.2 Define data transmission.

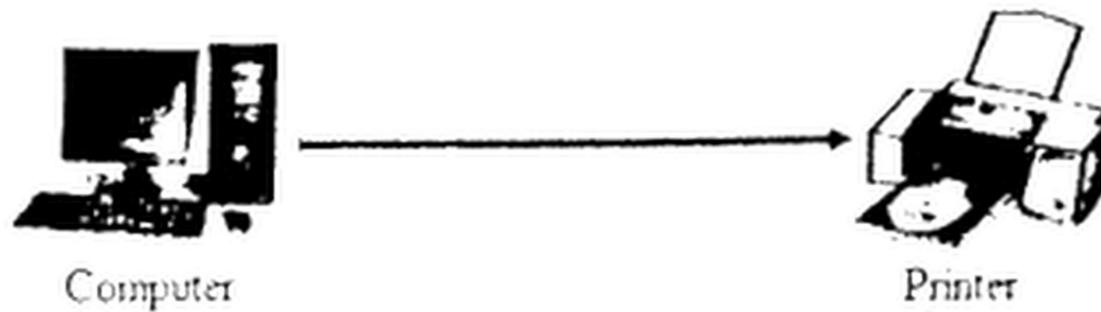
Ans: **Data Transmission:**

Data transmission is the process of sending data from one device to another. It consists of sender, receiver and the medium which carries the information.

Q.3 List three modes of data transmission.

Ans: There are three modes of data transmission which are simplex, Half-duplex and Full-duplex

Q.4 Write a note on simplex transmission mode.



Transmission through simplex mode

Transmission of data/information from keyboard to CPU or from CPU to printer is always in one direction. Therefore, these are simplex transmissions. Radio and television broadcastings are also simplex transmissions.

Q.5 What is meant by network architecture?

Ans: Network Architecture:

Network architecture refers to layout of network that consists of computers, communication devices, software, wired or wireless transmission of data and connectivity between components

A computer network can be as small as two computers linked together by a single cable whereas large networks connect thousands of computers and other devices.

Q.6 List three types of network architecture.

Ans: Types of Network Architectures:

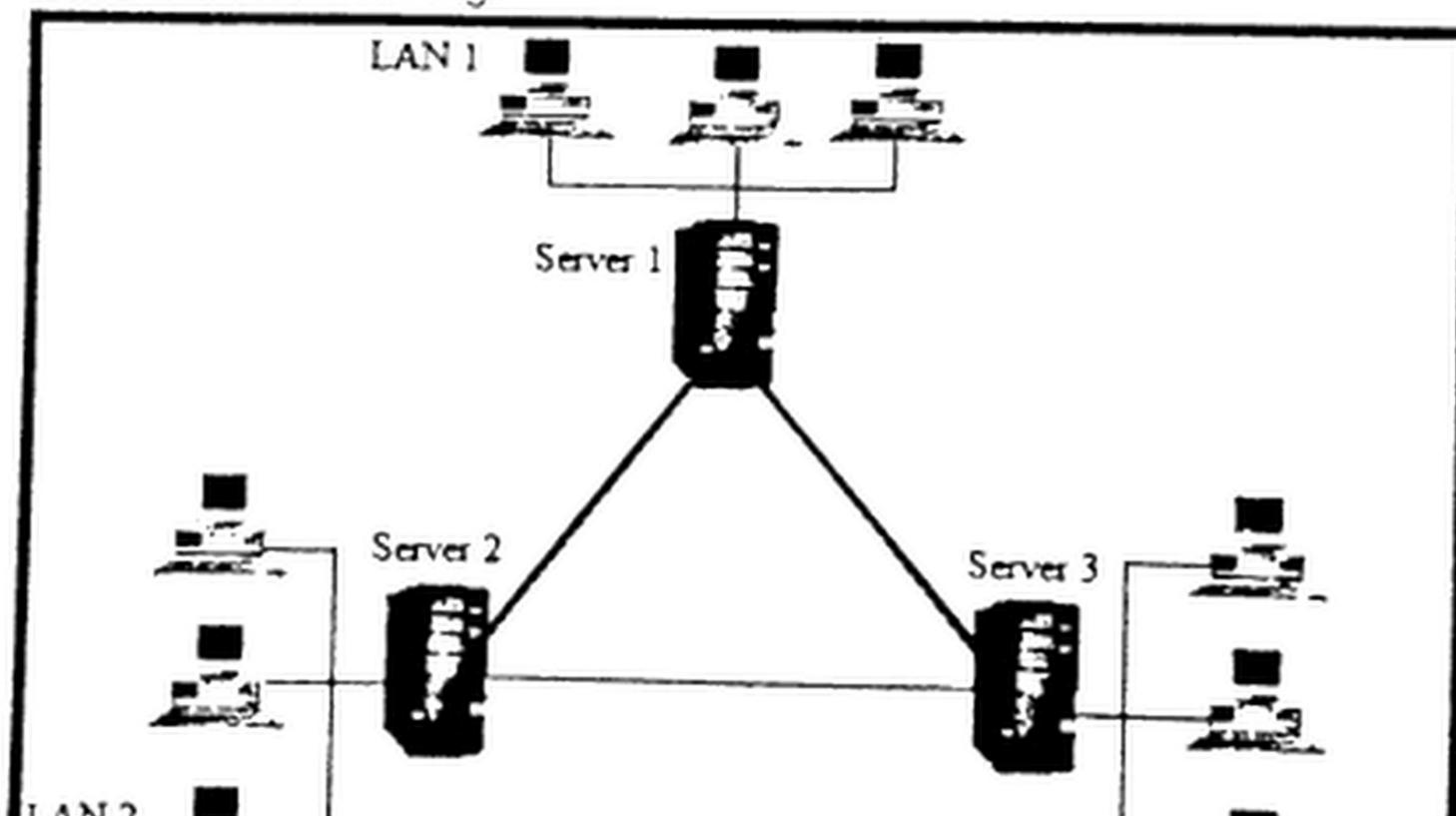
Three types of network architectures are commonly used which are:

- i. Client/server network
- ii. Peer-to-peer network
- iii. Point-to-point network

Q.7 Write a note on Point-to-Point networks.

Ans: Point-to-Point Networks:

It is a type of network in which a message is sent from one computer to another via other computers in the network. Large networks such as wide area networks that connect cities and countries are organized in such a way. Point-to-Point network is shown in Fig.



Characteristics of Point-to-Point Networks:

- i) Point-to-Point networks are generally used for long distance communication.
- ii) There may be different paths for transmission of information.

Q.8 What is meant by communication over network?

Ans: Communication over Networks:

Communication over network refers to transmission of data/information from one computer to another through a communication medium.

Q.9 Write a note on communication via telephone networks.

Ans: Communication via Telephone Networks:

Telephone network is now commonly used for data communications. The main reason for using telephone network is that it exists all over the world.

Types of communication lines are provided via telephone networks:

Following four types of communication lines are provided via telephone networks.

- Dial-up line
- Digital Subscriber Line (DSL)
- Integrated Services Digital Network (ISDN) lines
- Code Division Multiple Access (CDMA)

Q.10 Explain different types of modem which are commonly used.

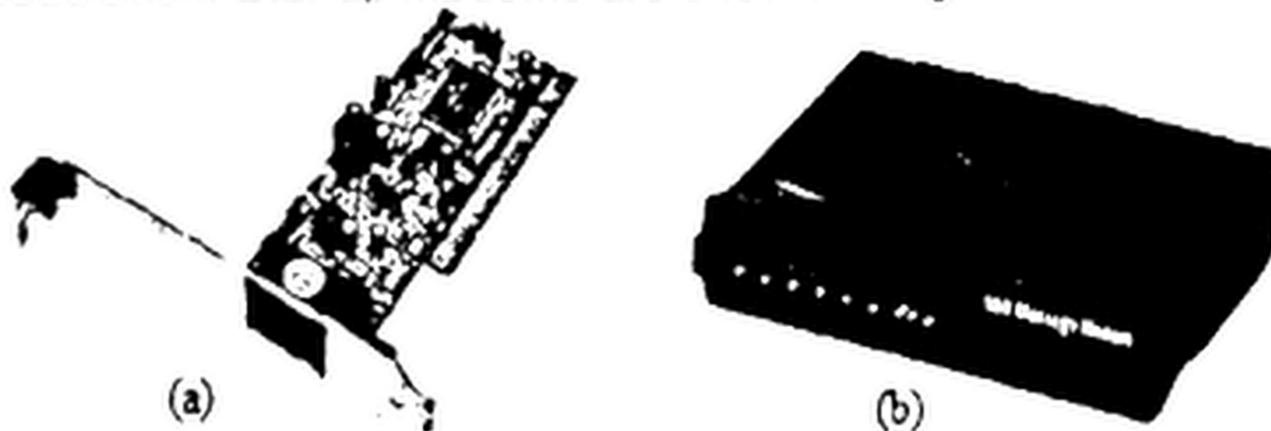
Ans: Types of Modems:

There are three types of modem which are commonly used. These are Dial-up modem, DSL modem and ISDN modem.

Dial-up Modem:

A Dial-up modem is required for Dial-up Internet connection. It is the short form of **MODulator/DEModulator**.

Modem accepts digital data from the computer in the form of two-level signals and converts them into analog signals for transmission over the telephone line. This process is called modulation. A second modem at the receiving end is used to convert the analog signals back to digital form which is called demodulation. Dial-up modems are shown in Fig.



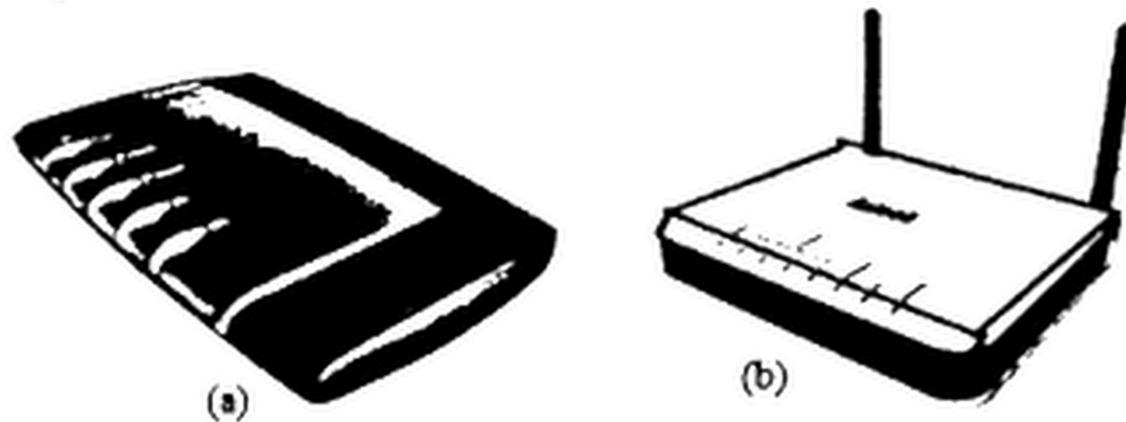
(a) Internal Dial – up modem (b) External Dial – up modem

DSL Modem:

A DSL modem is used to connect microcomputers to high-speed DSL connections. It is designed to provide high-speed Internet access.

ADSL modem is an external device that connects to a computer via

DSL modem converts the digital signals into analog high frequency signals that are carried by the telephone lines and vice versa. DSL modems are shown in Fig.



(a) Wired DSL Modem (b) Wireless DSL Modem

ISDN Modem:

ISDN modem is a device that converts digital signals used in computers to the signals that can be transmitted over the ISDN lines. It provides both voice and data transmission on a single line at the same time. ISDN modem is shown in Fig.



ISDN Modem

Q.11 Compare data communication lines on the basis of transfer rate, cost per month, advantages and disadvantages.

Ans: Comparison between Data Communication Lines:

Dial-up Line:

- Maximum speed is 56 Kbps.
- Easily available anywhere, no extra lines required.
- Cheaper than other Internet services.
- Internet connection is not permanently available.
- Voice communication is not possible while using Internet.

DSL (Digital Subscriber Line):

- Typical speed is 256Kbps or above.
- DSL connection is always available.
- Telephonic conversation and Internet access are available simultaneously.
- Costly than other types of Internet services.
- Various monthly rates are charged depending on the speed.
- Connection is available as soon as computer and DSL modem are turned on.

- Allows multiple devices to share a single line.

CDMA (Code Division Multiple Access):

- It is a wireless cellular communication technology.
- Transmission speed can be up to a several Mbps.
- Can provide service to many people at the same time.
- Provides improved voice quality

KEY POINTS

- A computer network is an interconnection between computers and devices to provide facilities among users to exchange information and resources such as printer, hard disk, Internet, etc.
- Simplex transmission mode provides data transmission in only one direction.
- Half-duplex transmission mode can send and receive data in both directions but not simultaneously.
- Full-duplex transmission mode provides data transmission in both directions at the same time.
- A computer that shares resources for others to use on a network is known as a server.
- A computer that accesses the resources shared by other computers on a network is known as a client.
- In a client/server network, each computer in the network acts as either a server or a client. Server cannot be used as client computer and client computer cannot act as server.
- In peer-to-peer network, all the computers have the same status. Every computer is capable of playing the role of client, server or both at the same time.
- Point-to-Point network is a type of network in which when a message is sent from one computer to another, it usually has to be sent via other computers in the network.
- Local Area Network (LAN) covers a limited area, usually ranging from a small office to a campus of nearby buildings.
- Wide Area Network (WAN) spans a large area, connecting several locations of an organization across cities, countries and continents.
- Metropolitan Area Network (MAN) falls between LAN and WAN. It spans area larger than a LAN but smaller than a WAN, such as a city.
- The physical arrangement of network nodes is known as network topology.
- Bus topology consists of a single central cable known as bus. All the devices are connected to the bus along its length to communicate with each other.
- Ring topology is shaped just like a ring. It is like a bus with both ends connected together.

- Dial-up modem is a communication device that converts digital signals to analog signals for transmission over telephone line. The analog signals are converted back to digital signals by the modem attached to computer at the receiving end.
- DSL modem is a communication device that provides high-speed connection to Internet
- ISDN modem is a device that converts digital signals used in computers to the signals that can be transmitted over the ISDN lines

EXERCISE

- Q1. Select the best answer for the following MCQs.**
- i. In which of the following transmission mode, information is transmitted in both directions but not simultaneously?**

A. Simplex mode	B. Half-duplex mode
C. Full-duplex mode	D. High speed mode
 - ii. In which of the following network, every computer can act as client, server or both at the same time?**

A. Client/server network	B. Peer-to-peer network
B. Point-to-Point network	D. Local area network
 - iii. Which of the following network provides centralized security?**

A. Client/server network	B. Peer-to-peer
C. Point-to-Point network	D. Local area network
 - iv. Which of the following computer shares resources on a network for others to use?**

A. Desktop computer	B. Client
C. Server	D. Microcomputer
 - v. Which of the following topology is most expensive to implement?**

A. Star	B. Bus
C. Ring	D. Mesh
 - vi. In which of the following network topology, switch is required?**

A. Star	B. Bus
C. Ring	D. Mesh
 - vii. Which of the following network is used to provide Cable TV and Internet services?**

A. Local area network	B. Wide area network
C. Metropolitan area network	D. Point-to-Point network
 - viii. Which of the following provides high speed Internet connection?**

A. Dial-up connection	B. DSL connection
C. ISDN connection	D. CDMA connection
 - ix. Which of the following network connects computers across cities, countries and continents?**

