- **Computer Network :-**

Computer network is a system that connects numerous independent computers in order to share information (data) and resources.

- **Advantages of computer networking:-**

The main benefits of networks include:

File sharing – you can easily share data between different users, or access it remotely if you keep it on other connected devices.

Resource sharing – using network-connected peripheral devices like printers, scanners and copiers, or sharing software between multiple users, saves money.

Sharing a single internet connection – it is cost-efficient and can help protect your systems if you properly secure the network.

Increasing storage capacity – you can access files and multimedia, such as images and music, which you store remotely on other machines or network-attached storage devices.

- **Transmission media is a communication channel that carries the information from the sender to the receiver. Data is transmitted through the electromagnetic signals.**

- **Twisted Pair Cable**

It includes two separately protected conductor wires. Normally, some pairs of cables are packaged jointly in a protective cover. This is the most frequently used type of transmission media and it is available in two types.

- **Coaxial Cable**

This cable contains an external plastic cover and it includes two parallel conductors where each conductor includes a separate protection cover. This cable is used to transmit data in two modes like baseband mode as well as broadband mode. This cable is widely used in cable TVs & analog TV networks.

- **Optical Fibre Cable**

This cable uses the notion of light reflected through a core that is made with plastic or glass. The core is enclosed with less thick plastic or glass and it is known as the cladding, used for large volume data transmission.

Network Devices :- Hardware devices that are used to connect computers, printers, fax machines and other electronic devices to a network are called network devices. These devices transfer data in a fast, secure and correct way over same or different networks. Network devices may be inter-network or intra-network. Some devices are installed on the device, like NIC card or RJ45 connector, whereas some are part of the network, like router, switch, etc. Let us explore some of these devices in greater detail.

- **Modem**

Modem is a device that enables a computer to send or receive data over telephone or cable lines. The data stored on the computer is digital whereas a telephone line or cable wire can transmit only analog data.

- **Router**

A router is a network layer hardware device that transmits data from one LAN to another if both networks support the same set of protocols. So a router is typically connected to at least two LANs and the internet service provider (ISP). It receives its data in the form of packets, which are data frames with their destination address added. Router also strengthens the signals before transmitting them. That is why it is also called repeater.

- **Switch**

Switch is a network device that connects other devices to Ethernet networks through twisted pair cables. It uses packet switching technique to receive, store and forward data packets on

the network. The switch maintains a list of network addresses of all the devices connected to it.

- **Gateway**

Gateway is a network device used to connect two or more dissimilar networks. In networking parlance, networks that use different protocols are dissimilar networks. A gateway usually is a computer with multiple NICs connected to different networks. A gateway can also be configured completely using software. As networks connect to a different network through gateways, these gateways are usually hosts or end points of the network.

- **Types of Computer Networks**

A computer network is a cluster of computers over a shared communication path that works for the purpose of sharing resources from one computer to another, provided by or located on the network nodes.

1. **Personal Area Network (PAN) :**

PAN is the most basic type of computer network. This network is restrained to a single person, that is, communication between the computer devices is centred only to an individual's work space. PAN offers a network range of 10 meters from a person to the device providing communication.

2. **Local Area Network (LAN) :**

LAN is the most frequently used network. A LAN is a computer network that connects computers together through a common communication path, contained within a limited area, that is, locally. A LAN encompasses two or more computers connected over a server. The two important technologies involved in this network are Ethernet and Wi-fi.

3. **Wide Area Network (WAN) :**

WAN is a type of computer network that connects computers over a large geographical distance through a shared communication path. It is not restrained to a single location but extends over many locations. WAN can also be defined as a group of local area networks that communicate with each other.

4. **Metropolitan Area Network (MAN) :**

A MAN is larger than a LAN but smaller than a WAN. This is the type of computer network that connects computers over a geographical distance through a shared communication path over a city, town or metropolitan area.

- **Topology is derived from two Greek words topo and logy, where topo means 'place' and logy means 'study'. In computer networks, a topology is used to explain how a network is physically connected and the logical flow of information in the network. A topology mainly describes how devices are connected and interact with each other using communication links.**

- **Bus Topology**

Bus topology is the simplest kind of topology in which a common bus or channel is used for communication in the network. The bus is connected to various taps and droplines.

- **Ring Topology**

Ring topology is a topology in which each computer is connected to exactly two other computers to form the ring.

- **Star Topology**

Star topology is a computer network topology in which all the nodes are connected to a centralized hub.