PON VIDYASHRAM GROUP OF SENIOR SECONDARY SCHOOLS

**APRIL NOTES**

**SUBJECT: COMPUTER SCIENCE** **CLASS: VIII**

**CHAPTER 1**

**COMPUTER NETWORKS**

## I Choose the correct answer:

1. Network that's spans countries and continents is known as_____.
   a. PAN
   b. LAN
   c. **WAN**
2. The device that is used to connect computers in a network is called_____.
   a. Fire wall
   b. **Switch**
   c. Router
3. Which topology has a single continuous cable and is used to connect to all the computers and other devices in a network.
   a. **Bus topology**
   b. Ring topology
   c. Tree topology
4. Railway computer network is an example of _____.
   a. LAN
   b. MAN
   **c. WAN**
5. What is the importance of a computer network?
   a. It allows sharing of resources
   b. It is an effective communication medium
   **c. Both a and b.**

## II Fill in the blanks:

1. Your school's computer network is an example of **LAN.**
2. **MAN** is a large network as compared to LAN.
3. All networks are made up of some essential components known as **building blocks**
4. Communication of data propagation and processing of signals is called **transmission.**
5. **Network topology** can be defined as the layout or design in which various elements of a network are interconnected.

## III Write True or False for the following:

1. In a peer –to-peer network, there is no server needed. **True**
2. Computers connected to a network cannot work independently. **True**
3. A single printer can be used in a network environment to serve all the computers.- **True**

4. LAN covers a large distance as compared to MAN. -**False**
5. Protocols means a set of rules. **True**
6. Firewall is an anti-virus program.-**False**

## IV Short answer questions:

1. **Define the term computer network.**

   A computer network is a system of interconnected computers and peripheral devices that are linked in order to share resources, such as printers, exchange files, and allow communication.

2. **Explain twisted pair and coaxial cables.**
   - **Twisted Pair Cable:** It consists of a pair of insulated wires twisted together. The use of two wires twisted around each other helps to reduce any disturbance and noise in the signals
   - **Coaxial Cable (coax):** It is an electrical cable with a conductor at its centre. The inner conductor is surrounded by a tubular insulating layer. The insulating layer is surrounded by a conductive layer called the shield which is finally covered with a thin insulating layer on the outside.

3. **What is the bus topology?**

   Bus networks use a common backbone to connect all devices. A single cable called the backbone functions as a shared communication medium to which the devices are attached with an interface connector. This kind of topology is normally used for small networks.

4. **What do you mean by 'full mesh'?**

   A mesh network in which every device connects to every other is called a full mesh.

5. **What works does the modem do?**

   It is an electronic device that converts the digital signals of a computer into the analog form so that they can travel over a telephone line.

## V Long answer questions:

1. **List the advantages of computer networks.**

   Computers connected in a network have the following advantages over a stand-alone computer:

   **Ease of Communication:** Communication means the transfer of information from a sender, across a distance, to a receiver. Computer networks allow people to communicate with each other by exchanging messages and information.

   **Sharing of Hardware Resources:** Another important advantage of networking is the ability to share hardware. For example, a printer can be shared among the users in a network so that there is no need to have individual printers for each and every computer in a company.

   **Sharing of Software:** Users can share software within a network easily. Networkable versions of the software are available at a considerably lower price compared to individually licensed versions of the same software.

   **Data Sharing:** People can find and share information and data because of networking.This is beneficial for large organizations to maintain their data in an organized manner and facilitate access for desired people.

2. **Briefly explain the components of a network.**

All networks are made up of some essential components, known as the building blocks. These components are:

(a) Network hardware
(b) Transmission media
(c) Network software

**Network Hardware**

Computers on a network can be divided into two categories: servers and clients/ nodes. A server computer usually has a higher configuration and speed. The clients, also known as nodes, are the resources which are attached to the server. Many different devices are used to set up a computer network. Some of them are

- The Network Interface Card (NIC)
- Modem
- Hubs, Switches and Repeaters

**Transmission Media**

A transmission medium is needed to connect the computers to each other in a network so that data signals can be transmitted among them. The medium can be guided or unguided. There are three types guided medium

- Twisted Pair Cable
- Coaxial Cable (coax)
- Optical Fibre Cable

**Network Operating System/ Software**

To operate a network, you need to install a special Network Operating System. Some popular network operating systems are Novell NetWare, Windows NT, UNIX, etc.

3. **Describe the hardware devices used to set up a computer network.**

Many different devices are used to set up a computer network. Some of the hardware devices are:

- **The Network Interface Card (NIC)**

  To connect to a network, a computer must have a Network Interface Card or NIC. The NIC joins the computer to the network allowing it to communicate with the other computers on the network.

- **Modem**

  It is an electronic device that converts the digital signals of a computer into the analog form so that they can travel over a telephone line. At the destination, the receiving modem converts the analog signals back into their digital form so that the destination computer understands them. There are four basic types of modems for a PC:

  (a) External modem
  (b) USB modem
  (c) Internal modem
  (d) Built-in modem

- **Hubs, Switches and Repeaters**

  Hubs, sometimes also known as concentrators, connect workstations and send every transmission to all the connected workstations. A switch is a device that is also used to connect computers in a network. Unlike a hub, a switch sends the incoming data to the desired destination workstation only. A repeater receives a signal on one of its

ports, regenerates the signal, and then retransmits the signal on all of its remaining ports.

4. **Write a note on the transmission media.**

Communication of data propagation and processing of signals is called transmission. Signals travel from transmitter to receiver via a path. This path is called medium. The medium can be guided or unguided. A transmission medium is needed to connect the computers to each other in a network so that data signals can be transmitted among them.

In guided media, data are sent along a physical path, i.e. cables. The three types of cables used to network computers are twisted pair cables (regular phone lines), coaxial cables and fibre optic cables.

➤ Twisted Pair Cable: It consists of a pair of insulated wires twisted together. The use of two wires twisted around each other helps to reduce any disturbance and noise in the signals. Twisted pair cable comes in two varieties-shielded (Shielded Twisted Pair or STP) and unshielded (Unshielded Twisted Pair or UTP). UTP cable is the most common cable used in computer networking.

➤ Coaxial Cable (coax): It is an electrical cable with a conductor at its centre. The inner conductor is surrounded by a tubular insulating layer. The insulating layer is surrounded by a conductive layer called the shield which is finally covered with a thin insulating layer on the outside.

➤ Optical Fibre Cable: It consists of a centre glass core surrounded by several layers of protective material. It transmits data in the form of light rather than electronic signals, thus eliminating the problem of electrical interference. It also has the capability to carry data at a very high speed.

In unguided media, no wires are installed. The data communication is predominantly sent by radio waves, microwaves or satellites.

5. **Explain the classification of networks based on the area covered by them.**

Depending on the geographical area covered by a network, there are four types of computer networks. They are:

**Personal Area Network (PAN)**: A personal area network is a computer network used to communicate among various electronic devices such as personal computers, mobile phones, etc. The area of a PAN is typically a few metres.

**Local Area Network (LAN):** A local area network is a computer network that is limited to a local area, such as a laboratory, a school or an office building. The computers in a LAN may be connected through wires and cables or by means of some wireless technology.

**Metropolitan Area Network (MAN):** A metropolitan area network is a computer network that usually covers a larger area than a LAN. For example, a network that connects two offices in a city/The network of ATMs in a city is an example of MAN.

**Wide Area Network (WAN):** A wide area network is a computer network that spans a wide geographical area. A WAN may be spread across cities, countries and continents. Internet is an example of WAN.

**6. What is network topology? Explain bus and ring topologies.**

Network topology can be defined as the layout or design in which various elements of a network are interconnected. Topology can be considered as the overall structure or shape of a network.

**Bus Topology:** Bus networks use a common backbone to connect all devices. A single cable called the backbone functions as a shared communication medium to which the devices are attached with an interface connector. This kind of topology is normally used for small networks.

**Ring Topology:** In a ring topology, all the computers and other devices are connected to each other in a closed circle. There is no central server machine. Instead, each machine is connected to two other machines. In this topology, data are transmitted in one direction only.

7. **What is network security? Explain briefly.**

A computer on a network can be accessed by many users. Security measures have to be taken to protect networks from unauthorized access and prevent data or information theft. Some of these measures are:

**Installing Anti-virus Software:** Anti-virus software can be used to protect the computer from various types of malware. Anti-virus software can detect viruses, worms, etc. and warn you of their presence in your computer. It can also deactivate and clean the computer of different types of malicious software. Every computer on a computer network must have anti-virus software installed. The anti-virus software must be updated on a regular basis. There are various types of anti-virus software, such as AVG, Avira, Norton, McAfee, etc.

**Using a Firewall:** In computing, a firewall is a network security system that controls the incoming and outgoing network traffic based on the applied set of rules. A firewall establishes a barrier between a trusted, secure internal network and another network (e.g., the Internet) that is not assumed to be secure and trusted.

## VI Differentiate between:

1. **PAN and LAN**

| PAN | MAN |
|---|---|
| • This is Personal Area Network.<br>• This computer network used to communicate among various electronic devices such as personal computers, mobile phones, etc.<br>• The area of a PAN is typically a few metres. | • This is Metropolitan Area Network.<br>• This computer network is limited to a local area, such as a laboratory, a school or an office building.<br>• The scope is usually within single building or between buildings. |

2. **MAN and WAN**

| MAN | WAN |
|---|---|
| • This is Metropolitan Area Network.<br>• This computer network is limited to a local area, such as a laboratory, a school or an office building. | • This is Wide Area Network.<br>• A wide area network is a computer network that spans a wide geographical area, such as across cities countries or continents. |

3. **Switch and repeater**

| Switch | Repeater |
|---|---|
| • A switch is a device that is used to connect computers in a network.<br>• A switch sends the incoming data to the desired destination workstation only. | • A repeater receives a signal on one of its ports, regenerates the signal, and then retransmits the signal on all of its remaining ports.<br>• Repeaters can extend the length of the network by connecting two network segments**.** |

4. **Client/server network and Peer- to- Peer network.**

A client/server network is a network in which the shared files and applications are stored in the server but network users (clients) can still store files on their individual PCs whereas, a Peer-to-Peer or P2P network is a network with all the nodes that act as both servers and clients. A PC can access files located on another PC and can also provide files to other PCs. All computers in the peer-to-peer network have equal responsibilities and capabilities to use the resources available on the network.

5. **Ring topology and mesh topology**.

- In Ring Topology, each node is connected to its left node and right node, while in Mesh Topology, each node is connected to each other via dedicated links.
- Ring Topology is cheaper than Mesh Topology. Mesh Topology is expensive considering more links as compared to Ring Topology.
- In Ring Topology, the information travels from nodes to nodes in a ring manner in one direction, while in Mesh Topology, the information travels from nodes to nodes.
- Ring Topology is used in LAN, while Mesh Topology is mostly used in Wide Area Networks (WAN).
- The failure of a single node can cause the entire network to fail in ring topology whereas, in mesh topology, the failure of a single node does not cause the entire network to fail as there are alternate paths for data transmission.