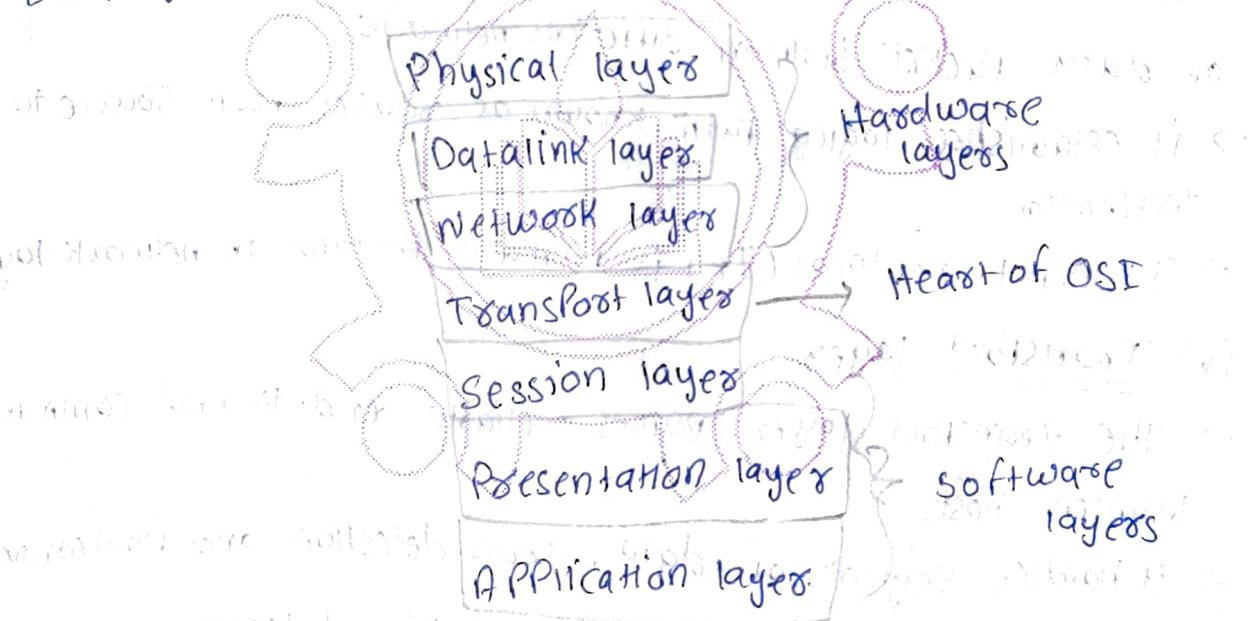


1) Explain the functionality of each layers in OSI reference model?

OSI Reference model:

The open systems interconnection (OSI) model is a conceptual framework used to understand the functions of various networking protocols. It divides network communication into 7 different layers.

- it divides network communication into 7 different layers
- Each layer is responsible for specific tasks and interactions



i) Physical layer:

- This is the bottom most layer of the OSI model.
- The Physical layer deals with the physical transmission of data.
- It has various network components like cables, optical fibers etc.

→ it transmits raw bits over a communication channel.

ii) Data link layer:

→ The Data link layer provides error free transmission of data frames between two nodes.

→ The bits of data from Physical layer are converted into frames of data.

→ This layer physically links two nodes, handles flow control.

iii) Network layer:

The network layer is responsible for the routing and forwarding of data packets between different networks.

→ It establishes logical path known as routes from source to destination.

→ Internet Protocol (IP) is primary protocol in network layer.

iv) Transport layer:

→ The transport layer ensures reliable end-to-end communication between hosts.

→ It handles segments of data, errors detection and flow control.

→ Transmission control protocol and user datagram protocol are used in this layer.

v) Session layer:

The session layer establishes, maintains and synchronizes communication between applications.

- it manages session setup and recovery, as well as, checkpoints.
- Examples for session layer protocols are Remote Procedure Call (RPC).

vi) Representation layer:

- The presentation layer is responsible for data translation, encryption to ensure that application layers can understand.
- it handles data encryption, characters encoding and compression.

vii) Application layer:

- The application layer provides network services directly to end users.
- it enables user interaction with network services.
- the protocols used are HTTP, FTP etc..

2) Explain TCP/IP Reference model?

The TCP/IP model also known as the internet protocol suite, is a conceptual framework that defines protocols used for communication.

- unlike OSI model, this model only has 4 layers, each responsible for specific functions in networking.

i) Application layer:

The application layer in TCP/IP model is combination of Application, Presentation and session layers of OSI model.

- it provides network services directly to end users
- This layer includes protocols for such as HTTP, FTP, DNS etc.

ii) Transport layer:

The Transport layer in TCP/IP model is similar to the transport layer in the OSI model.

- it ensures reliable end-to-end communication between ends
- Transmission Control Protocol (TCP) and User Datagram Protocol (UDP) is used in this layer.

iii) internet layer:

The internet layer in TCP/IP model is equivalent to the network layer of OSI model.

- it is responsible for addressing, routing and forwarding packets between networks.

iv) Link layer:

The link layer in TCP/IP model corresponds to data link, physical layers of OSI model.

- it defines the protocols and hardware technologies used to transmit data over physical network.

3) Compare and contrast TCP/IP and OSI models.

TCP/IP model

- These are 4 layers
- Developed by Department of Defence (USA)
- widely used practically
- more flexible
- Tangible
- Developed with a focus on practical implementation
- client server model
- Horizontal approach

OSI model

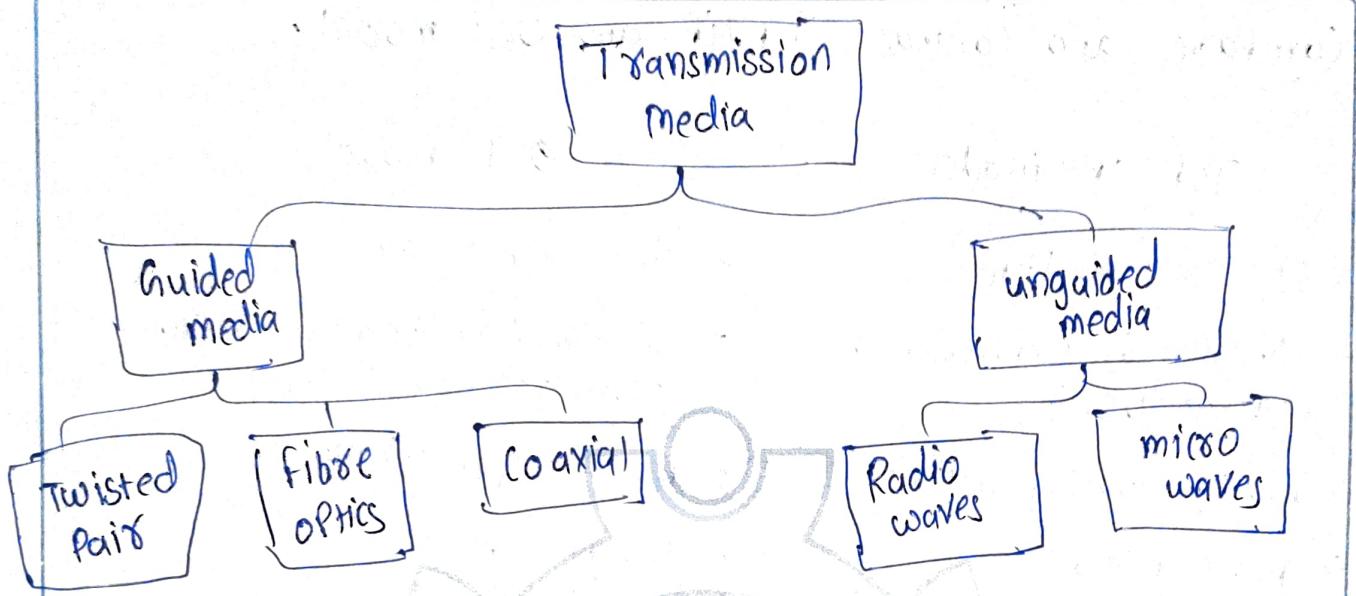
- There are 7 layers
- Developed by ISO (international standards organization)
- Not used practically
- less flexible
- not tangible
- often used for educational purposes.
- theoretical model
- vertical approach

4) Explain about various layer with a neat sketch?

Transmission media:

Transmission media is a communication channel that carries the information from sender to receiver.

- The main function of Transmission media is to carry the information in the form of bits through LAN.
- it is a physical path between a transmitter and a receiver.
- There are different types of Transmission media,



Guided media:

Guided media is a Physical media through which the signals are transmitted.

- it is also known as wired media or bounded media.
- There are 3 types of Guided media.
 - i) Twisted pair
 - ii) coaxial cable
 - iii) fibre optics.

i) Twisted pair:

Twisted Pair is a cable consists of pair of insulated copper wires twisted together.

- They are commonly used in Ethernet networks for short to medium distance communication.

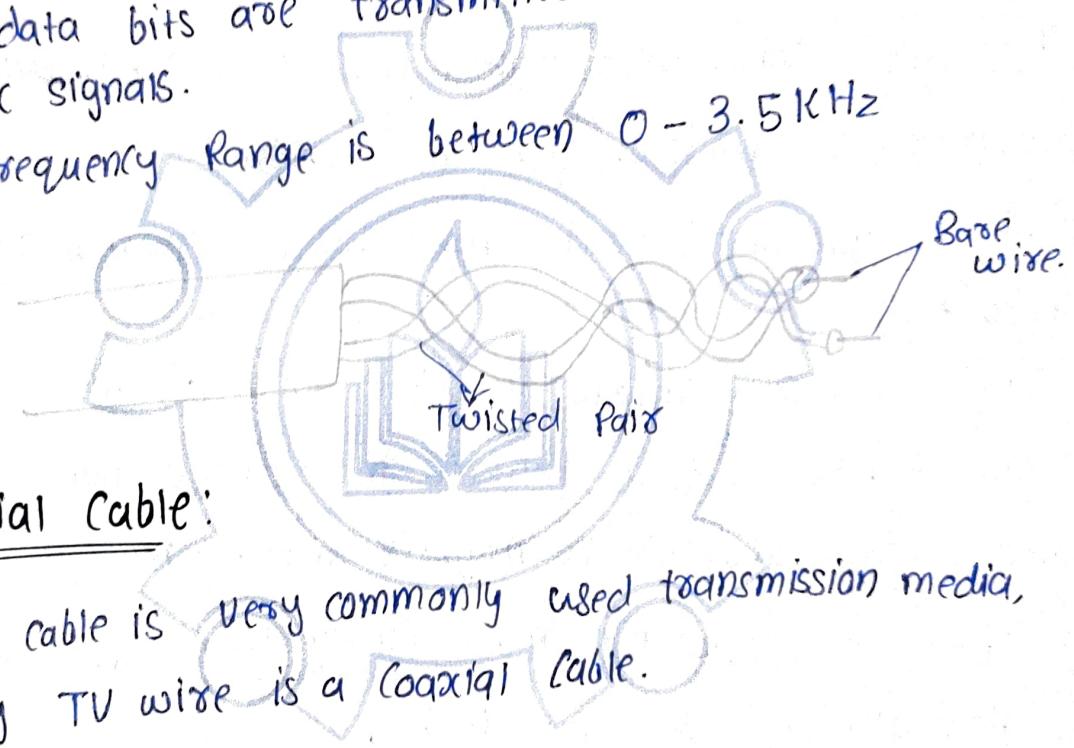
→ The Twisted Pair cable is cheap as compared to other transmission media.

→ It is also easy to install.

→ It is a lightweight cable

→ The data bits are transmitted in the form of electric signals.

→ The frequency range is between 0 - 3.5 KHz



ii) Coaxial Cable:

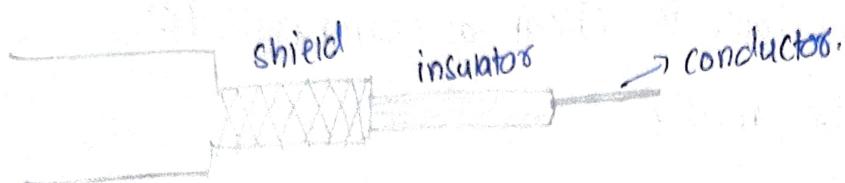
→ Coaxial cable is very commonly used transmission media. Generally TV wire is a coaxial cable.

→ Coaxial cables consist of a central conductor surrounded by an insulating layer, a metallic shield and an outer layer.

→ These cables can be operated for a long distance communication

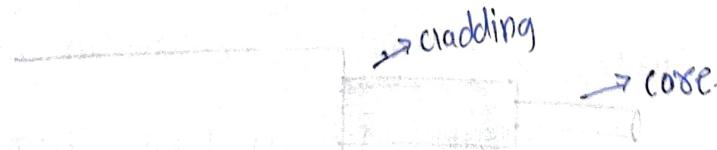
→ The name of this cable is coaxial because it contains two conductors parallel to each other.

→ It has higher frequency as compared to twisted pair cables.



iii) Fibre optic:

- fiber optic cables uses light signals to transmit data through a core made of glass or Plastic fibers.
- This is the one of the most fastest transmission media.
- This is most suitable for very long distance communication.
- The Plastic coating protects the optical fibers from heat, cold and electro magnetic interference.
- These are generally more costly than copper wires.
- They also provide very high frequency communication.



UnGuided media | wireless Transmission

An unguided transmission transmits electromagnetic waves without using any physical medium. Therefore it is also known as wireless transmission.

- In unguided media, Air is a medium through which electromagnetic signals are transmitted.
- Radio waves or microwaves are used in general.
- It offers mobility and flexibility in networks.
- The various wireless transmission technologies include, WiFi, Bluetooth, cellular networks and satellite communication.

5) Explain various types of Computer Networks?

A network setup by connecting two or more computers through communication channels is called as computer network.

- It enables computers to communicate with each other and to share data and resources.
- A computer network can be categorized by their size.
- There are mainly 4 types,

- i) Local Area Network (LAN)
- ii) Personal Area Network (PAN)
- iii) Metropolitan Area Network (MAN)
- iv) Wide area network (WAN)

i) Local Area Network (LAN):

Local area network is a group of computers connected to each other in a small area such as building, office.

- LAN is used for connecting two or more personal computers through medium such as twisted pair, coaxial cables.
- it is less costly
- Ethernet and wifi are common technologies used to implement LANs.

ii) Personal Area Network (PAN):

Personal area network is a network arranged within an individual person, typically within a range of 10 meters

- PAN is used for connecting the computer devices of personal use.
- Bluetooth and mobile hotspot are common technologies used to implement PANs

iii) metropolitan area network: (MAN):

A metropolitan area network is a network that covers a larger geographic area by interconnecting different LANs together.

- Government agencies use MAN to connect to the citizens & private industries
- These are very large networks but smaller than WANs
- The networks are connected using a telephone line.

iv) wide Area Network (WAN):

A wide area network is a network that extends over a large geographical area such as states or countries

- They use long distance communication media such as fiber optics and satellite links
- The internet as a whole is the largest WAN, connecting networks and devices world wide.

6) write a short note on ARPANET?

ARPAnet stands for Advanced Research Projects Agency network.

- ARPANET was created to make access to computers easier to people.
- It is also used to have a more effective communication method for military.
- It was first used for packet switching.
- Later ARPANET was converted to TCP/IP.
- It was developed by Department of Defence, USA.