

~~Ch 17 & 18~~

UNIT - 4 Data Communication & Networking

- Data is the raw facts collected through some observation.
- Information is the processed data.

Communication : sharing of information or data

a) local

(face-to-face)

b) remote

(sharing info over distance)

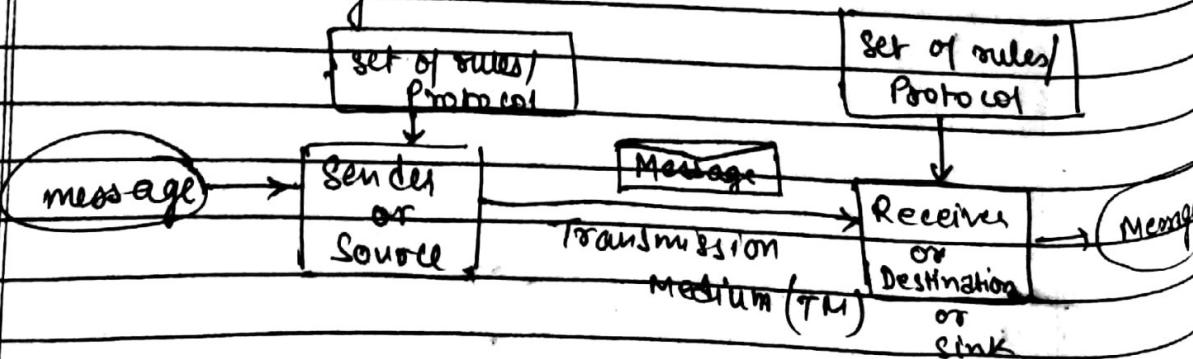
Eg: Telephone, etc.

Data Communication

It is process of exchanging information either locally or ~~remotely~~ remotely.

Components of Data Communication

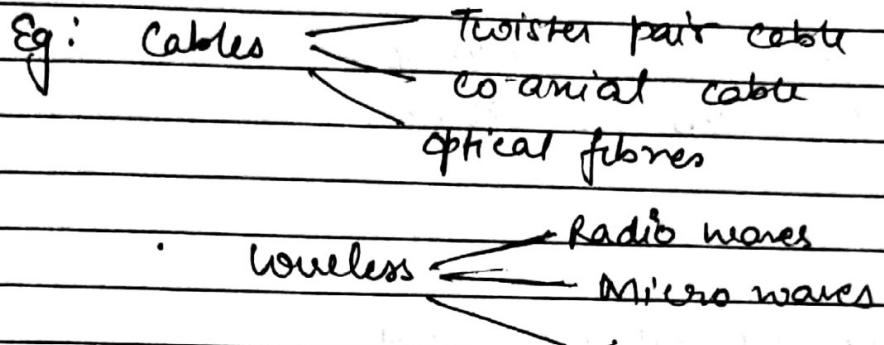
- ① Message (Data / Information)
- ② Sender
- ③ Receiver
- ④ Transmission medium (TM)
- ⑤ Protocol & software



GOOD WRITE

Transmission Media

It actually carries the actual message from the source to the destination.



They are of two types :-

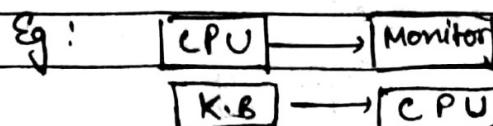
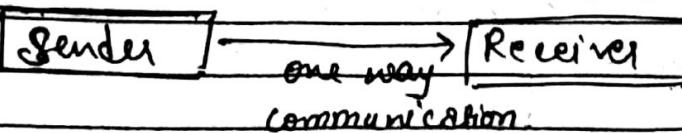
1. Wired
2. Wireless

Data Transmission Modes

→ 3 kinds of data transmission modes

1. Simplex Mode (one way)
2. Half Duplex
3. Full Duplex

1. Simplex Mode only one way data transmission b/w sender and receiver.



GOOD WRITE

2. Half Duplex



Eg: Walkie - Talking,
Web servers

Data Transmission Speed

- Data transfer rate is called the bandwidth.
- Data transfer rate is also called band rate.
- Bandwidth:— amount of data transmitted per unit time
- Bandwidth is measured in bits per sec. (bps)

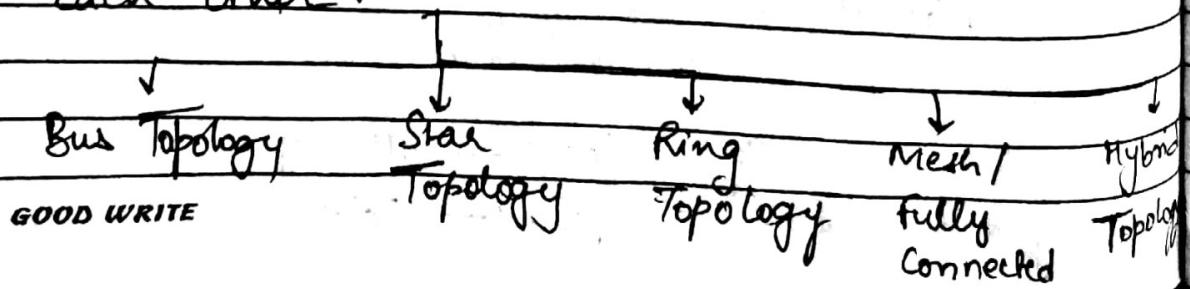
Eg: Bandwidth of a channel = 100 bps

(means 100 bits of
data transmitted per sec)
or

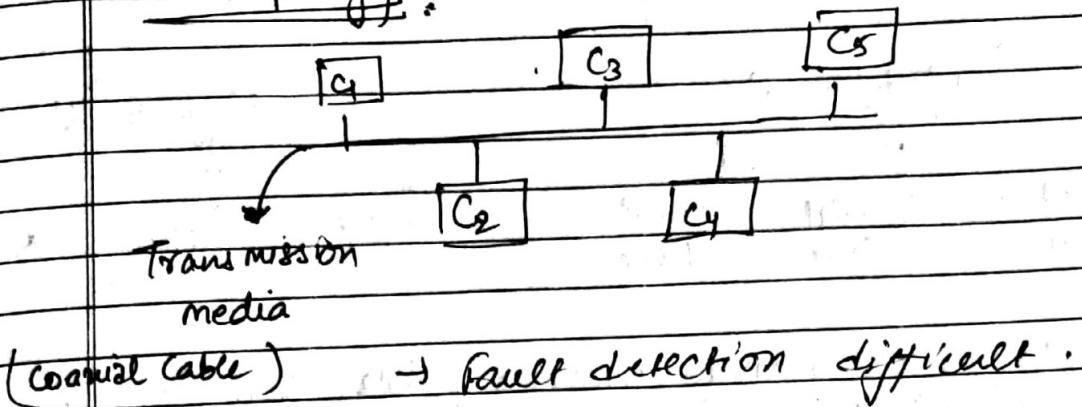
100 band.

Computer Network Topology

It is an arrangement that describes how the computers in a network are connected to each other.



1. Bus Topology



Eg: Ethernet

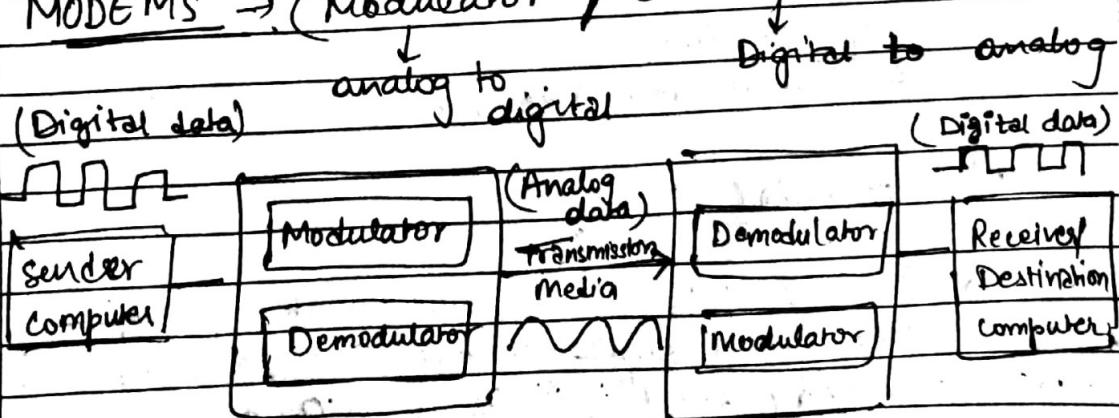
2. Ring Topology

Eg: Token Ring → coaxial / twisted pair
FDDI → optical fibre

3. Mesh Topology

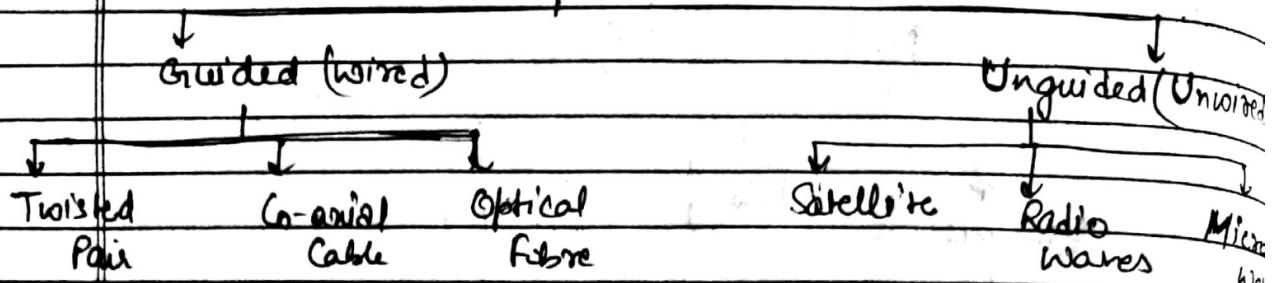
If computers are attached in a mesh network then total no. of links = $\frac{n(n-1)}{2}$

MODEMS → (Modulator & Demodulator)

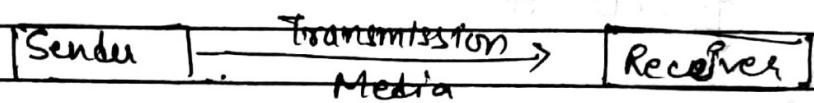


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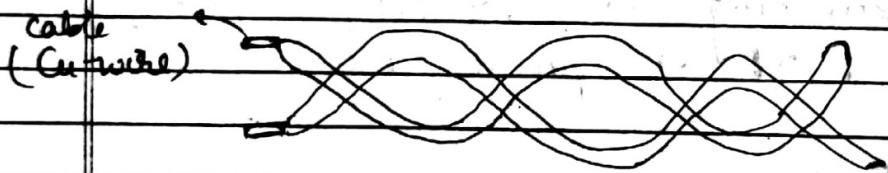
Data Transmission Media



Purpose is to carry messages / data from source (sender) to destination (receiver).



① Twisted Pair



→ consist of two insulated Cu wire twisted together to minimize the noise so that data can be received properly.

UTP → ~~Enclosed~~ Unshielded twisted pair

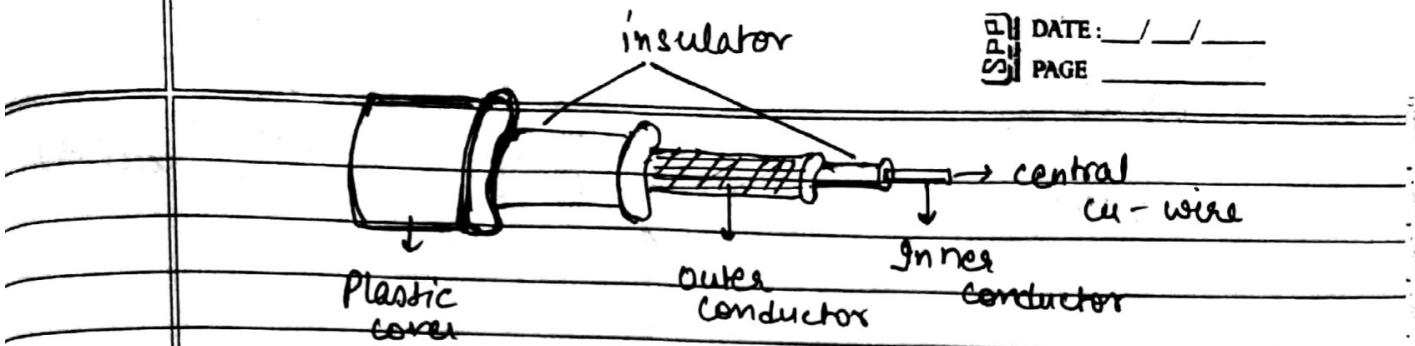
→ Applications:

Telephone line

LAN (Local Area Network)

② Co-axial cable

→ Instead of two wires like twisted pair, a co-axial cable has a single central Cu-wire enclosed in an insulating sheath, which is enclosed in an outer conductor of metal foil.



- Widely used in analog telephone networks where a single co-axial cable network carry 10,000 voice signals.
- Cable TV network, LAN called ethernet.

⑧ Optical Fibre

Eg: FDDI LAN

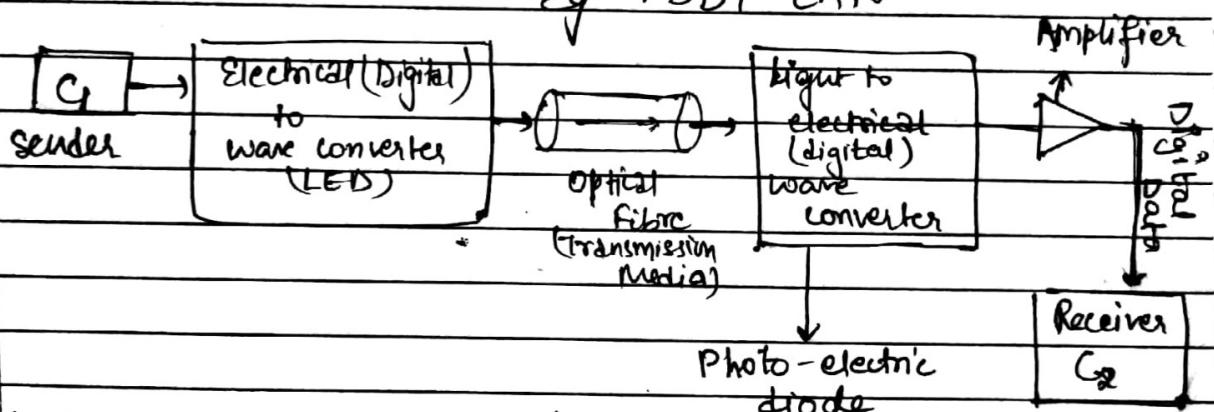
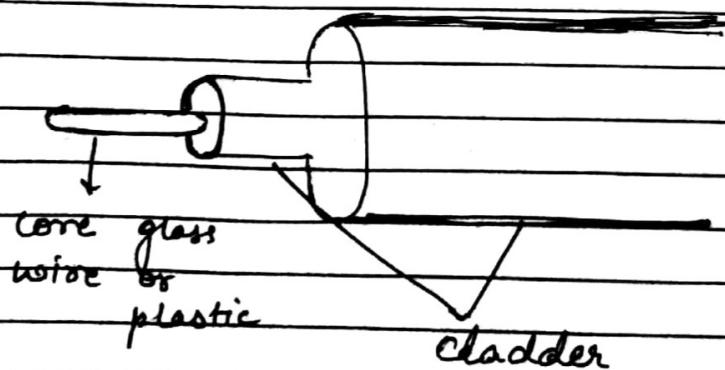
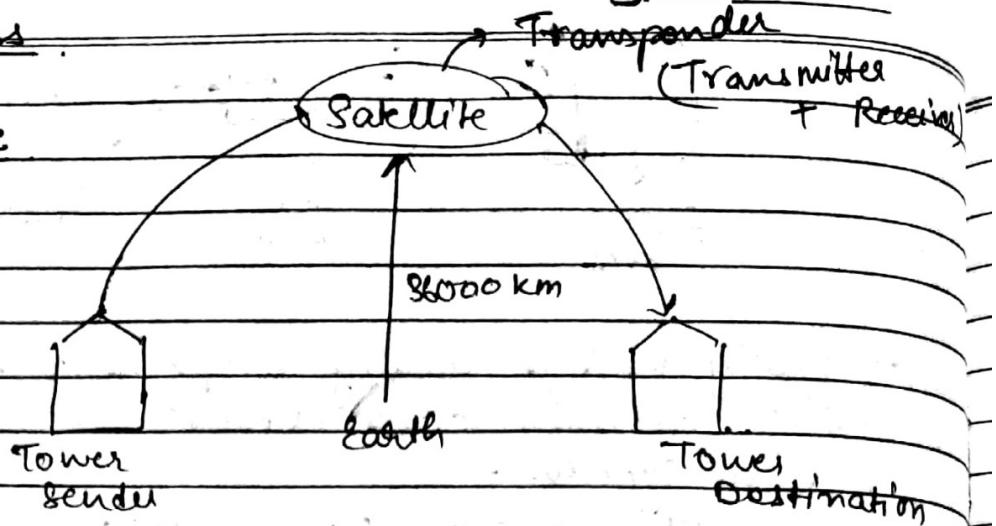


Fig: Internal structure of Optical fibre



Wireless

① Satellite



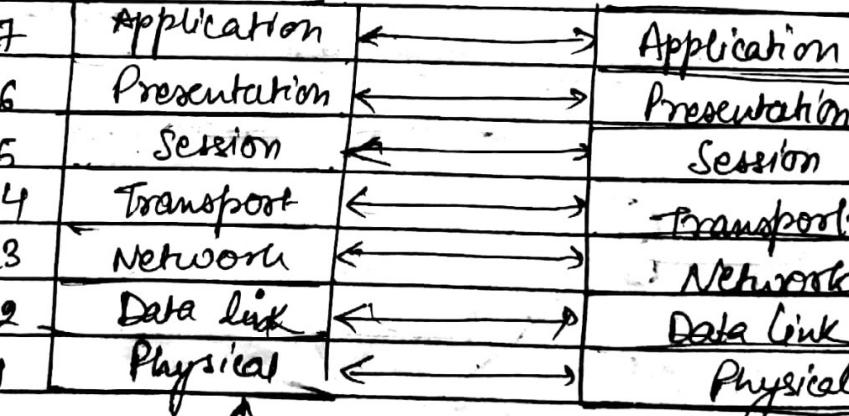
LAN Protocol → Networking Software

↳ OSI - ISO Reference Model

• Open System Interconnection developed by
an organisation ISO

International Standard

• It has seven layers.



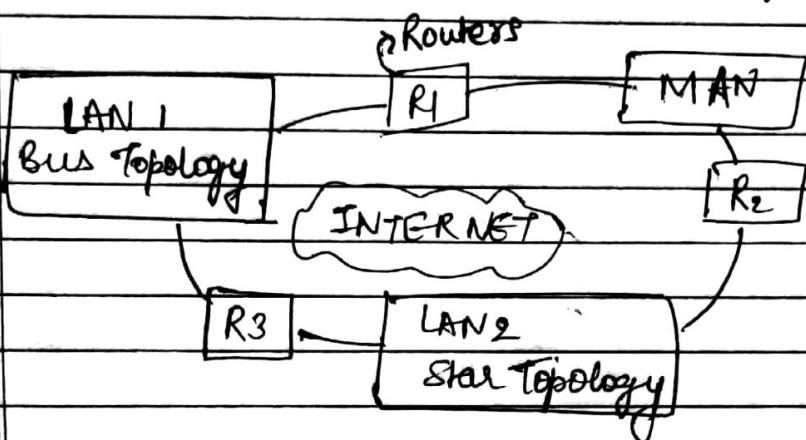
Sender Node

Receiver Node

WAN Protocol

- TCP / IP (Transmission Control Protocol / Internet Protocol)
- It has 5 layers.

Internet → It is a network of networks
(It can be heterogeneous.)



World wide web (www) or Web server.

It is online repository of information or data.

Q. What is web browser?

Q. What is E-mail?

IP Address \Rightarrow 32 bits / 4 bytes

↳ Unique Identification Number

↳ 4 Octets

Q. Diff b/w Distributed & Parallel Computer System.

↳ Loosely coupled

↳ Tightly coupled