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CT-03

1. a) what is transmission media? describe 6
transmission media form?

b. what is channel capacity? describe 4
numerous factors

c. what do you mean by switching? describe 4
about switching.

2. a) what is line coding? describe about 6
line coding?

b) briefly describe about uni-polar encoding 4

c) describe about bipolar encoding and 4
block coding.

3. a) briefly describe about sampling 7
quantization and encoding.

b) describe about parallel transmission, 7
serial transmission and asynchronous serial
transmission.

4. a) describe analog-to-analog conversion. 8
and describe Analog-to-analog conversion
with amplitude modulation, frequency
modulation and phase modulation.

b) describe twisted pair cable 6
and type of twisted pair cable.

5. a) what do you mean by Fiber optics? 5

describe about fiber optics

b) describe about coaxial cable and 7
and power lines

c) what is wireless transmission. explain 2
briefly

6. a) what do you mean by radio transmis- 7
sion and microwave transmission.
explain briefly.

b) describe about frequency division 7

multiplexing and time division multiplexing.

7. a) what is application layer? explain 5

broadly.

(b) what do you mean by http? describe 6
broadly?

(c) what is FTP?

3

8. a) describe about application service 6

(b) what is network service. Describe 8

basic of computer network?

Ans to the que no 1(a)

transformation media: The media over which the information between two computer system is sent, called transmission media.

forms of transformation media:

transformation media comes in two forms.

(1) guided media: All communication wires / cables are guided media, such as UTP, coaxial cables, and fiber optics. In this media, the sender and receiver are directly connected and

The information is send (guided) through it.

(2) unguided media: wireless or open air space is said to be unguided media

because there is no connectivity between
The sender and receiver information is
spread over the air, and anyone including
The actual recipient may collect the information.

Ans to the que no 1(b)

channel capacity: The speed of transmission
of information is said to be the channel
capacity we count it as data rate in
digital world. It depends on numerous factors
such as:

Bandwidth: The physical limitation on
underlying media.

Error-rate: Incorrect reception of information because of noise.

Encoding: The number of levels used for signaling.

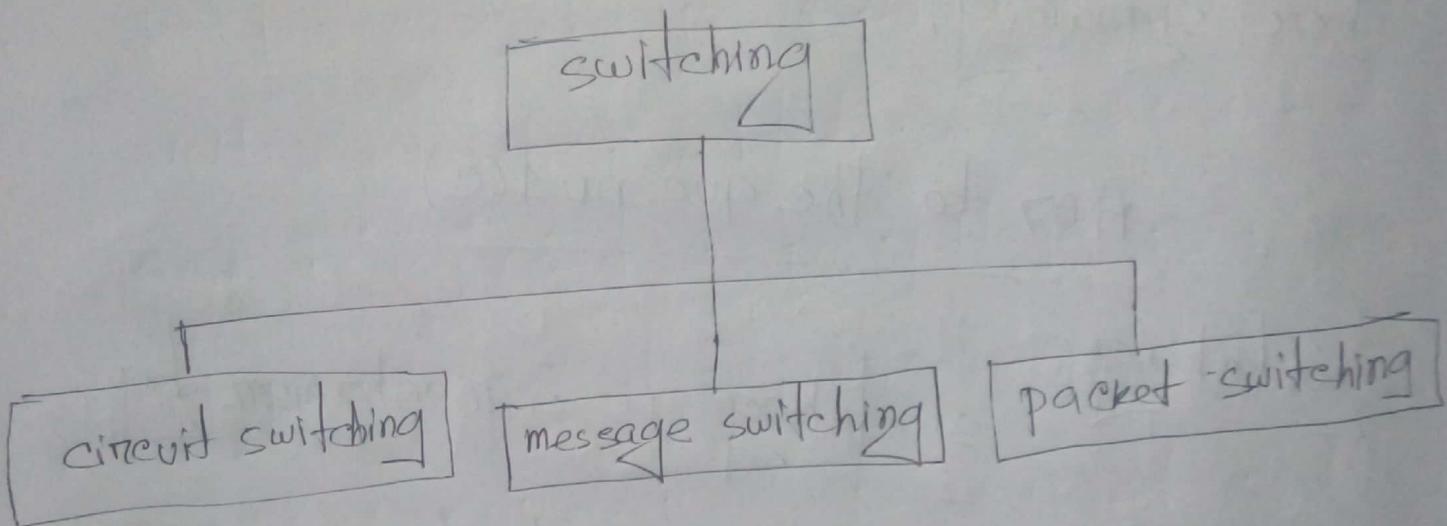
Ans to the que no 1(c)

switching: switching is a mechanism by which data/information sent from source towards destination which are not directly connected.

Networks have interconnecting devices which receives data from directly connected sources, store data

analyze it and then forwarded to the next interconnecting device closest to the destination.

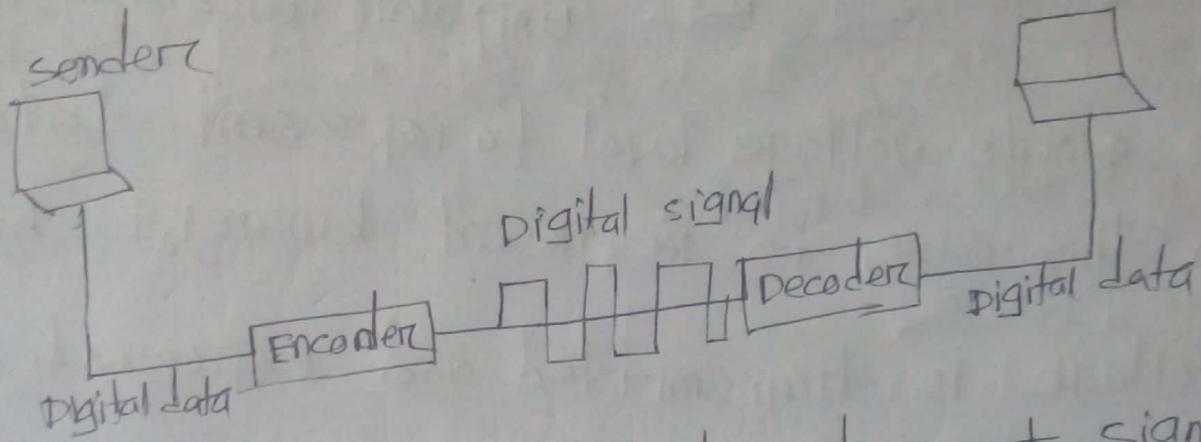
switching can be categorized as:



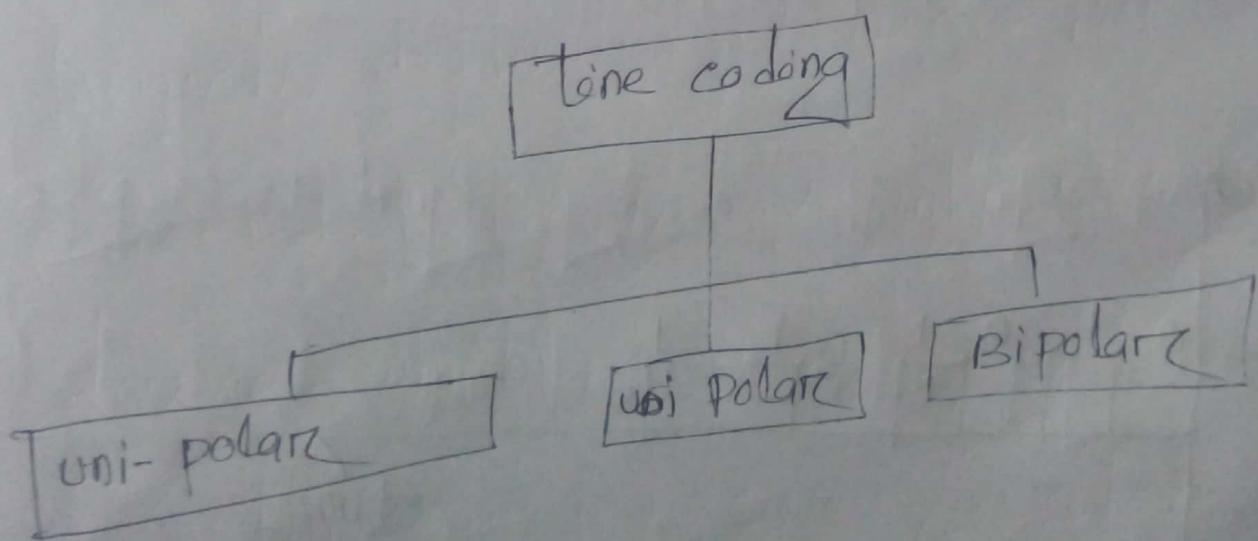
Ans to the que no 2(a)

Line coding: The process for converting digital data into digital signal is said to be line coding. Digital data is found

in binary format, it represented (stored) internally series of 1's and 0's

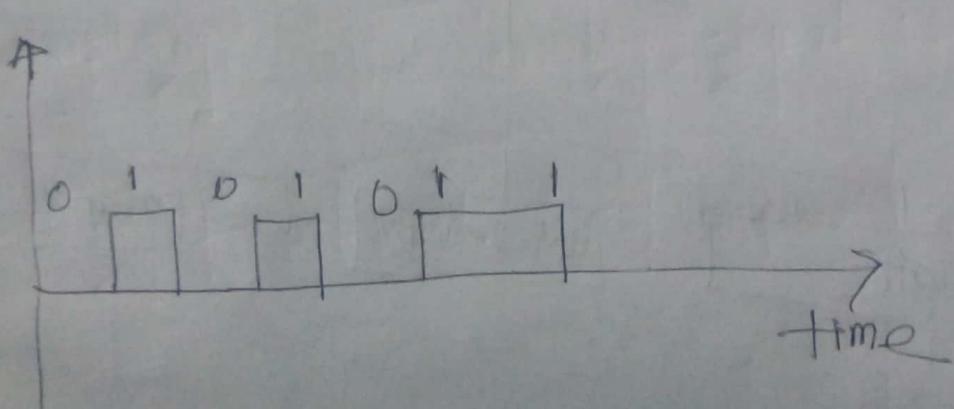


Digital signal is denoted by discrete signal, which represents digital data. There are three type of line coding schemes available



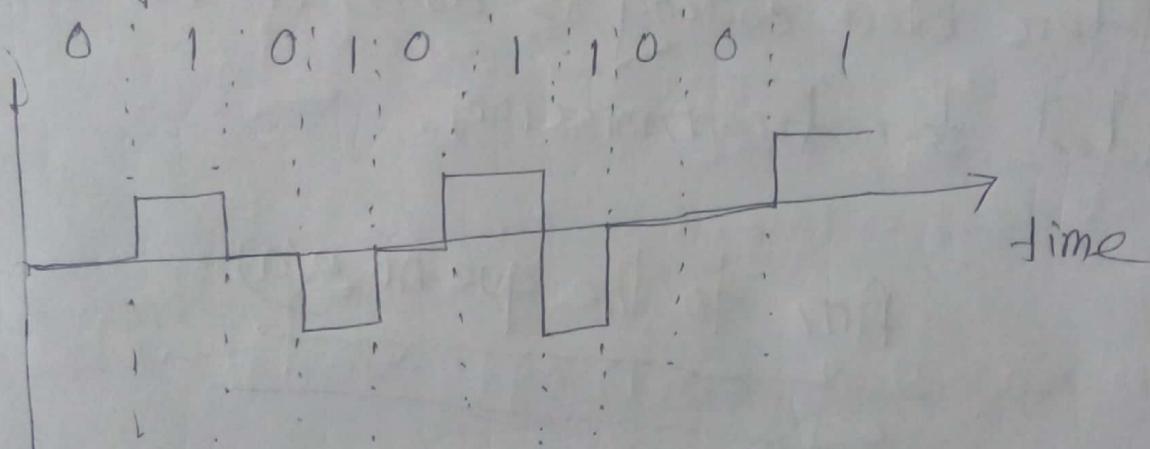
Ans to the que no 2(b)

- ' Uni-polar encoding': unipolar encoding scheme
use single voltage level to represent data.
In this case, to represent binary, 1; high voltage is transmitted and represented
and to represent 0, no voltage is transmitted.
It is also called unipolar - Non return - to -
zero, because there is no rest condition
it either represents 1 or 0



Ans to The que no 2(c)

Bipolar encoding: bipolar encoding uses three voltage levels, positive, negative and zero, zero voltage represents binary 0 and bit 1 is represented by altering positive and negative voltages.



Block coding: to ensure accuracy of the received data frame redundant bits are used. for example, in even-parity, one parity bit is added to make the count of 1's

in the frame even. This way the original number of bits is increased. It is called block coding.

block coding is represented by slash notation, mB/nB .

- o Division
- o substitution
- o combination

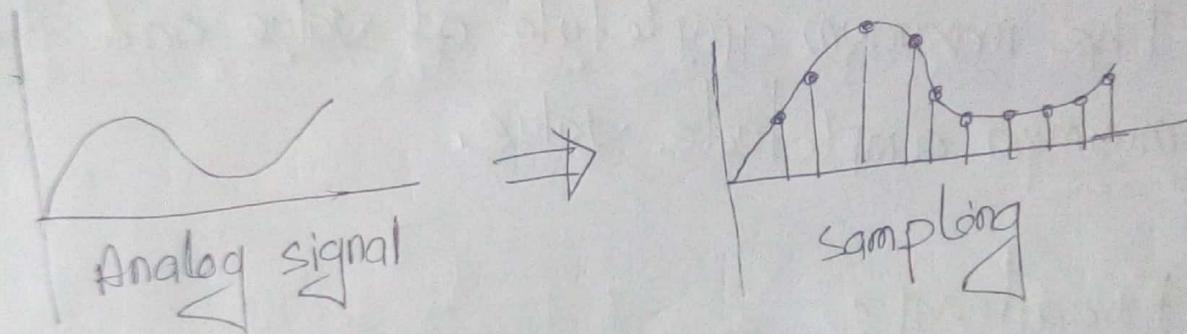
After block coding is done, it is line coded for transmission.

Amt to the que no 3(a)

sampling: The analog signal is sampled every + interval. Most important factor

is sampling is The rate at which

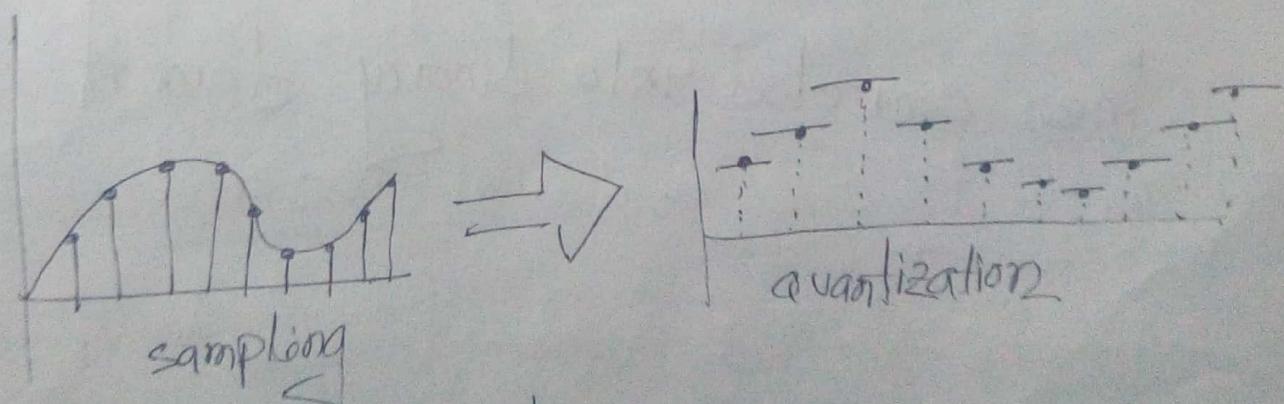
analog signal is sampled



According to Nyquist theorem, the sampling rate is the rate at which analog signal is sampled

The sampling rate:

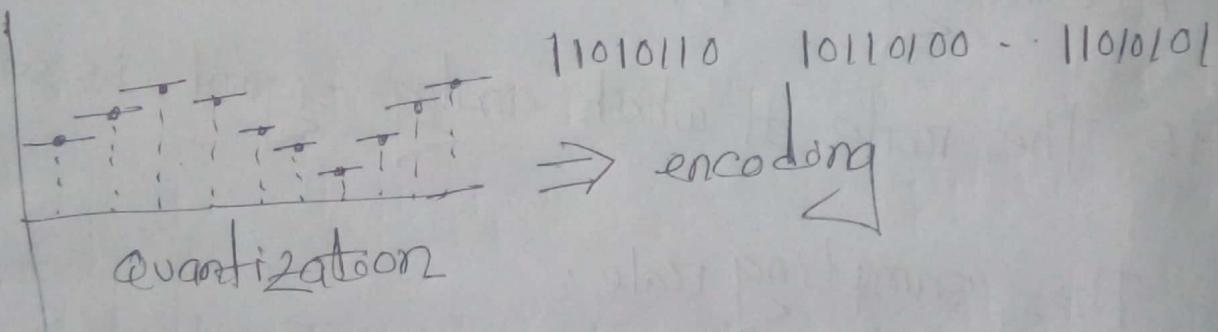
Quantization:



sampling yields discrete form of continuous analog signal. every discrete pattern shows

The amplitude of the analog signal at that instance. The quantization is done between the maximum amplitude of value and the minimum amplitude value.

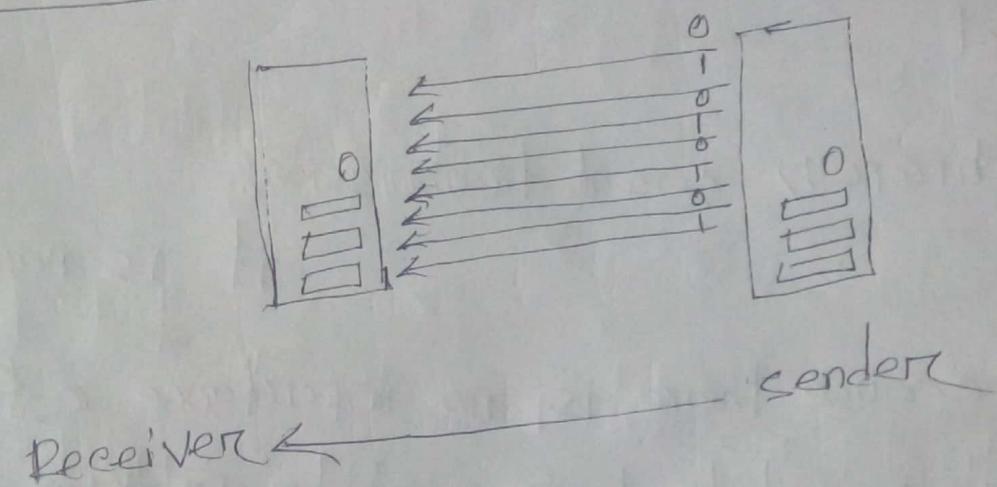
Encoding:



In encoding, each approximated value is then converted into binary format

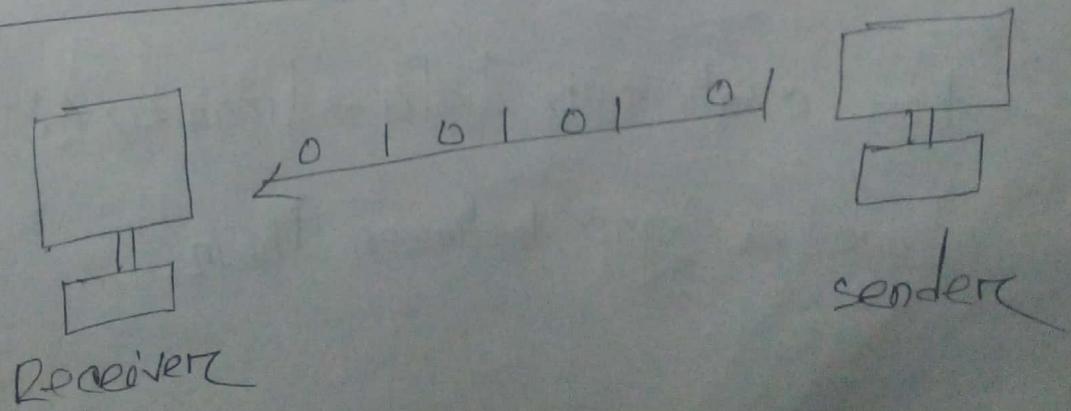
Ans to the que no 3(b)

parallel transmission:



The binary bits are organized in-to group of fixed length. both sender and receiver are connected in parallel with the equal number of data lines.

serial transmission:



In serial transmission bits are sent one after another in a queue manner, serial transmission requires only one communication channel.

Asynchronous serial transmission:

if it is named

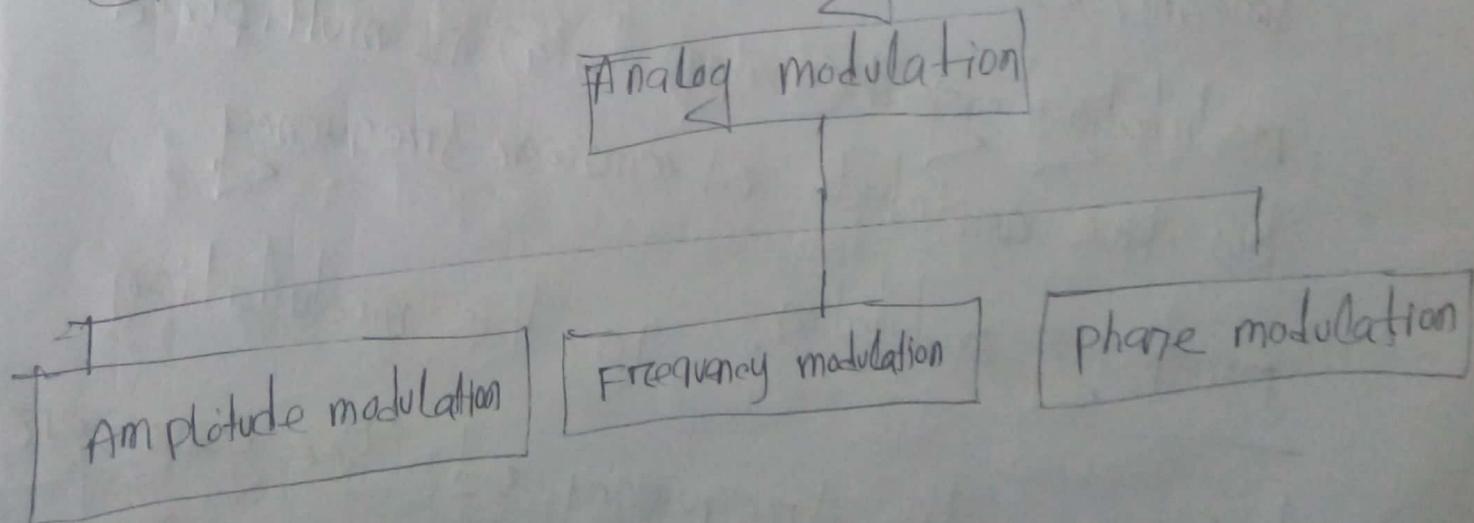
so because there is no importance of timing. Data bits have specific pattern and they helped receiver recognize the start and end data bits. For example, a 0 is prefixed on every data byte and one or more 1s are added at the end.

Two continuous data-streams (bytes) may have a gap between them.

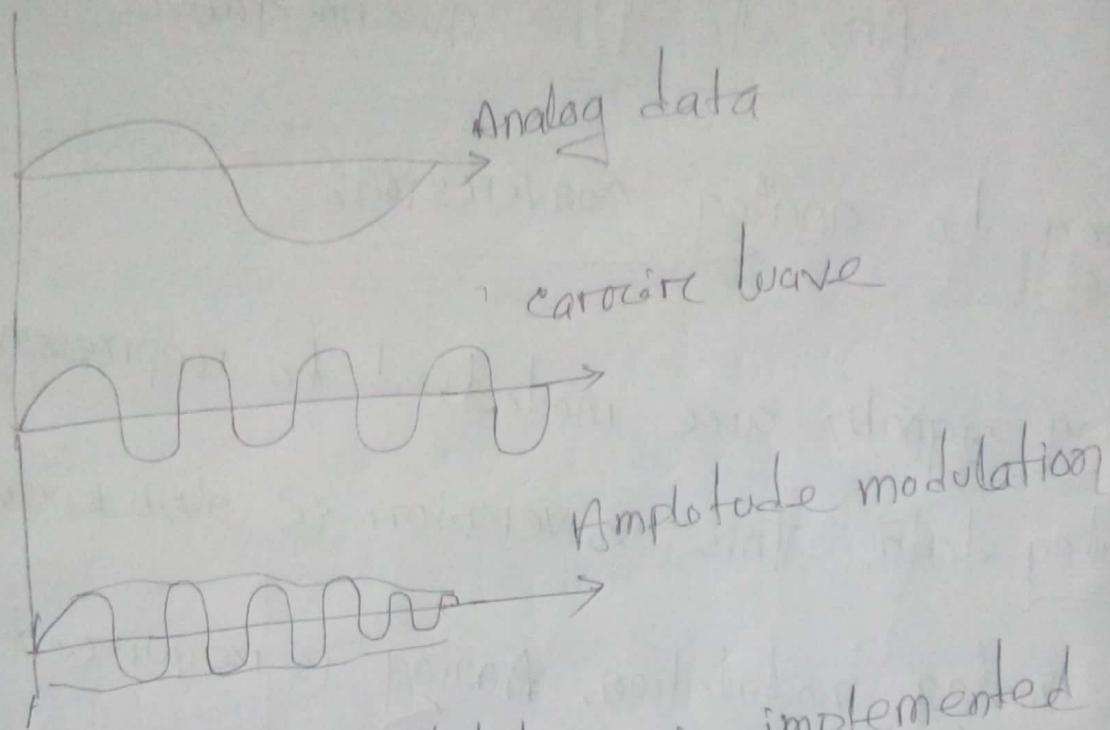
Ans to The que no 4(a)

Analog to analog conversion:

Analog signals are modified to represent analog data. This conversion is also known as analog modulation. Analog is required when bandpass is used. analog to analog conversion can be done in three way



(1) Amplitude modulation: In this modulation, the amplitude of the carrier signal is modulated to reflect the analog data.

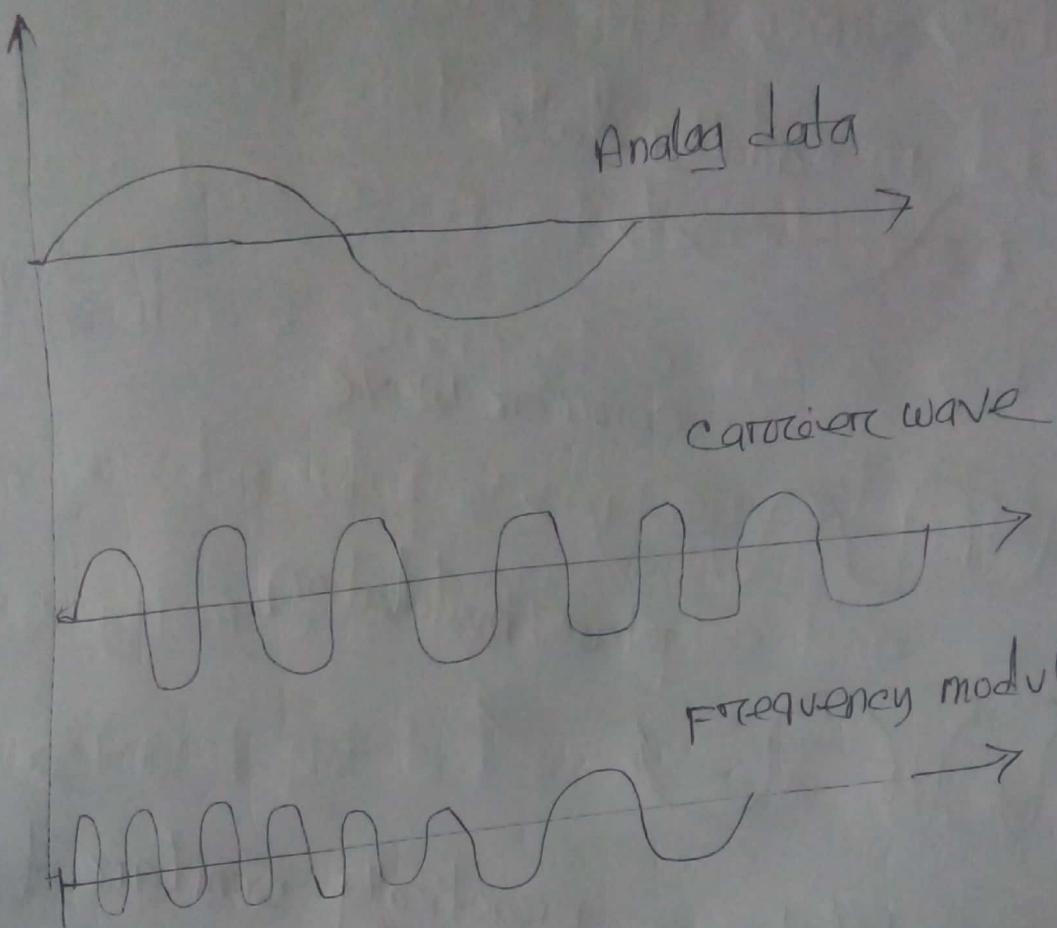


Amplitude modulation is implemented by means of a multiplexer. The amplitude of

modulating signal (analog data) is multiplied by the amplitude of carrier frequency.

Frequency modulation: In this modulation

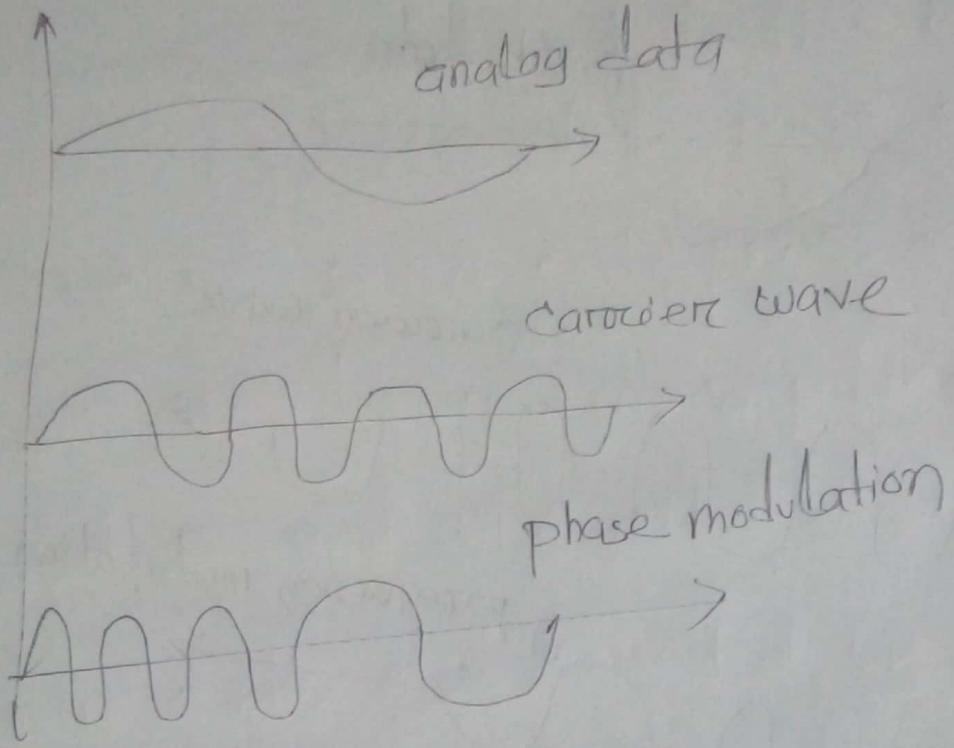
technique, the frequency of the carrier signal is modulated to reflect the change in the voltage levels of the modulating signal.



Phase modulation :

In The modulation technique

The phase of carrier signal is modulated in order to reflect The change in voltage of analog data signal



phase modulation is practically similar to frequency modulation, but in phase modulation frequency of the carrier signal is not increased. frequency of carrier is signal is changed to reflect voltage change in the amplitude of modulating signal.

Ans to The que no 4(b)

twisted pair cable:

A twisted pair cable

is made of two plastic insulated copper wires

twisted together to form a single media.

out of these two wires, one carries

actual signal and another is used for

ground reference. The twists between wires

are helpful in reducing noise (electro-magnetic

interference) and crosstalk.

There are two types of twisted pair

cables:

(1) shielded twisted pair(STP) cable

(2) unshielded twisted pair(UTP) cable

STP cables come with twisted wire pair
convered in metal foil. This makes it
more indifferent to noise and crosstalk.

UTP has seven categories, each suitable
for specific use, in computer network, cat-5
cat 5e, and cat 6 cables are mostly used.
UTP cables are connected by RJ45
connectors.

Ans to The que no 5(a)

Fiber optics: fiber optic works on the properties of light. when light ray hits at critical angle it tends to refract at 90 degree. This property has been used in fiber optic. The core of fiber optic cable is made of high quality glass or plastic. From one end of it light is emitted it travels through it and at the other end light detector detects light stream and converts it to electric data.

Fiber optic provider The highest mode of speed. it comes in two modes. one is single mode fibers and second is multimode fibers.

These can be subscriber channel (sc), straight tip (st), or mt-ri.

Ans to the queno 5(b)

Coaxial cable: coaxial cable has two wires of copper. The core wire lies in the center and it is made of solid conductor.

The core is enclosed in an insulating sheath. The second wire is wrapped around over the sheath and that too.

in furon encased by insulator sheath. this all is covered by plastic cover.

because of its structure, the coax cable is capable of carrying high frequency signals

than that of twisted pair cable. the wrapped structure provides it a good shield against noise and cross talk. coaxial cables

provide high bandwidth rates of up to 450 mbps.

cables are connected using BNC connectors

and BNC-t. BNC terminator is used to terminate the wire at the far end.

power lines :

Power line communication(PLC)

is layer-1 (physical layer) technology which uses power cables to transmit data signal. In PLC, modulated data is sent over the cables. The receiver on the other end de-modulates and interprets the data.

There are two types of PLC:

- (i) Narrow band PLC
- (ii) Broad band PLC

Narrow band PLC provider lower data rates up to 100s of kbps, as they work at lower frequencies (3-5000) kHz.

They can spread over several kilometers.

Broad band PLC provider higher data rates upto 100s of mbps and works at higher frequencies (1.8-250 MHz).

Ans to The que no 5(c)

wireless transmission:

wireless transmission is a form of unguided media. wireless communication involves no physical link established between two or more device, communicating wirelessly.

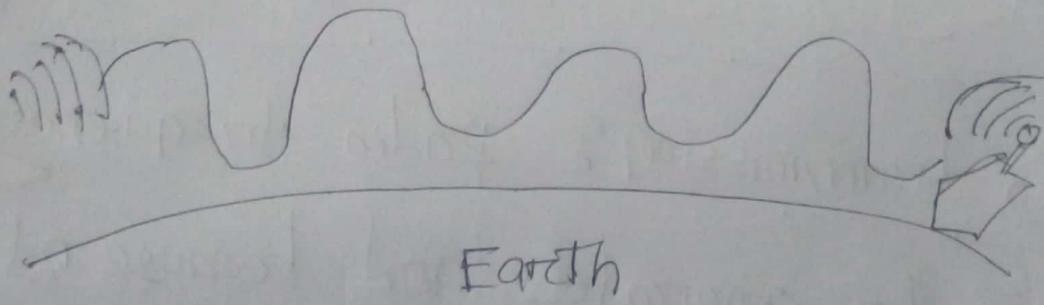
Ans to The que no 6(a)

Radio transmission: radio frequency is easier to generate and because of it's large wavelength it can penetrate through walls and structures alike. radio waves can have wavelength from 1mm - 100000nm

and have frequency ranging from

3Hz (Extremely) low frequency to 300 GHz

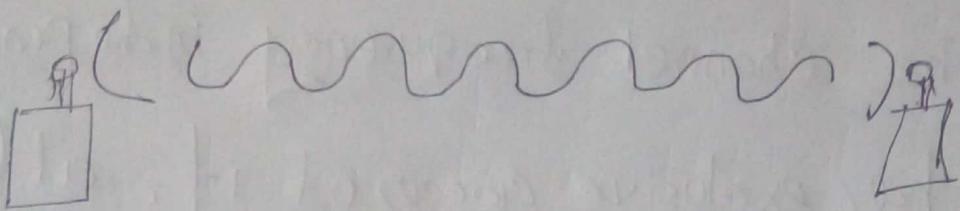
radio frequencies are sub-divided into six bands. Radio waves at lower frequencies can travel through walls whereas higher RF can travel in straight line and bounce back. Lower frequencies such as VLF, LF, MF bands can travel on the ground up to 1000 kilometers over the earth's surface.



microwave transmission: Electromagnetic

waves above 100 MHz tend to travel in a straight line and signals over them

can be sent by beaming those waves towards one particular station. Because microwave travels in straight lines.

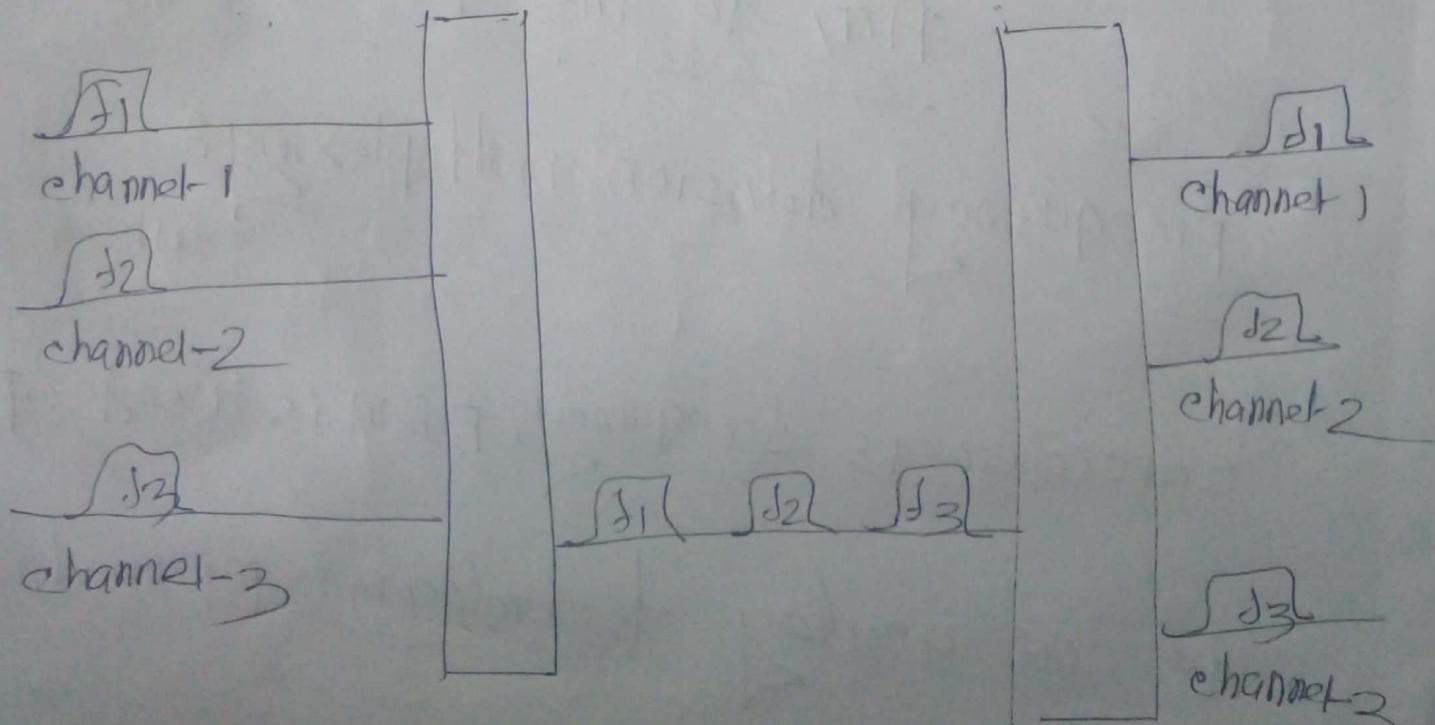


microwave antennas concentrate the waves making a beam of it. As shown in picture above multiple antennas can be aligned to reach farther.

Ans to The que no 6(b)

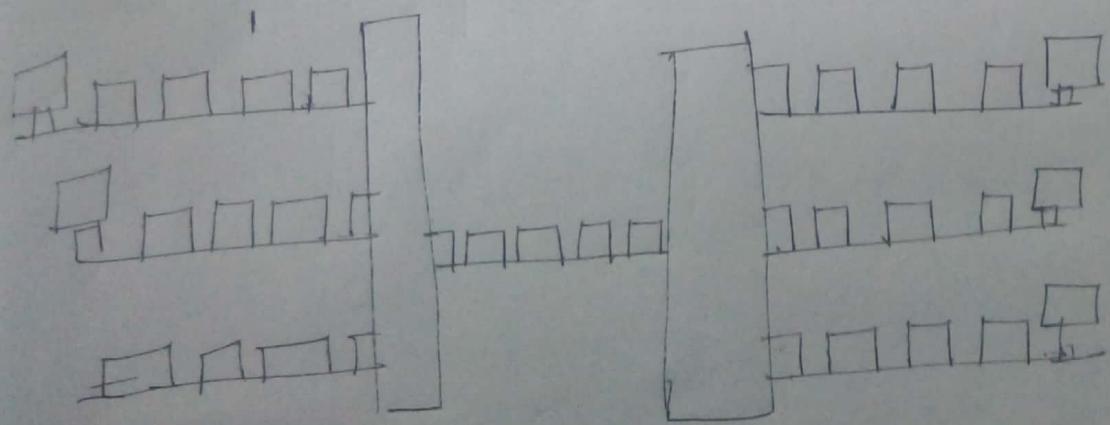
Frequency division multiplexing: when The carrier is frequency, FDM is used. FDM is an analog technology. FDM divides

The spectrum or carrier bandwidth is divided into logical channels and allocates one user to each channel. Each user can use the channel frequency independently and has exclusive access of it. All channels are divided in such a way that they do not overlap with each other. Channels are separated by guard bands.



Time Division multiplexing

TDM is applied primarily on digital signals but can be applied on analog signals as well. In TDM The shared channel is divided among its users by means of time slot. Each user can transmit data within the provided time slot only. Digital signal are divided in frames equivalent to time slot frame of an optimal size which can be transmitted in given time slot



new system, simple mail, transfer protocol etc

Ans to the que no 7(a)

application layer: application layer is the top most layer in OSI and TCP/IP layered model. This layer exists in both layered

models because of its significant

and user application.

A user may or may not directly

interact with the application

Application layer is where the actual communication is initiated and completed.

Because this layer is on the top of the layer stack it does not serve any other layers.

When an application layer protocol wants to communicate with another application layer protocol on a remote host it hands over the data or information to the transport layer. The transport layer does not

The rest, with the help of all the layers.

Ans to The que no 7(b)

HTTP HTTP means hyper text transfer protocol is the foundation of world wide web. Hyper text is well organized documentation system which uses hyperlinks to link the pages in the text documents. HTTP works on client server model. When a user wants to access any HTTP page on the internet, the client machine at user end initiates a TCP connection to server on port 80. When the server accepts the client request, the client authorized to access web pages.

To access web pages, a client

normally user web browsers, who are responsible for initiating, maintaining and closing tcp connection. HTTP is stateless protocol, which means the server maintains no information about earlier requests by client.

(i) HTTP 1.0 uses non persistent HTTP.

At most one object can be sent over a single tcp connection.

(ii) HTTP 1.1 uses persistent HTTP.

In this version, multiple objects can be sent over a single tcp connection.

Ans to the que no 7(c)

FTP: Ftp means file transfer protocol.
FTP is the most widely used protocol for file transfer over the network. FTP uses TCP/IP for communication and it works on TCP port 21. FTP works on client/server model where a client requests file from server and server sends requested resource back to the client.

FTP user out-of-band controlling FTP user TCP port 20 for exchanging controlling information and the actual data is sent over TCP port 21.

Aim to the que no 8(a)

Application services: There are nothing

but providing network based services to the users such as web services, database managing, and resource sharing.

Resource sharing: to use resources efficiently and economically, network providers a mean to share them. This may include servers, providers etc.

Databases: This application service is one of the most important service. It stores data and information, process it and enables the user to

retrieve it efficiently by using queries.

web services: world wide web has

become the synonym for internet it is used to connect to the internet, and access files and information servers provided by internet servers.

Amt to the que no 8(b)

Network services: computer system and

computerized systems help human being to work efficiently and explore the unthinkable. whe these devices are

connected together to form a network,

the capabilities are enhanced multiple times

computer network service:

Directory Services: These services are mapping between name and value which can be variable value or fixed, and provides various means of accessing it.

- (i) Accounting.
- (ii) Authentication and Authorization.
- (iii) Domain name services.

File services:

File services include sharing and transferring files over the network.

(i) file sharing: one of the reason which gave birth to networking was file sharing. File sharing enables the users to share their data with other users.

(ii) file transfer: This is an activity to copy or move file from one computer to another computer or to multiple computers with help of underlying network.

communication services:

- (i) Email.
- (ii) social networking.
- (iii) internet chat.
- (iv) discussion Boards.
- (v) Remote access.