

Data Link Layer + Network Layer

Q1-Q2

Set-01

a

→ What is Data Link Layer? Write the two sub-layers.

Ans:

Data Link Layer is 1st layer of OSI

Data Link Layer is second layer of OSI. This Layer is one of the most complicated layers and has complex functionalities and liabilities. Data Link layer works between two hosts which are directly connected in some sense.

Two sub-layers:

① Logical Link Control.

② Media Access Control.

(b) 10×10^3

→ Write down some functionality of Data-Link Layer.

Ans: Data Link layer does many tasks on behalf of upper layer. These are:

① Framing:

Data-Link Layer takes packets from Network Layer and encapsulates them into frames.

② Synchronization:

When Dhaka frames are sent on the link, both machines must be synchronized in order to transfer to take place.

③ Flow control:

Stations on some link may have different speed or capacity. Data-Link Layer ensures flow control that enables both machine to exchange data at same speed.

④

Discuss About Addressing and Error Control.

Ans: Addressing, Data-Link layer provides hardware addressing mechanism. Layer-2 hardware address is assumed to be unique on the link. It is encoded into hardware at the time of manufacture.

Error Control

Sometimes signals may have encountered problem in transition, and the bits are flipped. These errors are detected and attempted to recover actual data bits.

► Details about sub-layers of Data Link Layer.

Ans.: Data Link Layer has two sub-layers,

① Logical Link Control

It deals with protocols, flow-control, and error control.

② Media Access Control:

It deals with actual control of media.

Set-02

Q

⇒ How many types of mechanisms can be deployed to control the flow?

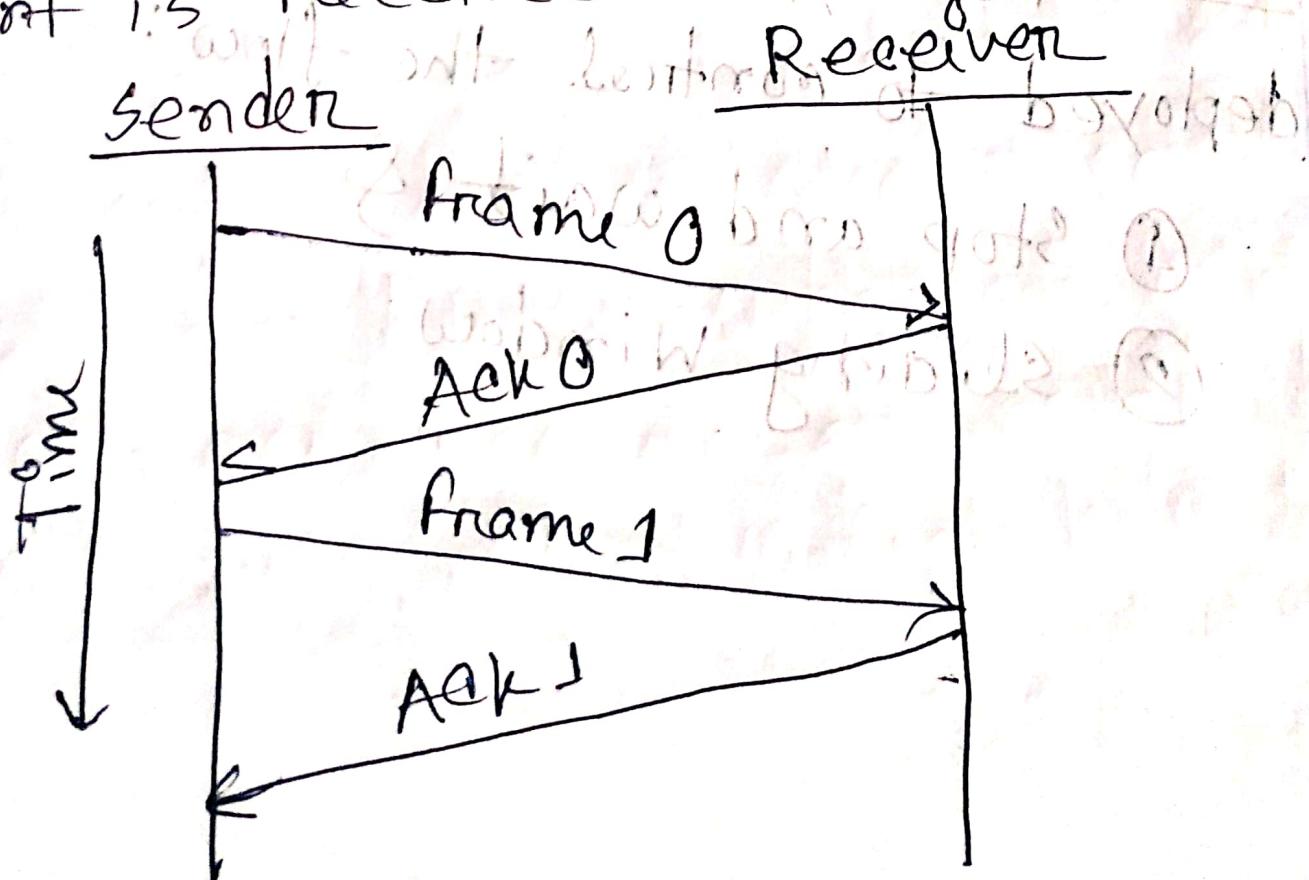
Ans: Two types of mechanisms can be deployed to control the flow:

- ① Stop and wait
- ② Sliding window

→ Discuss about the mechanism of Stop and wait.

Ans:

This flow control mechanism forces the sender after transmitting a data frame to stop and wait until the acknowledgement of the data-frame sent is received.



Q. Write down about Sliding Window

Ans:

Data-link layer is responsible for implementation of point-to-point flow and error control mechanism.

In this flow control mechanism, both sender and receiver agree on the number of data-frames after which the acknowledgement should be sent. As we learnt, stop and wait flow control mechanism wastes resources, this protocol tries to make use of underlying resources as much as possible.

Set-03

(a)

→ What is Error Control?

Ans:

Error Control: When a data-frame is transmitted, there

is a probability that data-frame may be lost in the transit or it is received corrupted. In both cases, the receiver does not receive the correct data-frame and sender does not know anything about any loss. In such case, both sender and receiver are equipped with some protocols which helps them

(b)

→ Write down the Requirements for error control mechanism.

Ans:

Requirements for error control mechanism

① Error detection - The sender and receiver, either both or any, must ascertain that there is some error in the transit frame.

② Positive ACK:

When the receiver receives a correct frame, it should acknowledge it.

③ Negative ACK:

When the receiver receives a damaged frame or a duplicate frame, it sends a NACK back to the sender.

①

→ What transition may occur in Stop-and-Wait ARQ.

Ans:

The following transition may occur in stop-and-wait ARQ:-

- ④ The sender maintains a timeout counter.
- ② When a frame is sent, the sender starts the timeout counter.
- ③ If acknowledgement of frame comes in time, the sender transmits the next frame in queue.

④ If a negative acknowledgement is received, the sender retransmits the frame.

Set-AW

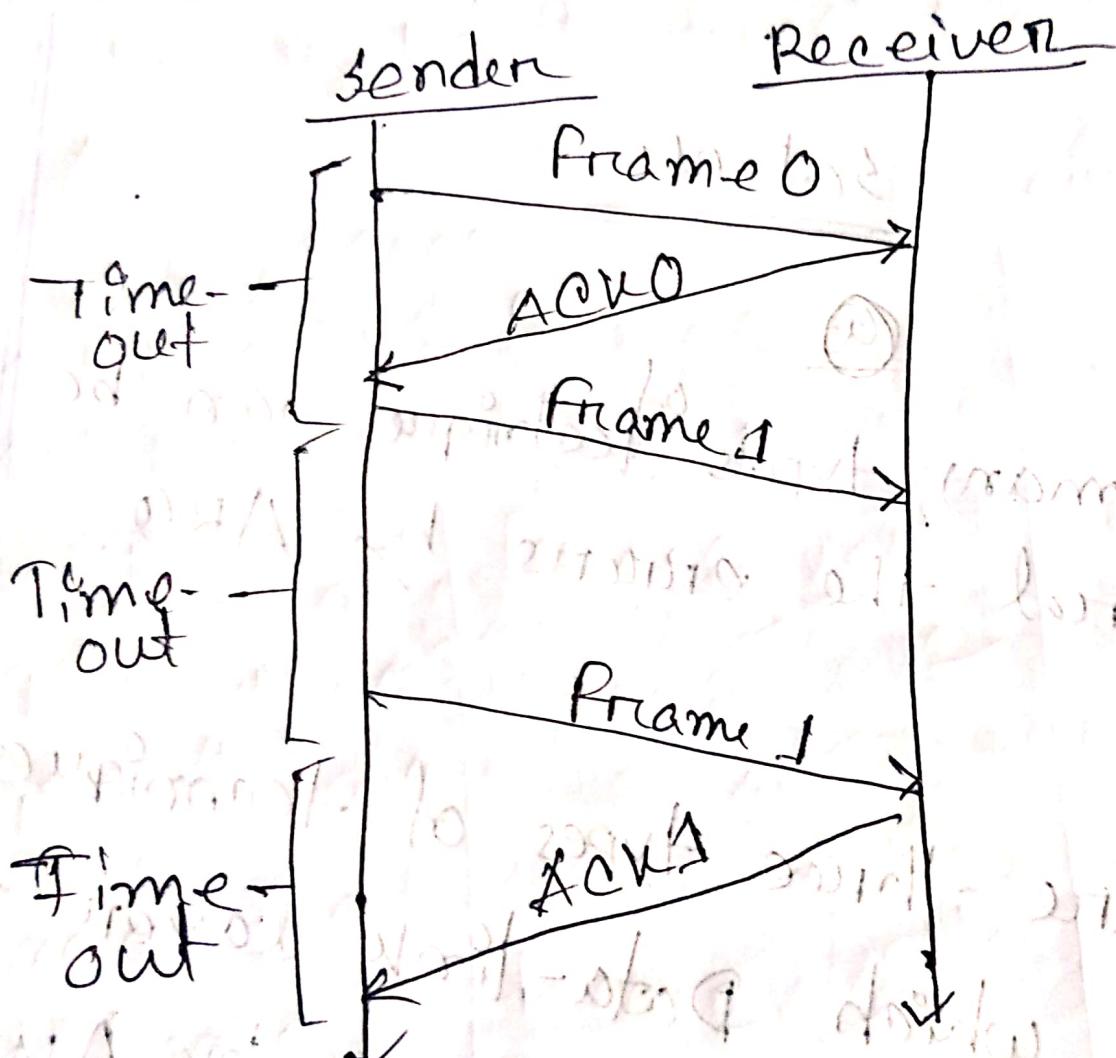
(a)

→ How many types of techniques can be deployed to control the errors by ARO.

→ Ans:

There are three types of techniques available which Data-link layer may deploy to control the errors by Automatic Repeat Requests.

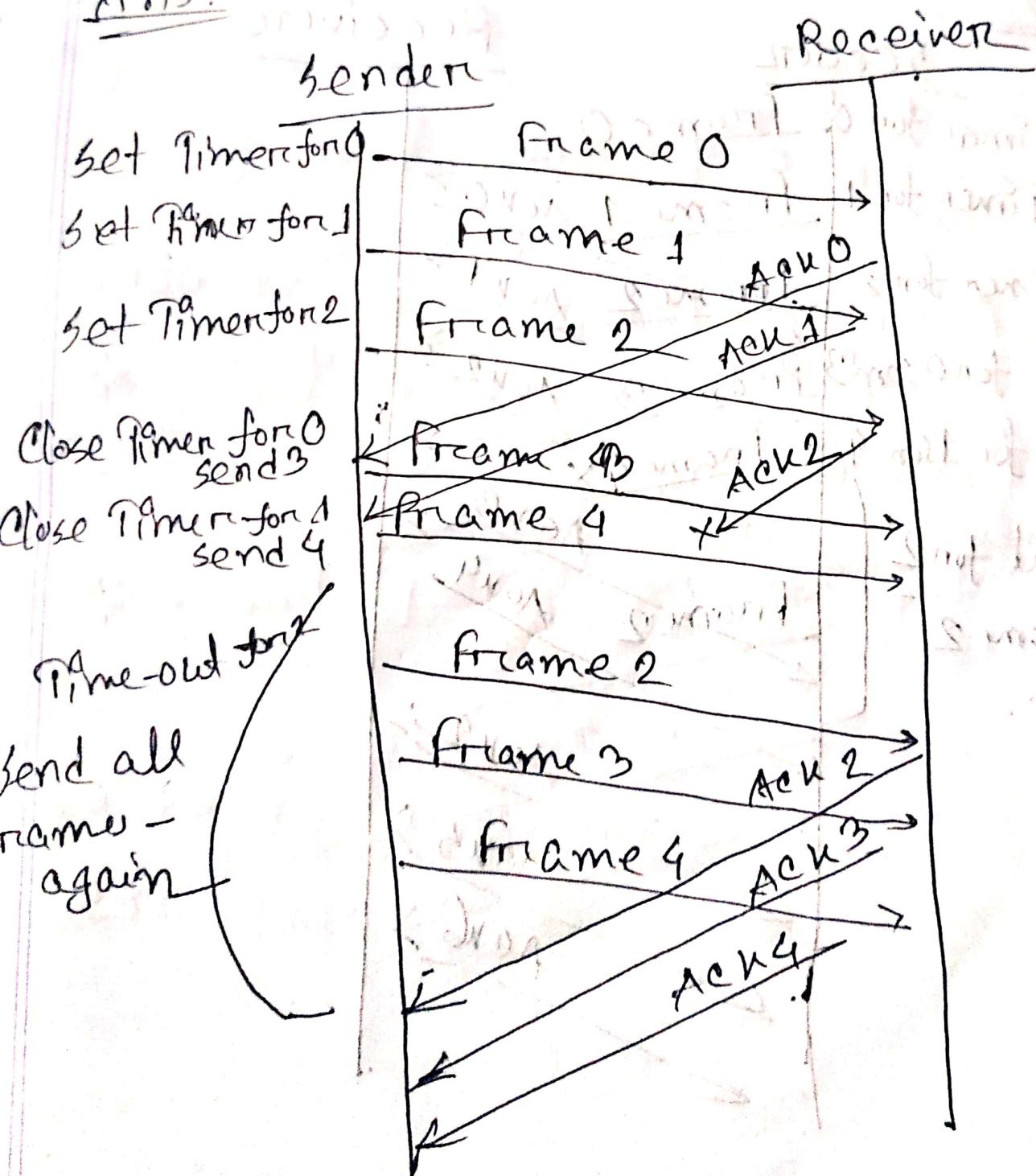
Stop-and-wait ARQ



(b)

→ Draw the frame of Go-Back-N ARQ

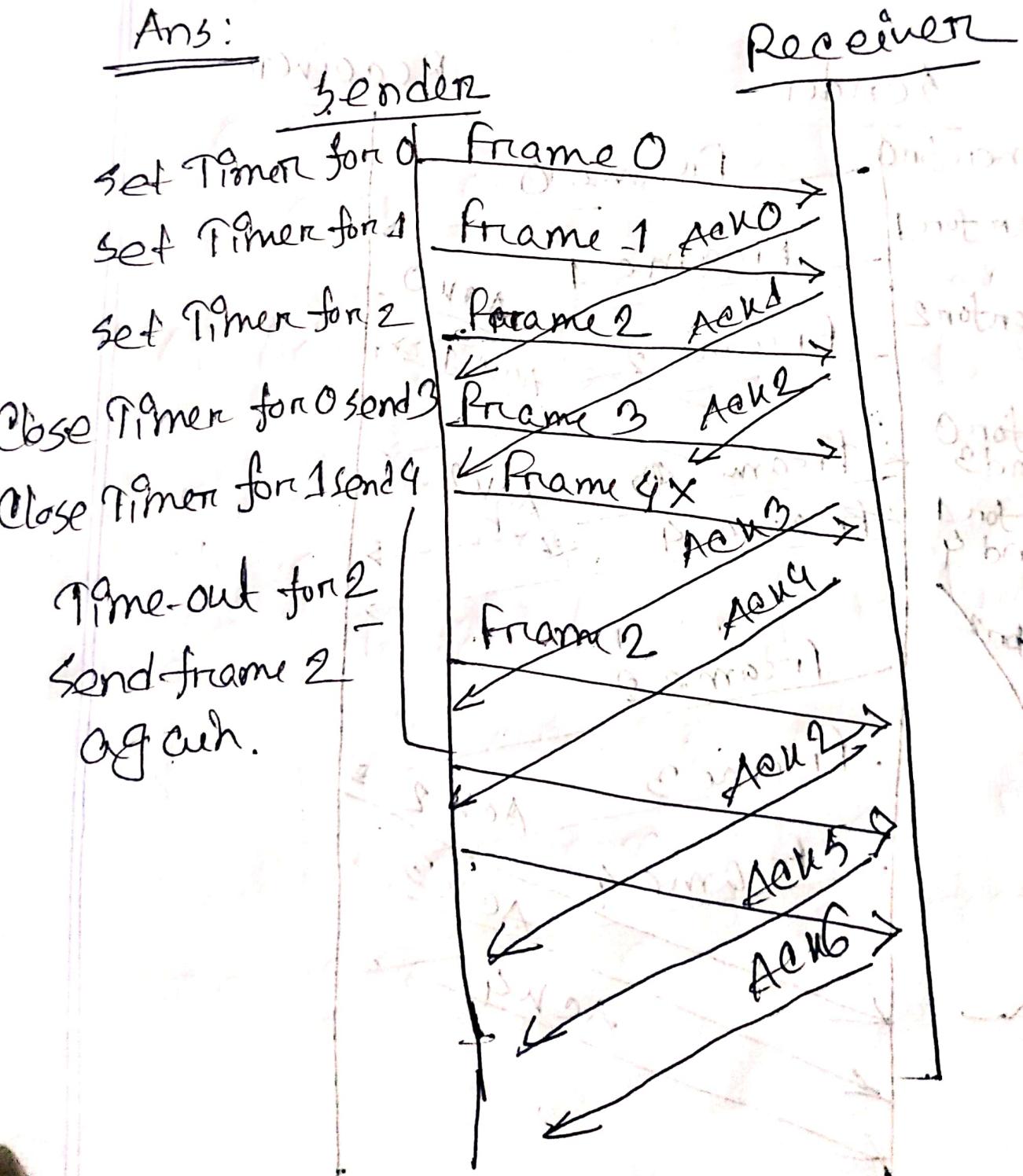
Ans:



Ques. (1) (a) (i)

⇒ Draw the frame of Selective Repeat ARQ

Ans:



Set - 05

(a)

→ Write down Network Layer features.

Ans:

Network Layer Features:

- ① Quality of service management.
- ② Load balancing and link management.
- ③ Security.
- ④ Interrelation of different protocols and subnets with different schema and subnets.
- ⑤ LB, VPN and tunnels can be used to provide end-to-end dedicated connectivity.

(b)

Ans:

Write down the Layer 3 functionalities

Ans:

Layer 3 functionalities:

- ① Addressing devices and networks.
- ② Populating routing tables or static routes.
- ③ Internetworking between different subnets.
- ④ Provides connection oriented mechanism.

①

→ Write down the Unicast Routing Protocol.

Ans:

There are two kinds of routing protocols available to route unicast packets:

① Distance Vector Routing Protocol:

Distance Vector is simple routing protocol which takes routing decision on the number of hops between source and destination. A route with less number of hops is considered as the best route. Every router advertises its set best routes to other routers.

(d)

Uses of synchronous transmission:

- ① Computer to computer data transmission.
- ② Used in chat rooms.
- ③ Used in telephonic conversations.
- ④ Used in video conferencing.

Set - 06

a

Discuss two cases of Data formatting:

Ans.

① Bandpass

The filters are used to filter and pass frequencies of interest. A bandpass is

band of frequencies which can pass

the filter.

② Low-pass:

Low-pass is a filter that passes low frequencies signals.

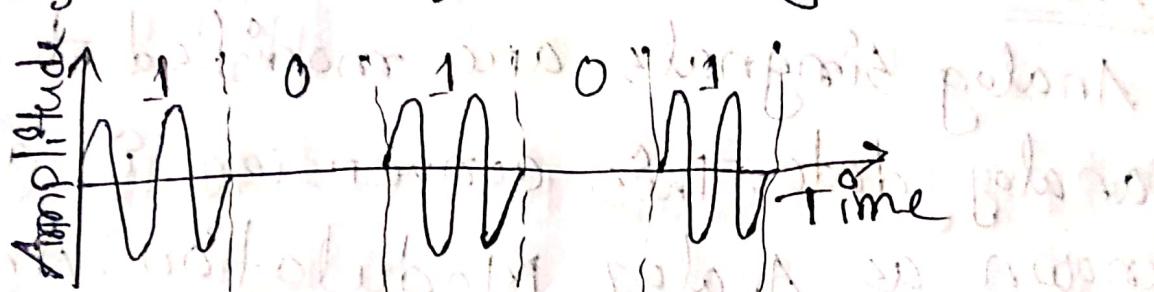
Discuss about Digital-to-Analog Conversion

Ans:

An analog signal is characterized by its amplitude, frequency, and phase. There are three kinds of digital-to-analog conversions.

① Amplitude shift keying

In this conversion technique, the amplitude of analog carrier signal is modified to reflect binary data.



② Frequency Shift Keying

In this conversion technique, the frequency of the analog carrier signal is modified to reflect binary data.

③ Phase Shift Keying

In this conversion scheme, the phase of the original carrier signal is altered to reflect the binary data.

Ques. 13. (B) State the types of AM.

Discuss about Analog-Digital-Analog Conversion.

Ans:

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

Analog Modulation

Amplitude Modulation

Frequency Modulation

Phase Modulation

Set-07

a

what is wireless transmission? ~~is a form of unguided~~

Ans:

Wireless transmission is a form of unguided media. Wireless communication involves no physical link established between two or more devices, communicating wirelessly. Wireless signals are spread over in the air and are received and interpreted by appropriate antennas.

(b)

Write down the difference between Radio and Microwave transmission.

Radio wave

These are omni-directional in nature.

3 KHz to 1 GHz.

These offers poor security.

Attenuation is high.

Setup and usage cost is moderate.

Microwave

These are unidirectional in nature.

1 GHz to 300 GHz.

Medium security

Attenuation is variable.

Setup and usage cost is high.

①

Differ

characteristics of Infaredwave transmitter.

Ans:

- ① These are unidirectional in nature.
- ② They cannot penetrate through any solid object and walls.
- ③ Frequency range : 300GHz to 400GHz.
- ④ These offers high security.
- ⑤ Attenuation is low.
- ⑥ Usage cost is very less.
- ⑦ There is no need of government license to use these waves.

Set-08

(a)

What is switching?

Ans:

Switching is process to forward packets coming in from one port to a port leading towards the destination. When data comes on a port it's called ingress, and when data leaves a port or goes out of it is called egress.

(b)

Category of switching.

Ans:

Switching can be divided into two main categories.

① Connectionless:

The data is forwarded on behalf of forwarding tables. No previous handshaking is required and acknowledgments are optional.

② Connect oriented:

Before switching data to be forwarded to destination, there is a need to pre-establish circuit along the path between both endpoints.

①

Write down the difference between Circuit and Packet switching.

Ams:

Ans:

Circuit switching

- ① Transmission of the data is done by the source.

- ② Recording of packet is never possible in circuit switching.

- ③ It's not a store and forward technique.

Packet switching

- ① Transmission of the data is done not only by the source but also by the intermediate routers.

- ② While recording of packet is possible in packet switching.

- ③ It's a store and forward technique.