CT - 02

Questions: Marks

01. (a) Write the some of skills are needed for telecommunication. → 4

(b) What are some examples of telecommunication technologies? → 3

(c) Explain the features of telecommunication engineering. → 7

02. (a) Define satellite communication. Draw the block diagram of satellite communication. → 5

(b) Write down the merits of the satellite communication. → 5

(c) Write down characteristics of mesh topology. → 4

03. (a) List five types of topology in computer networks. Describe the pitfalls of mesh topology. → 5

(b) Differentiate between terrestial microwave and satellite microwave transmission system. → 5

(c) What do you mean by Geostationary satellite system? → 4

04. (a) What is LATA? What are intra-LATA and inter-LATA services? → 3

(b) How to use a rotary dialphone for implementing pulse dialing? → 5

(c) What are the determining the design of a switching system? → 6

05. (a) What are the disadvantages of message switching? → 5

(b) What is dial tone? List five subscriber related signaling functions that are to be performed by the operator. → 6

(c) Which switching method reduces traffic congestion? → 3

06. (a) Define satellite Microwave transmission system. Describe the demerits satellite communication. → 5

(b) Write down advantages and disadvantages of star topology. → 5

(c) Define public switched telephone network (PSTN). List major systems of any telecommunication network. → 4

07. (a) What do you mean by In-band signaling? Write down advantages of In-band signaling. → 4

(b) How many types of signaling techniques? Draw the diagram of signaling techniques. → 6

(c) What is DSL technology? What are the services provided by the telephone companies using DSL? Distinguish between a DSL modem and a DSLAM. → 4

08. (a) How is data transfer acheived using CATV channels? → 2

(b) Write short notes (any four): → (4×3)

i. POTS (Plain Old Telephone Systems)
ii. Closed Numbering Plan
iii. Charging plan
iv. PBX (Private Branch Exchange)
v. In-channel Signaling.

01. (a) Write the some of skills are need for telecommunication.

Ans. to the Questions no-01(a)

Here are the top telecommunication which are required to help you m industry demands.

- Cloud Computing Skills.
- IT Support Skills or Network Engineering
- Programming
- Soft skills
- Value Adding and Certification.

01.(b) What are some examples of telecommunication technologies?

Ans. to the Questions no - 01 (b)

Examples of telecommunication techno

- Television
- Broadcasting
- Telephone
- Internet
- Cybercrime
- Radio technology
- Satellite Communication
- Modem

01. (c) Explain the features of telecommunication engineering.

Ans. to the Questions no-01(c)

Features of telecommunication engineering:

Terminals and Channels:

All telecommunications network depend on terminals. They're the components that allow communications to stop and start. There's no point in having a terminal without having a channel to support it. The best example of modern channel is the wireless signal.

Telecommunications processors:

As you may already be aware, the information that passes through channels requires a lot of processing before it reaches the

end user. In a lot of cases, this means moving from analog to digital and then back to analog again.

Telecommunications Software:

The information that passes through different telecommunications channels needs software to support it too. The type of software you use will depend on your telecommunications of choice.

The types of Data Being Submitted:

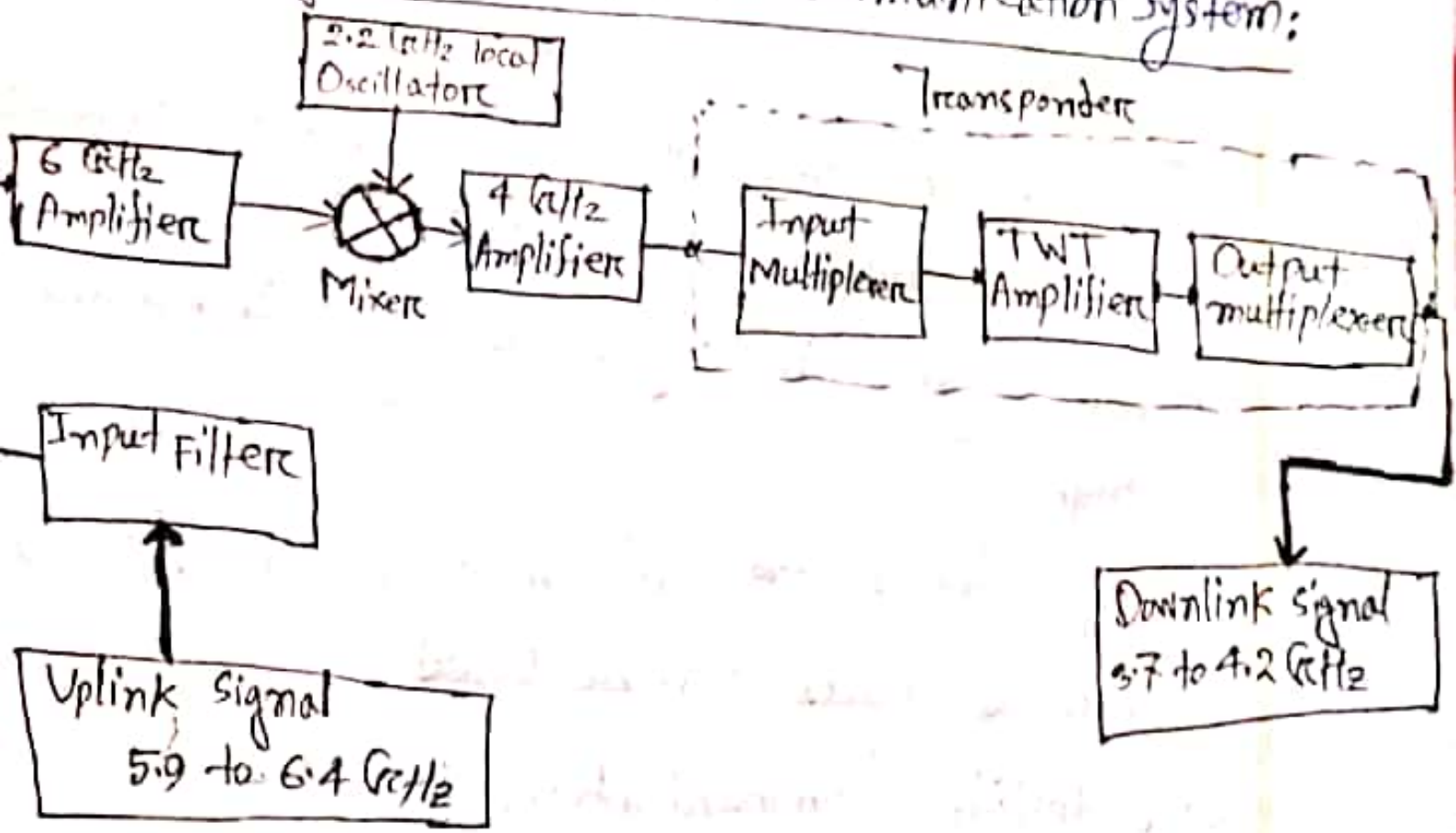
As we've already highlighted, telecommunications come in lots of wonderful formats now. Although voice conversations will continue to ~~reign~~ reign supreme for a while, many business rely on instant messaging.

02. (a) Define ~~Satte~~ Satellite Communication. Draw the block diagram of satellite communication system.

Ans. to the Questions no-02(a)

Satellite Communication: Satellite is powerful long distance and point-to multipoint communication system. A communication satellite is an Radio Frequency repeaters.

Block diagram of Satellite Communication System:



02. (b) Write down the merits of the satellite Communication.

Ans. to the Questions no-02(b)

Following is the merits of satellite communicat system.

Merits:

1. No tracking is required by Geostationar Satellites.
2. Multiple access points are available in Satellite communication.
3. 24 hour communication can be achieved with the help of satellite.
4. The signal quality of satellite communicatio is higher.
5. To put more information on the carrier a broad band can be used.
6. Satellite Communication is used for long distance communication or across oceans.

02 (c) Write down characteristics of a mesh topology.

Ans. to the Questions no-02(c)

Characteristics of a mesh topology are as follows:

- A mesh topology provides redundant links across the network.
- If a break occurs in a segment of cable, traffic can still be rerouted using the other cables.
- This topology is rarely used because of the significant cost and work involved in having network components directly connected to every other component.
- It is common for partial mesh topologies to be deployed. This balances cost and the need for redundancy.

03.(a) List five types of topology in computer networks. Describe the pitfalls of Mesh topolo

Ans. to the Questions no-03(a)

There are five types of topology in computer networks:

1. Mesh Topology
2. Star Topology
3. Bus Topology
4. Ring Topology
5. Hybrid Topology

Pitfalls of Mesh Topology:

1. Amount of wires required to connected each system is tedious and headache.
2. Since each device needs to be connec with other devices, number of I/O ports required must be huge.
3. Scalability issues because a device cannot be connected with large number of dev with a dedicated point to point link.

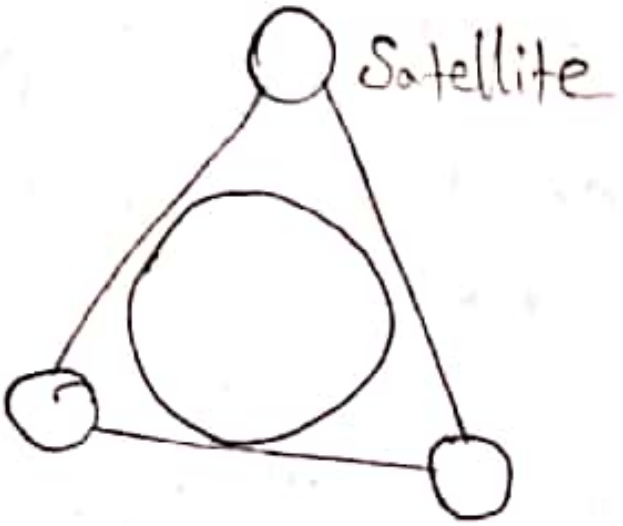
03. (b) Differentiate between Terrestial Microwave and satellite Microwave Transmission System.

Ans. to the Questions no-03(b)

Terrestial Microwave	Satellite Microwave
1. The frequency range needed is from 4 GHz to 6 GHz.	1. The frequency range used in this system is between 11 GHz to 14 GHz
2. In this system, attenuation mainly depends on frequency and signal strength.	2. Attenuation is generally affected by the frequency and power.
3. It requires focused signals and line of sight as physical path.	3. It requires the proper allignment of earth station atternas.
4. In these systems, short distance systems can be inexpensive but long distance systems are almost costly.	4. These systems are very expensive as cost of building and launching is very high.
5. Relay towers are used to extend the signals.	5. Satellites are used for the expansion of signals.

03. (c) What do you mean by Geostationary Satellite System?

Ans. to the Questions no-03(c)



Geostationary Satellite System

Geostationary satellite:

The satellites were placed in low earth orbit. as a result the satellite at a such high speed that it visible to the ground only for a short time at each day, the satellite appeared below the horizon and dies appear below the opposite horizon, the ground station was cut-off at long time in a day, to maintain the communication link another station had to be activated.

04. (a) What is LATA? What are intra-LATA and inter-LATA services?

Ans. to the Questions no - 04(a)

LATA: A LATA is a small or large metropolitan area that according to the divestiture of 1984 was under the control of a single telephone service provider.

Intra-LATA and inter-LATA services:

The services offered by the common carries inside a LATA are called intra-LATA services. The services between LATAs are handled by interexchange carries (IXCs). These carries, sometimes called long-distance companies, provide communication services between two customers in different LATAs.

04. (b) How to use a rotary dial phone for implementing pulse dialing?

Ans. to the Questions no-04 (b)

A rotary dial phone uses the following for implementing pulse dialing:

i. Finger plate and spring
ii. Shaft, gear and pinion wheel
iii. Pawl and ratchet mechanism
iv. Impulsing cam and suppressor cam on a trigger mechanism.
v. Impulsing contact
vi. Centrifugal governor and worm gear
vii. Transmitter, Receiver and bell by-pass circuits.

04. (c) What are the determining the desig
a switching system?

Ans. to the Questions no - 04 (c)

In order to determine the best design for
telephone switching system, a number of cri
must be determined and considered by the

Traffic intensity of the busy-hour:

Perhaps the most important factor, traffic
intensity of the busy hour is, simply, the cal
rate + (plus) the average holding time durin
60-minute period that the traffic intensity
its highest.

Calling rate:

This is the average number of requests
connection per unit of time.

Holding time:

This is the mean amount of time th
a call lasts.

05. (a) What are the disadvantages of message switching?

Ans. to the Questions no- 05(a)

Following are the disadvantages of message switching type:

i. This switching type is not compatible for interactive applications such as voice and video.

ii. This method is costly as store and forward devices are expensive.

iii. It can lead to security issues if hacked by intruders.

iv. As the system is complex.

v. Message switching type does not establish dedicated path between the devices.

05. (b) What is dial tone? List five subscriber related signaling functions that are to be performed by the operator.

Ans. to the Questions no – 05(b)

Dial tone: The dial tone is the signaling tone, which indicates that the exchange is ready to accept the dialed digits from the subscriber.

i. Respond to the calling subscriber that system is ready to receive the identification of the called party.

ii. Inform the calling subscriber that the call is being established.

iii. Ring the bell of the called party.

iv. Inform the calling subscriber, if the called party is busy.

v. Inform the calling subscriber, if the called party line is unobtainable fore some reason.

Building, maintaining and improving switch:

In order to build, maintain and improve switch that will suply the highest quality of service to its subscribers, network operators must monitor their network hardware constantly and efficiently and be ready to repair, replace or add any parts that are required.

05. (c) Which switching method reduces traffic congestion?

Ans. to the Questions no-05(c)

Congestion is a symptom of an overloaded network. Packet switching is more efficient than circuit switching because it ensures that more of the bandwidth of all cables are fully utilized. As it makes better use of resources, packet switching is more likely to reduce congestion than circuit switching.

06. (a) Define Satellite Microwave Transmission System. Describe the demerits satellite communication.

Ans. to the Question no-06(a)

Satellite Microwave Transmission System uses satellites for broadcasting and receiving of signals. These systems need satellites which are in the geostationary orbit which is 36000 km above the earth.

Demerits of satellite communication:

1. The transmitter and receiver used in satellite communication requires high power, most sensetive transmitters and large diameter antena's.
2. Satellite communication is disturbed by solare activities and cyclones in the space.
3. Due to ageing effect the efficiency of satellite components decreases.
4. The longer propagation times (Approx. 300ms) is one of a disadvantage of satellite communication.
5. The cost for initial design and launching of the satellite in the orbit results in extremely high.

06. (b) Write down advantages and disadvantages of star topology.

Ans. to the Questions no-06(b)

Advantages of Star Topology:

1. Less expensive because each device only need one I/o port and needs to be connected with hub with one link.
2. Easier to install
3. Less amount of cables required because each device needs to be connected with the hub only.
4. Robust, if one link falls, other links will work just fine.
5. Easy fault detection because the link can be easily identified.

Disadvantages of Star topology:

1. If hub goes down everything goes down, none of the devices can work without hub.
2. Hub requires more resources and regular maintenance because it is the central system of star topology.

06.(e) Define public switched telephone network (PSTN) list major systems of any telecommunication network.

Ans. to the questions no-06(e)

PSTN: public switched telephone network is perhaps the most stupendous telecommunication network in existence today. The length of telephone wire-pairs buried underground exceeds a bilion kilometres.

Any telecommunication network may be viewed as consisting of the following major systems;

1. Subscriber end instruments or equipments
2. Subscriber loop systems
3. Switching systems
4. Transmission systems
5. Signaling systems

07. (a) What do you mean by In-band Signaling? Write down advantages of In-band signaling.

Ans. to the questions no-07(a)

In-band Signaling: In-band voice frequency uses the same frequency band as the voice, which is 300 - 3400 Hz, which has to be protected against false operation by speech.

Advantages of In-band signaling:

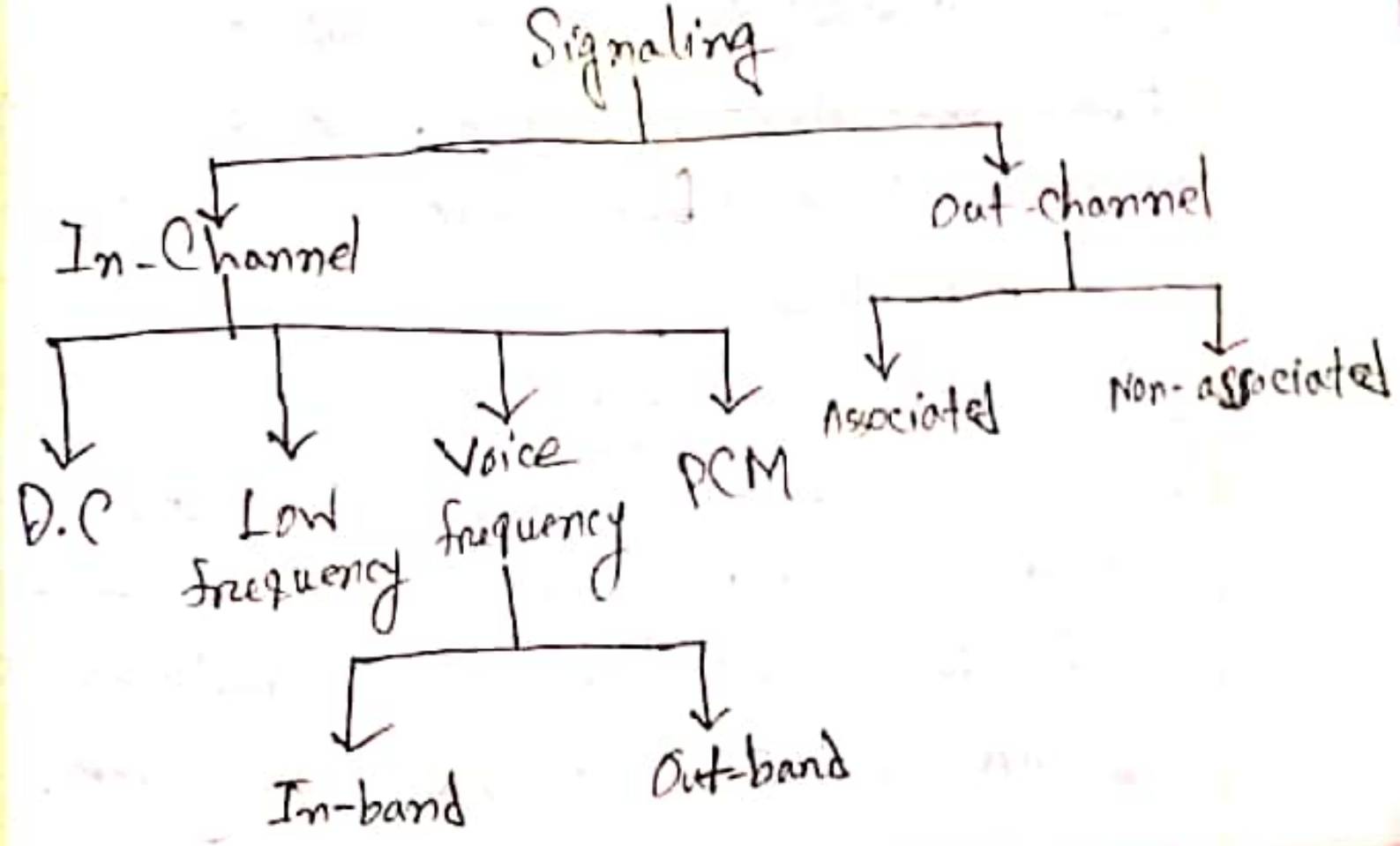
- The control signals can be sent to every part where a speech signal can reach.
- The control signals will be independent of the transmission systems as they are carried along with the speech signals.
- The Analog to digital and Digital to analog conversion processes will not affect them.

07 (b) How many types of signaling techniques? Draw the diagram of signaling techniques.

Ans. to the questions no-07(b)

As discussed above, the signaling techniques are categorized into two, the In-channel signaling and the common channel signaling. However, these are furethere divided into few types depending upon the frequencies and frequency techniques used.

Diagram of signaling Techniques:



07.(c) What is DSL technology? What are the services provided by the telephone companies using DSL? Distinguish between a DSL modem and a DSLAM.

Ans. to the questions no-07(c)

DSL technology: Telephone companies developed digital subscriber line (DSL) technology to provide higher speed access to the internet.

Services provided by the telephone companies using DSL: DSL technology is a set of technologies, each differing in the first letter (ADSL, VDSL, HDSL, and SDSL). The set is often referred to as xDSL, where x can be replaced by A, V, H, or S.

DSL modem VS DSLAM:

DSL uses a device called ADSL modem at the customer site. It uses a device called a digital subscriber line access multiplexer (DSLAM) at the telephone company site.

08. (a) How is data transfer acheived using CATV channels?

Ans. to the questions no-08(a)

To provide internet aceess, the cable company has divided into the available bandwidth of the coaxial cable into three bands: video, downstream data, and upstreamdata. The downstream only video band occupies frequencies from 54 to 550 MHz. The downstream data occupies the upper band, from 550 to 750 MHz. The upstream data occupies the lower band, from 5 to 42 MHz

08 (b) Write short notes (any four):

i. POTS (Plain old Telephone Systems)
ii. Closed Numbering Plan
iii. Charging plan
iv. PBX (Private Branch Exchange)
v. In-channel Signaling

Ans. to the questions no- 08 (b)

i. POTS: Plain Old Telephon Systems is understood as an aggregate of world's circuit switched telephone networks, used for providing public telecommunication. These systems are operated regionally, locally, nationally and inter-nationally using telephone lines, fiber optic cables, microwave transmission links or cellular communications. POTS consists of switches at centralized points on the network, which act as nodes for communication between any point and any other point on the network.

ii. closed numbering Plan:

This is also called the Uniform numbering plan where the number of digits in a subscriber number are fixed. This is used in a few countries such as France, Belgium, Canada, Hawaii and in a few parts of USA. An international numbering plan or world numbering plan has been defined by the CCITT. For numbering purpose, the world is divided into zones. The

iii. charging Plan:

The calls are charged as accounted by the metering instrument connected to each subscriber line or as per a metering register that is assigned to each subscriber in case of electronic exchanges. A meter counts the number of charging units, and that count is incremented by sending a pulse to the meter. For the number of units,

the meter reads, a bill is raised by assi
a rate to the charging unit.

The individual calls can be charged based on
following categories:

- Duration independent charging
- Duration dependent charging

iv. Private Branch Exchange:

Private Branch Exchange or PBX can be understood as a local exchange within an office or a building, in order to communicate within themselves. As the name implies, it is a private exchange, which is a branch to the main exchange similar to a local loop connected to the main loop as a branch. private Branch Exchange is a telephone system whwithin in a local area that switches calls between those users on local lines while allowing all users to share a certain number of external phone lines. The main purpose of PBX is to save the cost of requirement for a line.