

CT-08

- ①
- ⓐ What is dial-up modem technology? 7
 - ⓑ List some of the common modem standards. 3
 - ⓒ List the seven steps to successful analog to digital signal conversion. 6
 - ⓓ Define private Branch Exchange or PBX 5
 - ⓔ List the parts of a PBX.

2.

- ⓐ Define blocking in a switched network. 4
- ⓑ A path in a digital circuit-switched network -
has a data rate of 1 mbps. The exchange of
1000 bits is required for the set up and
tear down phases. The distance between two points
is 5000 Km.

- Q
- ① list five types of topology in computer networks. 5
- ② Differentiate between terrestrial and satellite microwave transmission system 5
- ③ What do you mean by Geostationary satellite system? 4

- 4
- ④ What are the differences between circuit switching and packet switching? 5
- ⑤ List four types of connections in a network 4
- ⑥ What is direct control switching system 5

- 5
- ⑦ Define electromechanical system? and describe benefits of automatic switching system 5
- ⑧ Define circuit switching. What are the benefits of circuit switching. 5
- ⑨ What are the features of crossbar switches - 9

- 6
- ① Define satellite microwave transmission system 5
 - ② Write down advantages and disadvantages of star topology. 4

- ③ Define public switched telephone network 4

- 7
- ④ What do you mean by IT support skills on network engineering? 4

- ⑤ What is Hybrid topology? 5
- ⑥ List the advantages and disadvantages of ISDN 5

- 8
- ⑦ Distinguish between cable modem and ADSL - 2

- ⑧ Write short notes: (any four) 12

- ① Out-band signalling.
- ② Ring topology.
- ③ Bus topology.
- ④ Electronic mail.
- ⑤ LAN.

Ans to the question no: 1

⑦

Dial up modem technology: Dial up modems use part of the bandwidth of the local loop for to transfer data.

Common-modem standards:

The latest dial-up modems use the V series standards such as V.92 and V.92 bits (9600 bps) V.34 bits (28,800 or 33,600 bps) V.90 (56 kbps for download and 33.6 kbps for uploading) and V.92 (56 kbps for downloading and 48 kbps for uploading).

⑥

① Describe the electrical output of the seadore or selection preceding the gain block.

② Calculate the ADC's requirement.

③ Find the optimal ADet voltage reference the signal conversion.

④ Find the maximum gain and define search criteria for the op-amp.

⑤ Find the optimal amplifiers and design the gain block.

⑥ check the total solution noise against the design target.

⑦ Run simulation and validate.

⑧

PBX: Private Branch Exchange is a telephone system within 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 parts of a PBX include:

- * A telephone trunk that contains many phone lines, which are terminated at PBX.
- * The network of lines within the PBX.
- * A human operator console which is optional.

Aos to the question no: 2

(a)

Blocking: In multistage switching blocking refers to times when one input can't be connected to an output because there is no path available between them all the possible intermediate switches are occupied. One solution to blocking is to increase the number of intermediate switches.

TSI (Time-slot Interchanges) is the most popular technology in a time-division switch. It uses random access memory with several memory locations. The RAM fills up with incoming data from time slots in the order received. Slots are then sent out in an order based on the decisions of a control unit.

b

i) $78 + 25 + 4 = 107 \text{ ms}$

ii) $78 + 25 + 100 = 203 \text{ ms}$

iii) $78 + 25 + 1000 = 1103 \text{ ms}$

iv) In case a we have 107 ms

In case b we have $203/100 = 2.03 \text{ ms}$

In case c we have $1103/1000 = 1.103 \text{ ms}$.

Ans to the question no: 3

a) There are five types of topology in computer networks:

i) mesh topology.

ii) star topology.

iii) Bus topology.

iv) Ring topology.

v) Hybrid topology.

(b)

Terrrestrial Microwave	Satellite Microwave
① The frequency range needed is from 4GHz to 6Hz.	② 11 GHz to 19 GHz.
③ In this system attenuation mostly depends on free space signal strength.	④ Frequency and power.
⑤ Requires focused signals and line of sight as physical path.	⑥ Requires the proper alignment of earth station antennas.
⑦ Relay towers are used to extend the signals.	⑧ Satellites are used for the expansion of signals.

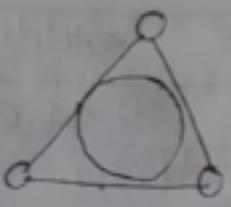


Fig: Geostationary satellite

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

Ans to the question no: 4

①

Feature

switching circuit

Packet switching

Dedicated path

yes

no

Path info:

path dedicated
for one conversation

Route is established on
a per packet basis
of the conversation using
destination.

Delay

call setup delay

Packet transmission
delay.

Bandwidth
type

fixed bandwidth

Dynamic

Overload
effects

stops call establishment

increases packet
delay

b

There are four types of connections that can be established in a telecommunications network.

- * Local call connection between subscribers in the system.
- * Outgoing call connection between a subscriber and an outgoing trunk.
- * Incoming call connection between an incoming trunk and a local subscriber.
- * Transit call connection between an incoming trunk and an outgoing trunk.

c) Direct control switching system:

The switching systems where the control sub systems form an integral part of the network are called the direct control switching system.

Benefits of automatic switching system:

- Language barriers will not affect the request for connection.
- Higher degree of privacy is maintained.
- Faster establishment and release of call is done.
- Number of calls made in a given period can be increased
- calls can be made irrespective of the load on the system or the time of the day.

Ans to the question no 5

①

Electromechanical crosspoint Technology: The electromechanical crosspoint switch has the capability of making and breaking contacts in 1-10 ms of time duration for several million times without any wear and tear.

The challenges are described below:

- ① Reduction in the size of a crosspoint
- ② Reduction in the cost of a crosspoint.
- ③ Improvement of the switching time
- ④ Electromechanical
- ⑤ Electroacoustic

(b)

circuit switching: This method of switching establishes a dedicated communication path between the sender and receiver.

Benefits of circuit switching:

- ① It uses a fixed bandwidth.
- ② Data is transmitted with a fixed data rate.
- ③ No waiting time is switches
- ④ Suitable for long continuous communication.

(c)

Features of crossbar switches:

- ① While processing a call the common control system helps in the sharing of resources.
- ② The specific route functions of call processing are handled because of the wise logic computers.
- ③ The flexible system design helps in the appropriate ratio selection is allowed for a specific switch.
- ④ Fewer moving parts ease the maintenance of crossbar switching system.

Ans to the question no: 6

- ④ Satellite microwave transmission system uses satellites for broadcasting and receiving of signals. These systems need satellite which are in the geostationary orbit which is 3600 km above the earth.

Demerits of satellite communication:

- ① The transmitters and receivers used in satellite communication requires high power, most sensitive transmitters and large diameter antenna.
- ② Satellite communication is disturbed by solar activities and cyclones in the space.
- ③ Due to ageing effect the efficiency of satellite components decreases.
- ④ The longer propagation times is one of a disadvantage of satellite.
- ⑤ The cost for initial design and launching of the satellite in the orbit results is extremely high.

(b)

Advantages of star topology:

- ① Less expensive.
- ② Easier to install.
- ③ Less of amount of cable.
- ④ Robust, if one link fails, other links will work just fine.
- ⑤ Easy fault detection because the link can easily identified.

Disadvantages of star topology:

- ① If hub goes down everything goes down.
- ② Hub requires more resources and regular maintenance because it is the central system of star topology.

(e)

PSTN: Public switched telephone network is perhaps the most stupendous telecommunication network in existence today.

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

- ① subscribers and instruments
- ② subscriber loop systems.
- ③ switching systems.
- ④ transmission systems.
- ⑤ signalling systems.

Ans to the question no: 7

⑤ Network engineering involves different types of processes which are required to maintain, support & troubleshoot and implement communication networks. This could either be within a single organization or between multiple organizations. Skilled network supports engineers are expected to be able to create a network infrastructure which should be available to variety of stakeholders which include customers, employees, supply side staff and clients. They are also expected to have relevant knowledge regarding different types of networks such as WAN, LAN, MAN & WLAN.

(b)

Hybrid topology: A combination of two or more topology is known as hybrid topology.

Advantages of hybrid topology:

- ① We can choose the topology based on the requirement for example scalability is our concern then we can use star topology instead of bus topology.
- ② Scalable as we can further connect other computer network with the existing networks with different topologies.

Disadvantages of hybrid topology:

- ① Fault detection is difficult.
- ② Installation is difficult.
- ③ Design is complex so maintenance is high thus expensive.

(e)

Advantages of ISDN:

- (i) As the services are digital, there is less chance of errors.
- (ii) The connection is faster.
- (iii) The bandwidth is higher.
- (iv) Voice, data and video - all of these can be sent over a single ISDN line.

Disadvantages of ISDN:

The disadvantages of ISDN is that it requires specialized digital services and is costlier.

However the advent of ISDN has brought advancement in communications. Multiple transmissions with greater speed are being achieved with higher levels of accuracy.

Ans to the question no: 8

- ① The CM is installed on the subscriber's premises. The AMT is installed inside the distribution hub by the cable company.
- ② The CM receives data from the internet and passes them to the combiner which sends them to the subscriber. The AMT also receives data from the subscriber and passes them to the internet.

(e)

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