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CT-01

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01. (a) Describe the need for an switching and define a switch.

<center>Ans to the Q. NO -01 (a)</center>

Need for switching:

a. Switching provides a practical solution to the problem of connecting multiple devices in a network.

b. It is more practical than using a bus topology.

c. It is more efficient than using a Star topology and a central hub.

Definition of switch:

Switches are devices capable of creating temporary connections between two or more devices linked to the switch.

01. (b) List the three traditional switching methods. What are the most common today?

Ans. to the Q. No. - 01 (b)

Switching methods:

The three traditional switching methods are

      i. Circuit switching
      ii. Packet switching and
      iii. Message Switching

The most common today are circuit switching and packet switching.

01. (c) What are the difference between circuit switching and message switching?

Ans. to the Q. No.-01(c)

S.No	Circuit Switching	Message Switching
1.	Data is not stored.	Data is first stored, then forwarded to the next note.
2.	Needs dedicated physical path.	Not need dedicated physical path.
3.	A Geographical addressing.	A Hierarchical addressing.
4.	Costlier than message switching.	The cost of message switching is less than circuit switching.
5.	Routing is manual type routing.	Routing is not manual type routing.
6.	Charge depend on time and distance.	Charge is based on the number of bytes and distance

01. (d) What are the two approaches to packet-switching?

Ans to the Q. No. -01 (d)

Approaches to packet switching:

There are two approaches to packet switching.

      i. Datagram approach and

      ii. Virtual circuit approach.

02. (a) List four major components of a packet switch and their functions.

Ans. to the Q. No. - 02 (a)

A packet switch has four components:

i. Input ports: An input port performs the physical and data link functions of the packet switch.

ii. Output ports: The output port performs the same functions as the input port, but in the reverse order.

iii. Routing processor: The routing processor performs the function of table lookup in the network layer.

iv. Switching fabric: The switching fabric is responsible for moving the packet from the input queue to the output queue.

02. (b) What are the advantages of packet switching over circuit switching?

Ans. to the Q. No. - 02 (b)

This switching offers various benefits compared to circuit switching and they are listed below:

▢ It delivers the data to a destination by finding their own paths; circuit switching has a dedicated and predefined channel.

▢ It is highly reliable as missing packets are detected by destination; circuit switching does not have this option.

▢ It uses lesser bandwidth as packets are quickly routed towards the destination; circuit switching should have dedicated bandwidth.

◻ The channel in packet switching is available for other transmissions as soon as packets are routed; circuit switching occupies the channel till the voice communication is completed.

◻ It is cost-effective and easier to implement circuit switching is expensive.

02. (c) What are the drawbacks of circuit switching?

<u>Ans. to the Q. No-02(c)</u> ◻

<u>Drawbacks of circuit switching</u>:

◻ Circuit switching establishes a dedicated connection between the end parties.

◻ Bandwidth requirement is high even in cases of low data volume.

◻ There is underutilization of system resources.

◻ Time required to establish connection may be high.

03. (a) List four types of connections in a telecommunication network?

Ans. to the Q. No - 03 (a)

There are four types of connections that can be established in a telecommunication network. The connections are as follows:

□ Local call connection between two 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.

03. (b) What are the differences between circuit switching and packet switching?

Ans. to the Q. No-03 (b)

Feature	Circuit switching	Packet switching
Dedicated Path	Yes	No
Path Formation	Path dedicated for one conversation.	Route is established on a per packet basis of the conversation using datagram.
Delay	Call setup delay.	Packet transmission delay.
Bandwidth Type	Fixed bandwidth.	Dynamic bandwidth.
Overload effects	Stops call establishment.	Increases packet delay.

03. (c) What is direct control switching system and what are the benefits of automatic switching system ?

Ans. to the Q. No-03(c)

Direct Control switching system:

The Switching systems where the control sub systems from an integral part of the net-work are called the direct control switching system.

Benefits of automatic switching system:

→ Language barries will not affect the request for connection.

→ Higher degree of privacy is maintained.

→ Faster establishment and release of calls 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.

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

Ans. to the Q. 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 hadled by interexchange carries (IXCs). These carries, sometimes called long-distance companies, provide communication services between two customers in different LATAs.

04. (b) What are the determining the design of a switching system?

Ans. to the Q.No-04 (b)

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

Traffic intensity of the busy-hour:

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

Calling rate:

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

Holding time:

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

Building, maintaining and improving switch:

In order to build, maintain and improve a switch that will supply 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.

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

Ans. to the Q. No- 04 (c)

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 or a trigger mechanism.

v. Impulsing contact

vi. Centrifugal governor and worm gear

vii. Transmitter, Receiver and bell by-pass circuits.

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

Ans. to the Q. No-05 (a)

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.

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

Ans. to the Q. 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, that if the called party is busy.

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

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

Ans. to the Q. No-05(e)

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.

06. (a) What are the features of crossbare Switches?

Ans. to the Q. No-06 (a)

In this section, we will discuss the different features of the Crossbare switches.

i. While processing a call, the common control system helps in the sharing of resources.

ii. The specific route functions of call processing are hardwired because of the wire logic computeres.

iii. ~~The specific route functions~~ The flexible system design helps in the appropriate ratio selection is allowed for a specific switch.

iv. Fewere moving parts ease the maintenance of Crossbar switching system.

06. (b) Define Electromechanical Crosspoint Technology. What are the challenges for the crosspoint Technology?

Ans. to the Q. No - 06 (b)

Electromechanical Crosspoint Technology:-

The Electromechanical Crosspoints switches which are capable of making and breaking contacts in 1-10 ms of time duration for several million times without any weare and teare.

In this section, we will discuss the challenges associated with the Crosspoint Technology. The challenges are described below:

i. Reduction in the size of a Crosspoint

ii. Reduction in the cost of a Crosspoint

iii. Improvisation of the switching time

iv. Electromechanical

v. Electronic

06. (c) Define circuit switching. What are the benefits of circuit switching?

Ans. to the Q. No-06 (c)

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

Some of the benefits of circuit switching are as follows —

i. It uses a fixed bandwidth.

ii. A dedicated communication channel increases the quality of communication.

iii. Data is transmitted with a fixed data rate.

iv. No wating time at switches.

v. Suitable for long continuous communication.

07. (a) Draw the circuit switching diagram.

Ans. to the Q. No - 07(a)

In this type of switching, there is a set of switches connected with physical links. Here once the dedicated path is established between the sender and receiver, it stays the same until one of the users terminates the connection.

There are three phases in the establishment of a circuit switching network. They are
— circuit establishment, Data transfer and circuit disconnect.
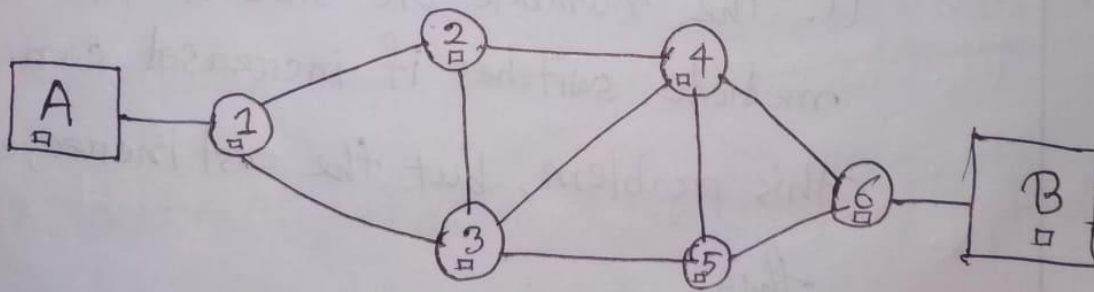
Fig: Circuit Switching

07.(b) Write down the advantages and disadvantages of a multistage network.

Ans. to the Q. No-07(b)

The advantages of a multistage network are as follows:

i. The number of crossbars are reduced.

ii. The number of paths of connection can be more.

The disadvantages of a multistage network are as follows:

i. Multistage switches may cause blocking.

ii. The number or size of the intermediate switches if increased can solve this problem, but the cost increase with this.

07. (c) Draw the flowchart that shows the different categories of the crosspoint Technology.

Ans. to the Q. No-07 (c)

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                    │  Crosspoint Technology   │
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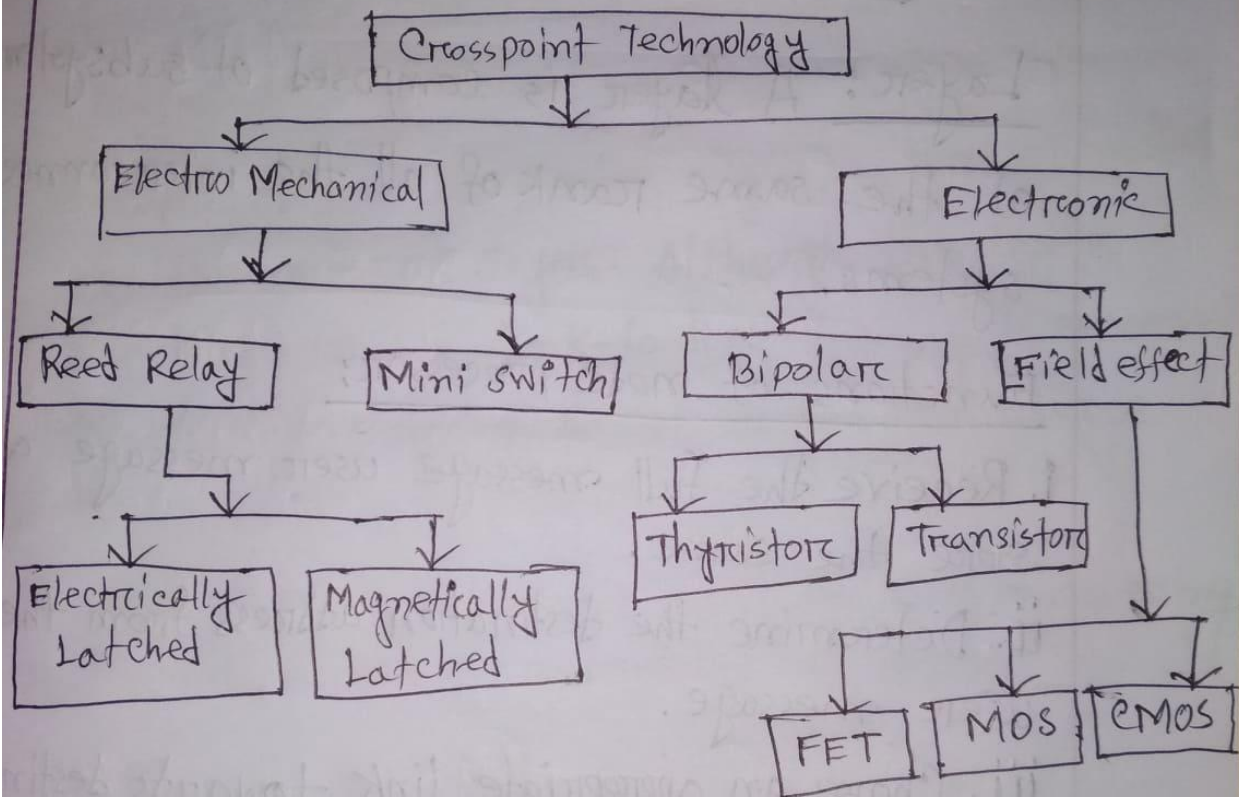
Fig: different categories of the crosspoint Technology.

08. (a) Define Layer. Write down the functions of the node processor.

Ans. to the Q. No – 08(a)

Layer: A layer is composed of subsystems of the same rank of all the interconnected systems.

Functions of node processor:

i. Receive the full message user message and store the same.

ii. Determine the destination address from the user message.

iii. Choose an appropriate link towards destination based on certain routing criterion.

iv. Forward the message to the next note on the choosen link.

v. Check the message for data transmission errors and perform error recover if required.

08. (b) Define network layer. Write down the step by step performance of a routing algorithm.

Ans. to the Q. No-08(b)

Network Layer:

The highest link-to-link layer in the OSI model is the network layer. Although this layer functions on a link-to-link basis, it is concerned with transmission of packets from the source node to the destination node.

A number of measures may be used in assessing the performance of a routing algorithm:

1. Minimum delay

2. Minimum number of intermediate nodes or hops.

3. Processing complexity

4. Signaling capacity required on the network.

5. The rate of adaption in the case of adaptive algorithms.

6. Fairness to all types of traffic.

Q8. (c) What do you mean by LAN within some examples?

Ans. to the Q. No-08(c)

LAN: A local area network (LAN) typifies a distributed environment and finds application in a number of areas. Some examples are:

1. Office automation
2. Factory automation
3. Distributed computing
4. Fire and security system
5. Process control
6. Document distribution

08. (d) Write down benefits of the application layer.

Ans. to the Q. No-08(d)

Benefits of application layer:

1. Directory services

2. Cost allocation

3. File transfer and management

4. Editors and terminal support services

5. Telematic services like videotex