Mawlana Bhashani Science and Technology University

Department of Information and Communication Technology

Course Code : ***ICT-4101***

Course Name : ***Telecommunication Engineering***

Class Test No. : ***01***

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Assignment no. 01

Questions:

1.(a) what is telecommunication engineering? what are the key challenges facing telecommunication engineering? -5

(b) Briefly describe the ways in which demand assignment may be carried out in an FDMA network. -4

(c) How switching system works in telephone communication? -5

2.(a) What is communication Links? -3

(b) Briefly explain the classification of Switching systems. -6

(c) How telecommunication network works Explain briefly. -5

3. (a) what is service specific Networks? Explain with examples. - 4

(b) What is switching Matrix? Describe the types of connections in telecommunication Network? - 5

(c) What are the differences between folded Network and blocking Network? - 5

4. (a) what is Erlag in telecommunication network? - 3

(b) Describe the different block of the switching system. - 4

(c) What is Network traffic? - 2

(d) Describe the following Signaling - 5 tones: i) Dial Tone. iv) Routing Tone.
ii) Ring Tone.
iii) Busy Tone.

5.(a) How common control subsystem work? -3

(b) Explain the topology of a Multi-exchange Network ? – 5

(c) what is crossbar switching ? what are the features of crossbar switches? -6

6.(a) Explain what is meant by (i) lines of apsides and (ii) lines of nodes. Is it possible for these two lines to be coincident ? -5

(b) Briefly describe the ways in which demand assignment may be carried out in an FDMA network. -5

(c) what are the challenges for the Crosspoint technology ? - 4

7. (a) Briefly explain the main sections of the Crossbar Exchange Organization? -4

(b) Write shorte Note of - -5

i) Pre-selection,
ii) Group selection,
iii) Line selection.

(c) What are the differences between centralized spc and Distributed spc? -5

8. (a) Describe the software architecture? -2

(b) Describe the process in a Multiprogramming Environment. -4

(c) What is PCB? How it process data? -4

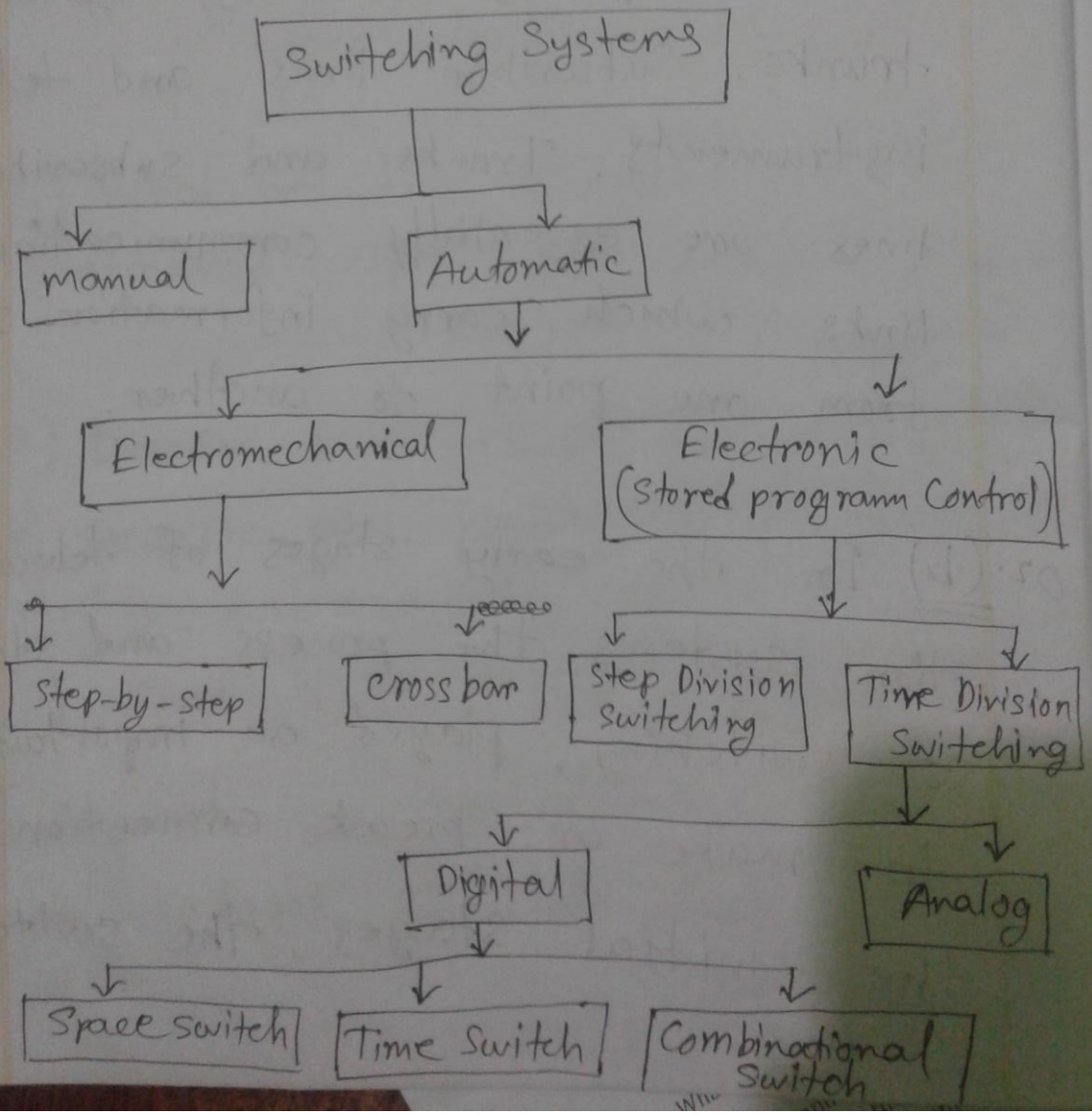
(d) what are the advantages and disadvantages of Multistage Network? -4

Answer to the questions no(02)

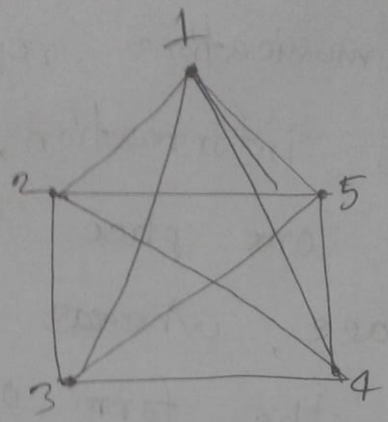
02. (a) A telephone switching network is made trip of switching systems trunks. Subscriber lines and telephone instruments. Trunks and subscriber lines are essentially communication links which carry information signals from one point to another.

02. (b) In the early stages of telecommunication systems, the process and stages of switching, played an important to make or break connections. At the initial stages, the switching

systems were operated manually. These system were later automated. The flowchart shows how the switching systems were classified.



02. (c) Telecommunications represent the transfer of information, from an entity at one place to an entity at another place, whereas the information can be in the form of data, voice or symbol. In telephone conversions, the one who initiates the call is refered to as the calling subscriber. and the one for whom the call is destined is the called subscriber. Let us consider a network of 5 subscribers. The following illustration shows a point-to-point connection for five subscribers:



In the point-to-point connection, for n entities, we need n(n-1)/2 links. All these links form a fully connected Networks.

Answer to the question no-(03)

03. (a) with the concept of switched connections for telephony taking its firm roots, the idea of offering

other non voice services using switched and switched networks caught the attention of tele communication specialist of in the first half of the 20th century. Examples are — Telephone Networks, Telex Networks, Telegraph Networks and Data networks.

03. (b) The hardware used to establish connection between inlets and outlets is called the switching matrix or the switching Network.

There are foour 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. (C) The differences between folded network and blocking network are given as follows:-

Folded Network	Blocking Network
1. A network where the outlets are connected to the inlets, is called folded Network.	1. If there are no switching path free in the network, is called blocking Network.
2. The number of inlets is equal to the number of outlets for a switching Network.	2. The number simultaneous switching paths is less than the maximum number of conversations that can take place.
3. The network is called symmetric Network.	3. The subscriber is said to be blocked in this network.
4. There is no blocking probability.	4. There is blocking probability in this network

Answer to the question no(04).

04.(a) The traffic in a telecommunication network is measured by an internationally accepted unit of traffic intensity known as Erlang.

04.(b) The block diagram of the switching system given below show the essential elements of a switching system :-

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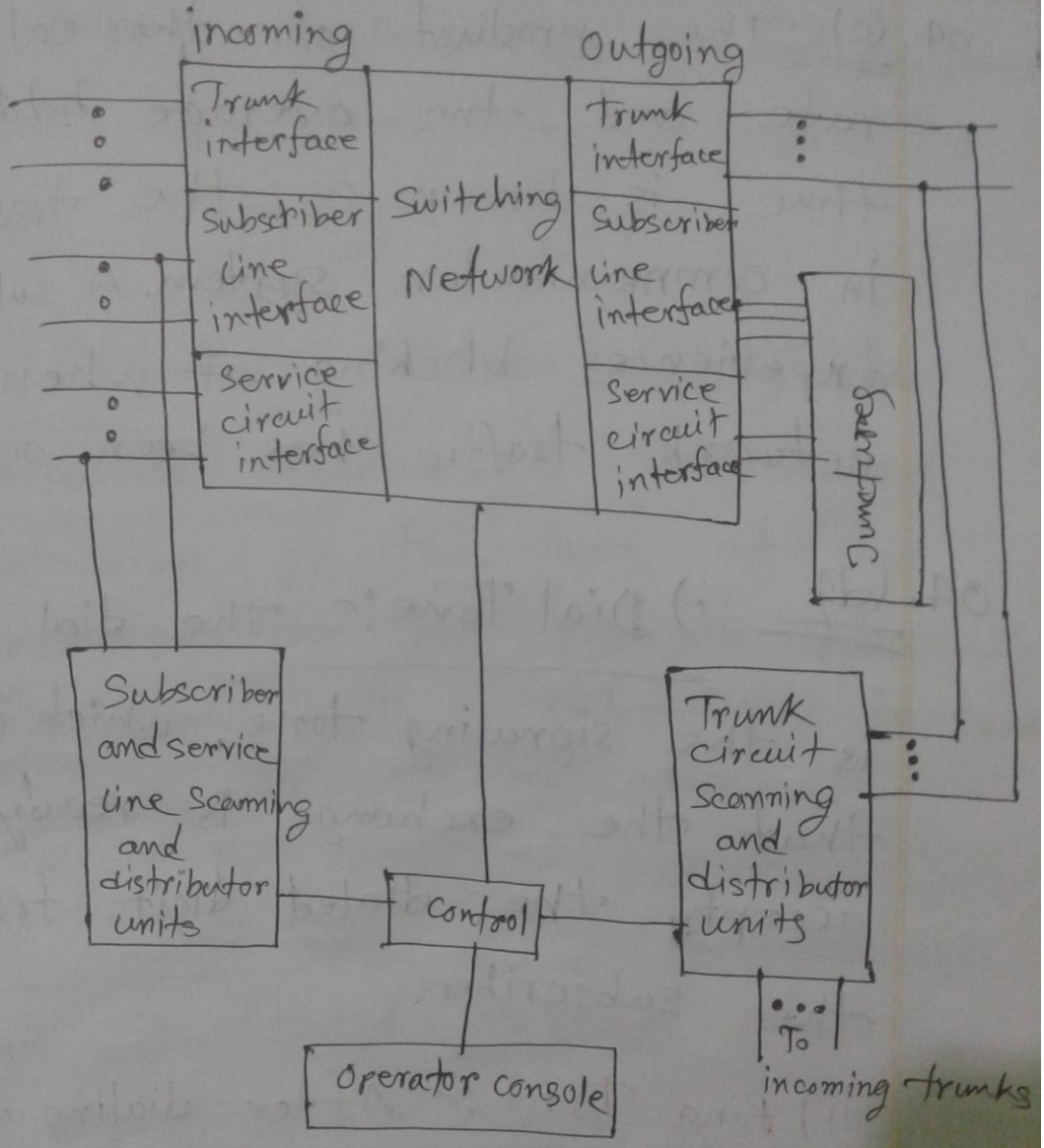

fig:- different block of the switching system.

04 (c) The product of the calling rate and the average holding time is known as the traffic in communication system. A subscriber experiences blocking ~~at~~ when network traffic has been occured.

04 (d) i) Dial Tone :- The dial tone is the signaling tone, which indicates that the exchange is ready to accept the dialed digits from the subscriber.

ii) Ring Tone :- After dialing the number of the called party, when the line of the called party is

obtained, the exchange control equipment sends out the ringing current to the telephone set.

iii) Busy Tone:- After dialing the required number, if the called subscriber or the lines at the exchange are not free to place a call, the calling subscriber is sent a busy tone.

iv) Routing Tone:- When a subscriber call is routed through a number of different types of exchnges, one hears different call in progress tones as the call progressies through different exchanges.

Answer to the question no (05)

05. (a) The crossbar switching system introduced the common control subsystem in its switching system. Two main ideas were implemented by the common control subsystem :-

i) The routing of the call sould be done by the call exchange, but not by the numbers dialed.

ii) A unique identification number should be allotted to the subscriber.

Q5. (b) In a multi exchange network, the routes used to establish connection with a particular subscriber differs from time to time. In the stronger exchange following the multi-exchange network, the subscri-ber has be more concerned with the routing. A subscriber should have the details of all the numbers of exchanges present in the route. There may arise situations where a subscriber may be required to establish a connection on the routes; these becomes cumbersome at times.

The following figure is an example of the topology of a multi-exchange network.

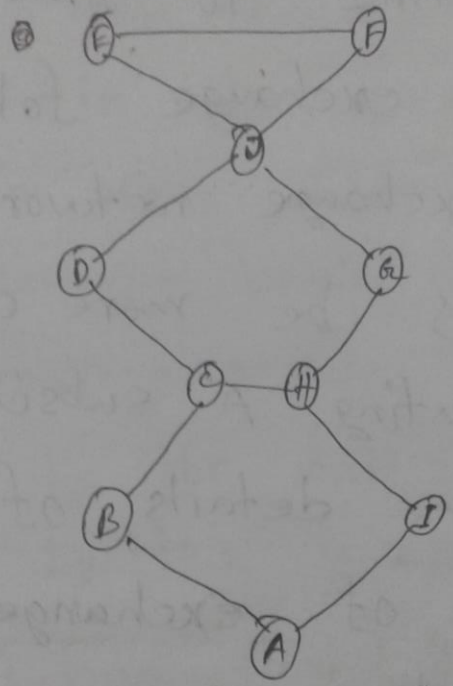

fig: topology of a multi-exchange network

05. (c) The active elements called crosspoints are placed between the input and the output lines. In the

common control switching systems, the separation between switching and control operations allows the usage of switching networks by a group of common control switches to establish many calls at the same time on a shared basis.

The features of crossbar switches are given below:-

- while processing a call, the common control system helps in the sharing of resources.
- The specific route functions of call processing are hardwired because of the wire logic computers.

- The flexible system design helps in the appropriate ratio selection is allowed for a ~~sep~~specific switch.
- Fewer moving parts ~~esee~~ the maintanance of crossbari switching systems.

Answer to the question no (07)

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07. (a) The organization of a crossbar exchange consists of three basic building blocks such as link frames, control markers and registers. Link frame contains

primary and secondary stages having crossbars, connected with links between them. This two stage ~~and~~ arrangement with links has the effect of increasing the number of outlets for a given number of inlets. If the number of outlets is high, the selectivity is higher too. The Registers are there to store the number dialed, in order to establish the connection.

07. (b) i) Pre-selection :- The organizing marker does the pre-selection. When the calling subscriber lifts the handset, the dial tone is heard. The register send this tone. This stage that stars from lifting the handset to sending the dialed tone is called Pre-selection.

ii) Group selection :- Once the dialed tone is heard, the number can be dialed. The call is switched through the desired direction as decided, in accordance with the code given by the translator.

this stage of selecting the desired group for making a call is called Group Selection.

iii) Line Selection :- The line of the called party is controlled by the terminating marker which also sets up ringing on the line. This stage of selecting the line of the desired subscriber can be called as the Line selection.

07. (C) The differences between distributed SPC and centralized SPC are given below :-

Centralized SPC:- The previous version of Centralized spc used a single main processor to perform the ~~exchange~~ exchange functions. The dual processor replaced the single main processor at a later stage of advancement. This made the process more reliable. A dual processor architecture may be configured to operate in three modes like:

- Standby Mode
- Synchronous Duplex Mode
- Load Sharing Mode.

Distributed SPC:- The introduction of distributed SPC has enabled to provide a wide range of services. This SPC has separate small processors called the regional processors that deal with different works, rather than just one or two processors working on the whole thing like in the centralized system. The distributed SPC has more availability and reliability than centralized SPC, because entire exchange control fuctions may be decomposed either horizontally or vertically for distributed processing.