

1.

- (a) What is Telecommunication?
- (b) What is the need for switching exchanges?
- (c) Describe switching systems.

2.

- (a) Define calling subscriber and called subscriber.
- (b) What is the classification of switching systems?
- (c) Describes automatic switching system

3.

a) Define crossbar.

b) Describe telecommunication network.

c) Describe service specific networks with example.

4.

a) What is Intels and outlets?

b) Describe Telephone communication.

c) What are the types of a connection in a telecommunication network?

Q6. 05

a) What is system?

b) Describe Data network hierach.

c) Show geographical coverage and speeds of data network.

Q7. 06

a) What is Modem?

b) Make a difference chart between voice traffic and data traffic.

c) Describe the functions of node processor.

07.

- a) What is subsystem?
- b) Describe Entity process.
- c) Show an entity of connectionless service.

08.

- a) What is Layer?
- b) Classified routing algorithms.
- c) Explain the performance of a routing algorithm.

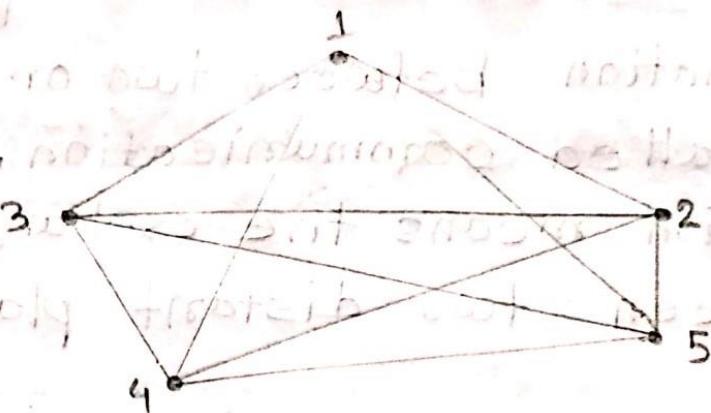
Ans to the question

1. (a) Telecommunication: The exchange of information between two or many individuals is called communication. Hence, Telecommunication means the exchange of information between two distant places.

1. (b) The need for switching exchanges are given below,

The point to point connection for establishing communication requires the telephone sets to be linked using wires. If the number of telephone sets on the subscribers present is low in number, the type of connection will be a little complex. However, if this number is high or moderate, then the connection will lead to mess. To understand the complication, let us consider

a network of 5 subscribers. The following illustration shows a point to point connection for five subscribers (telephone sets)

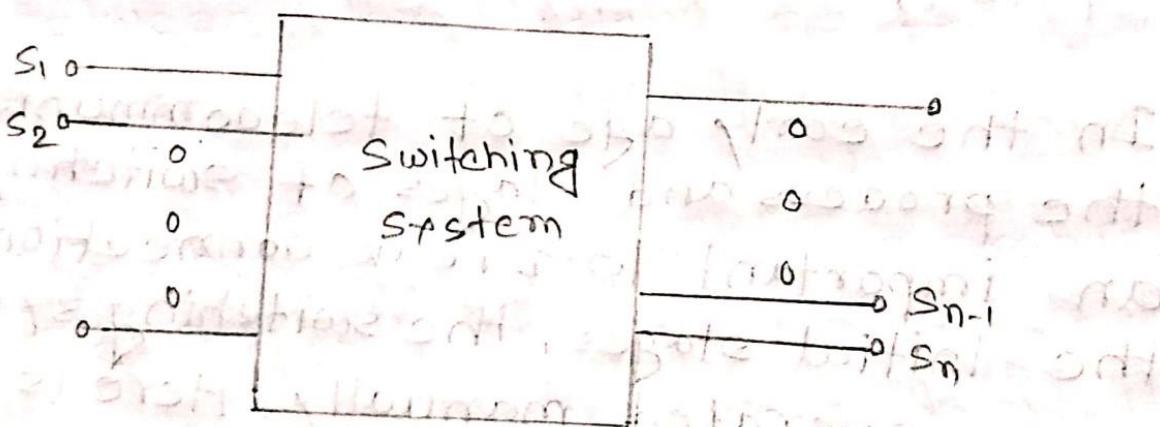


Hence a system of switching the networks is needed in between these subscribers.

1. (a) Description of switching systems are given below:

This network connection cannot be simply made with telephone sets and bunch of wires but a good system is required to make or break a connection. This system is known as the switching system or the switching office or the exchange.

With the introduction of the switching system the subscribers instead of getting connected directly to one another, are connected to a switching office and then to the required subscriber.



Below, fig; switching system.

Ans to the question  
no : 02

2. a)

calling subscriber:

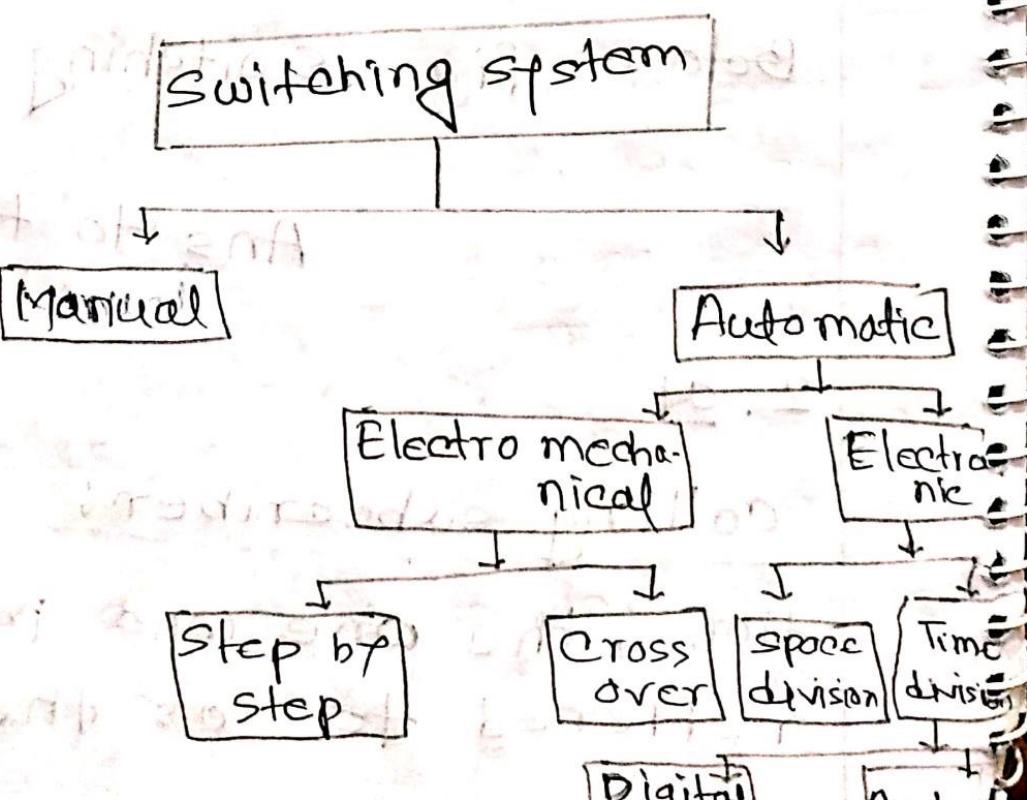
In telephone conversation, the one who initiates the call is referred to as the calling subscriber.

Called subscriber:

In telephone conversation, the one for whom the call is destined is the called subscriber.

2.(b) The following, classified switching system,

In the early age of telecommunication the process and stages of switching played an important role to break connection. At the initial stages, the switching systems were operated manually. Here is the flowchart,



The switching systems in the early stages are operated manually. The connection were made by the operators at the telephone exchange in order to establish a connection.

Q. (a)

The automatic switching system are classified as the following.

(i) Electromechanical switching system - Here, mechanical switches are electrically operated

(ii) Electronic switching system: Here, the usage of electronic components such as diodes, transistors and ICs are used for the switching purpose.

Above are the classification of Automatic switching system.

Ans to the question  
no: 03

3. of Crossbar:-

The crossbar switching systems have hard wired control subsystems which use relays and latches. The subsystems have limited capability and it is virtually impossible to modify them to provide additional functionalities.

3. b) Description of Telecommunication network are given below,

A telecommunication network is a group of systems that establishes a distant call. The switching systems are part of a telecommunication network. The switching system provides connection between different subscribers. Such switching systems can be grouped to form a telecommunication network. The switching

systems are connected using lines called the trunks. The lines that run to the subscriber premises are called the subscriber lines.

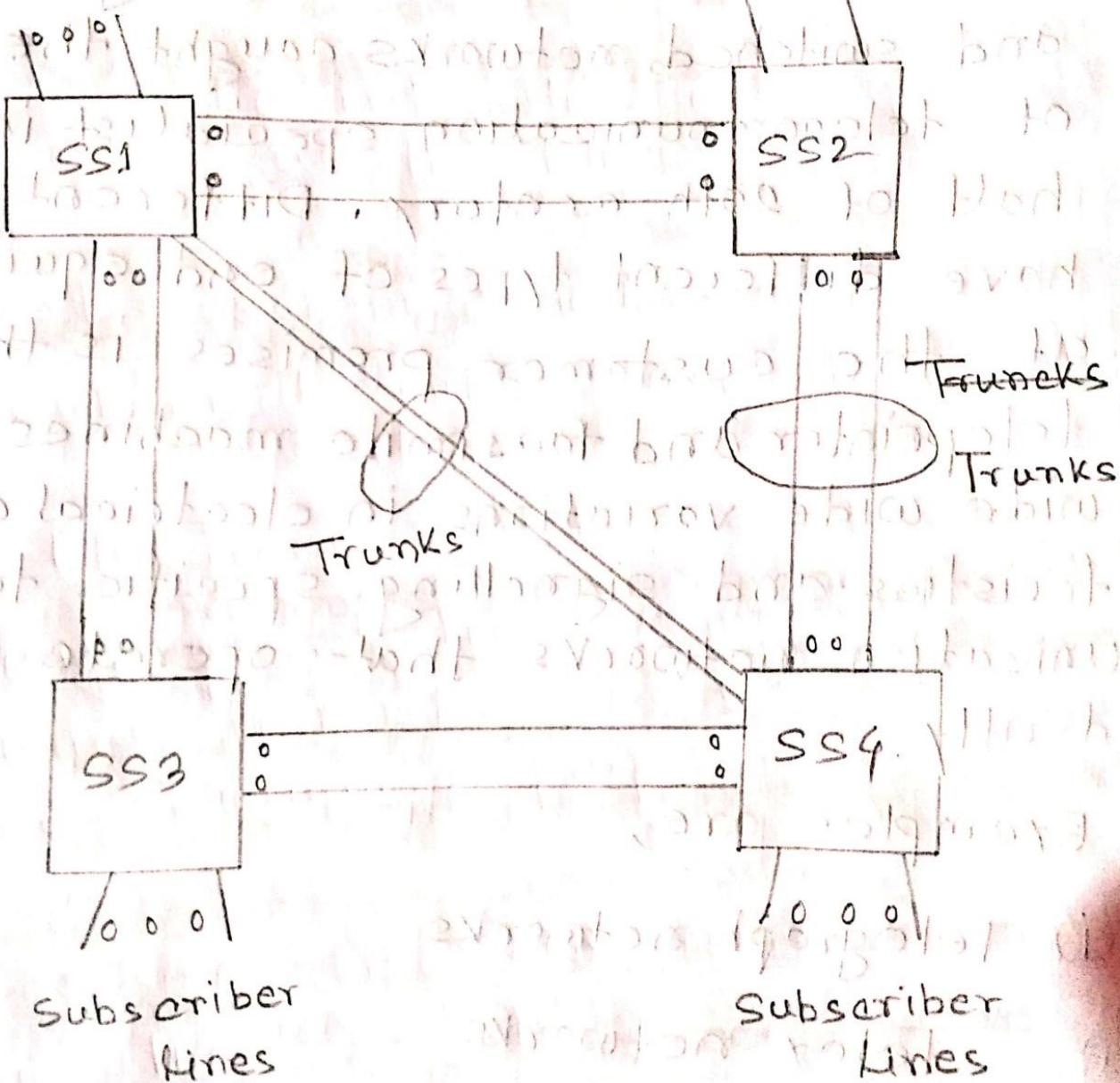


fig: a Telecommunication network

### 3.(c) Service specific network:-

With the concept of switched connections for telephony taking its firm roots, the idea of offering other non voice services using switches and switched networks caught the attention of telecommunication specialist in the 1st half of 20th century. Different services have different types of end equipments at the customer premises is that telex, teleprinter and facsimile machines. Such wide wide variations in electrical characteristics and signalling specific telecommunication networks that operate independently.

Examples are,

- (i) Telegraph networks.
- (II) Telex networks
- (III) Telephone networks
- (IV) Data networks.

Ans to the question

no: 04

4.(a)

Intels: The set of input circuits of an exchange are called Intels.

Outtels: The set of output circuits of an exchange are called outtels.

4. (b) Telephone communication:

In normal communication system, information is transferred both ways. An entity is capable of both receiving and sending although these do not take place simultaneously. An entity is either receiving and sending at any instant of time. When one entity is transmitting the other is receiving and vice versa. Such a form of commu-

cation where the information transfer takes place both ways but not simultaneously is known as half duplex communication.

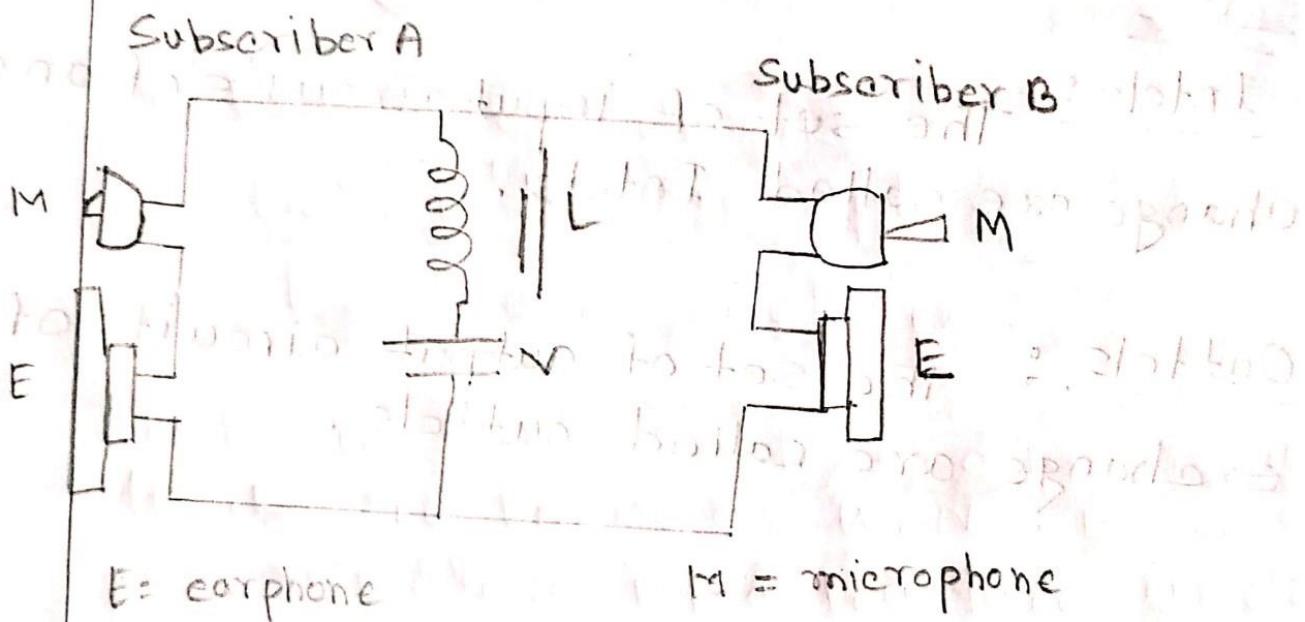


fig: Telephone communication circuit.

#### 4. (C) Types of connection:

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.

4. cl

- Outgoing call connection between a subscriber and outgoing trunk.
- Incoming call connection between an incoming trunk and a local subscriber.
- Transit call connection between an incoming trunk and an outgoing trunk.

Ans to the question

no: 05

5. of System:

A system is one or more autonomous computers and their associated software, peripherals and users, which are capable of information processing and transfer.

### 5.(b) Data network hierarchy:

Data networks are classified according to their geographical coverage!

- Wide area networks
- Metropolitan area networks
- Local area networks.

Intercity inter country and international networks are known as WANs. Based on the communication infrastructure used.

A MANs. interconnects computers within a metropolitan city, CAB cables, twisted pair wires or shielded lines, optical fibers provide the communication medium for man.

A LANs are confined to a single building or a group of building generally belonging to the same organization.

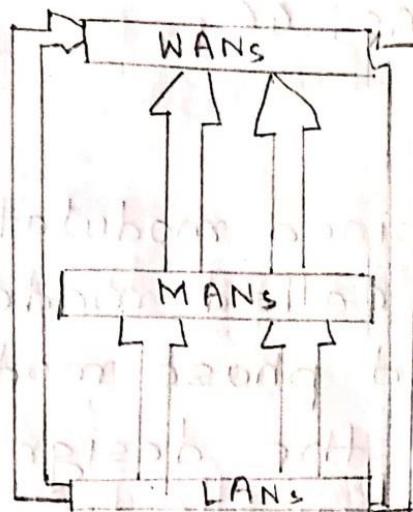
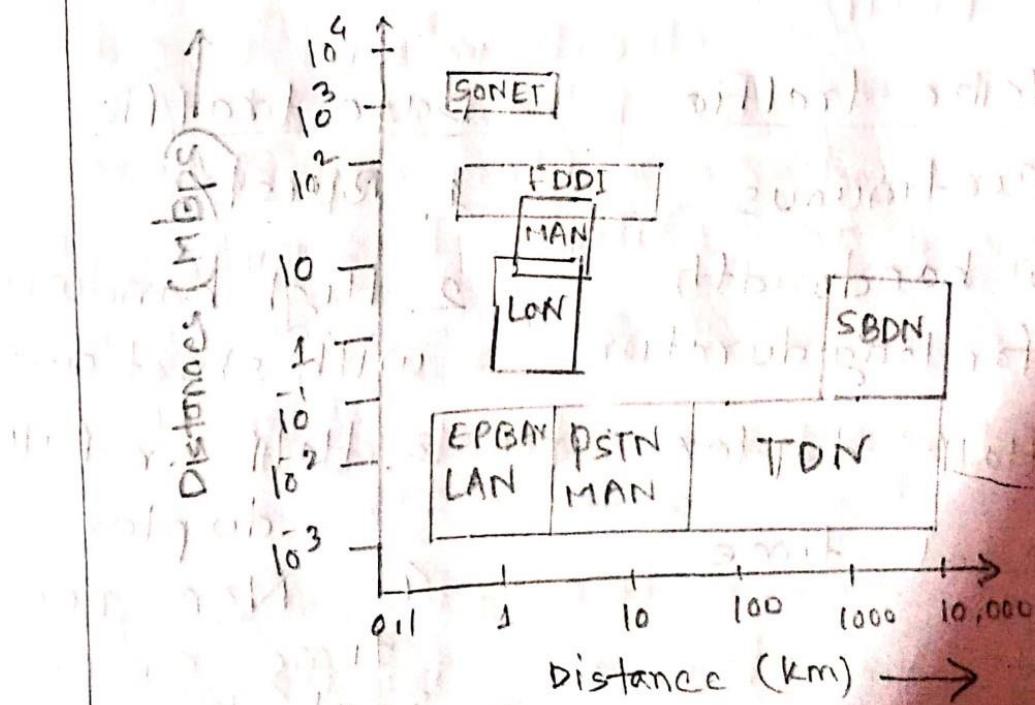


fig: Data network hierarchy

5.(c) Geographical coverage and speeds of data networks are given below.



Ans to the question

no; 06

6. a) Modem:

Combined modulator and de-modulator unit is called modem. Amplitude, frequency and phase modulation are all used in the design of modem.

6. b) Diffens between voice traffic and data traffic are given below,

Voice traffic

1. Continuous
2. Low bandwidth for long duration
3. Half duplex
4. Real time

Data traffic

1. Bursty.
2. High bandwidth with short duration
3. Half or full duplex.
4. Non real time or near

### Voice traffic

5. Loss acceptable

6. Error tolerable

### Data traffic

5. Loss unacceptable.

6. error unacceptable

### 6.(c) Node processor function:

In message switching once the transmission is initiated a message is transmitted in its entirety without a break from one node to another.

The node performs the following function.

1. Receive the full user message and store the same.
2. check the message for data transmission.
3. Determine the destination address from the user message.
4. Choose an appropriate link towards destination based on certain routine

criterion.

5. Forward the message to the next node on the chosen link.

Ans to the question no: 07

7. a) Subsystem:

A logically independent smaller unit of a system a succession of subsystem make up a system.

7. b) Entity: The functions in a layer are performed by hardware sub-sys sub-systems and or software packages. These are known as entities. This process is depicted in figure.

- ① A three layer structure is used in this communication.
- ② The conversation between an upper and lower layer is strictly business like.

- (iii) There is generally a little private conversation between the trunk operators and the two secretaries, on account of their familiarity.
- (iv) There are fairly well defined functions to be performed by each layer.

7.4 This separation of services and the protocols provides complete freedom to change protocols at will without affecting the service.

Idle - No connection

Connection establishment

+  
connection release

+  
Idle no connection

(a) connection oriented services

**IDLE - No connection**

**Data transfer**

**Idle - No connection**

(b) Connection service

Ans to the question no; 08

8. a)

Layer:

A Layer is composed of subsystems of the same rank of all the interconnected system.

8. b)

Classification of routing algorithm are given below,

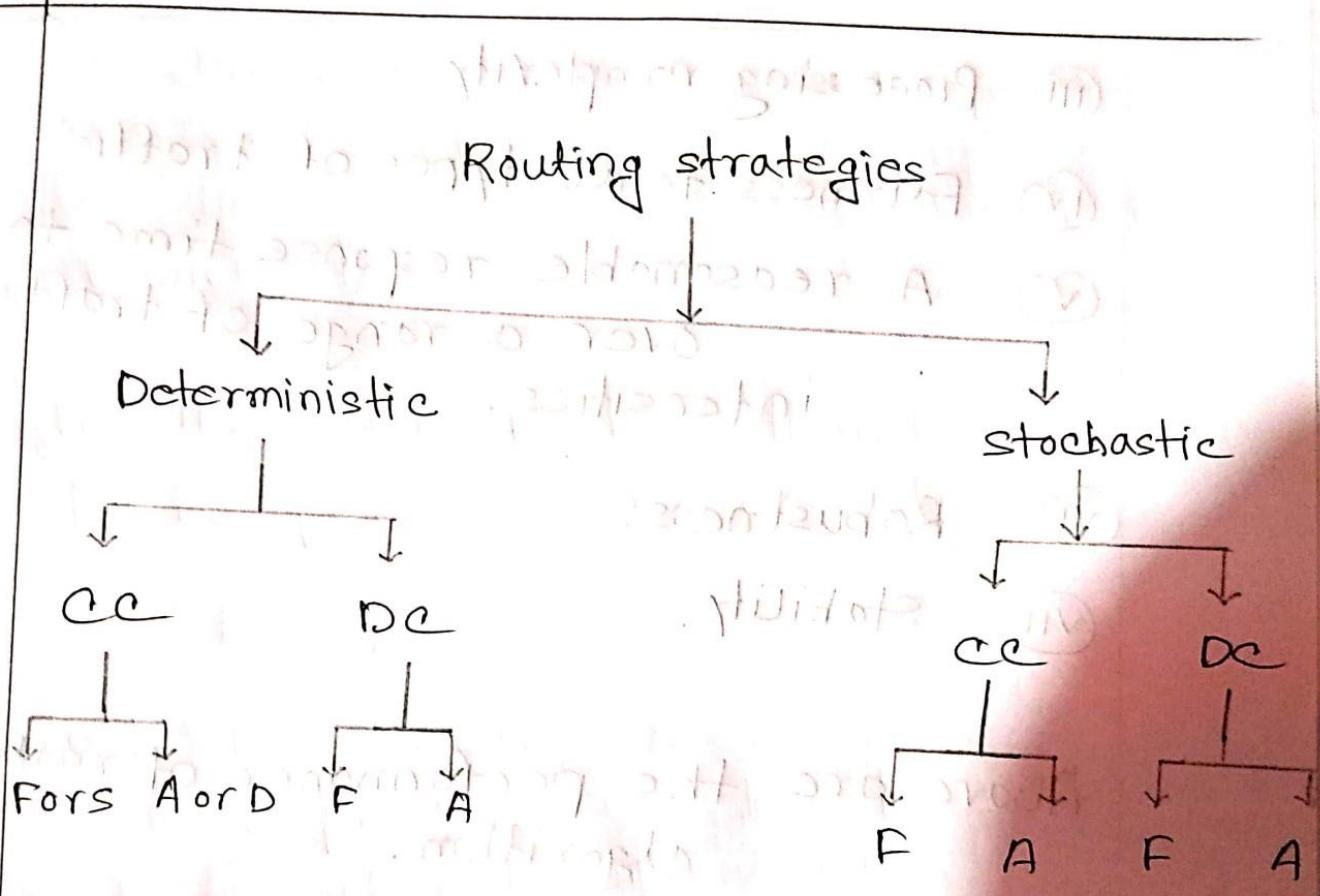


fig: classification of routing algorithms.

8. Performance of routing algorithm:-  
 A number of measure may be used in assessing the performance of a routing algorithm,

- (i) Minimum delay
- (ii) Minimum number of intermediate nodes or hops.

- (III) Processing complexity
- (IV) Fairness to all types of traffic
- (V) A reasonable response time to over a range of traffic intensities.
- (VI) Robustness.
- (VII) stability.

Above are the performance of routing algorithm.