Mid Examination - Spring 2024
Course : CSE-443 | Mobile & Telecommunication
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Ans. to the Q. No - 01

(a)

Data Communication :-

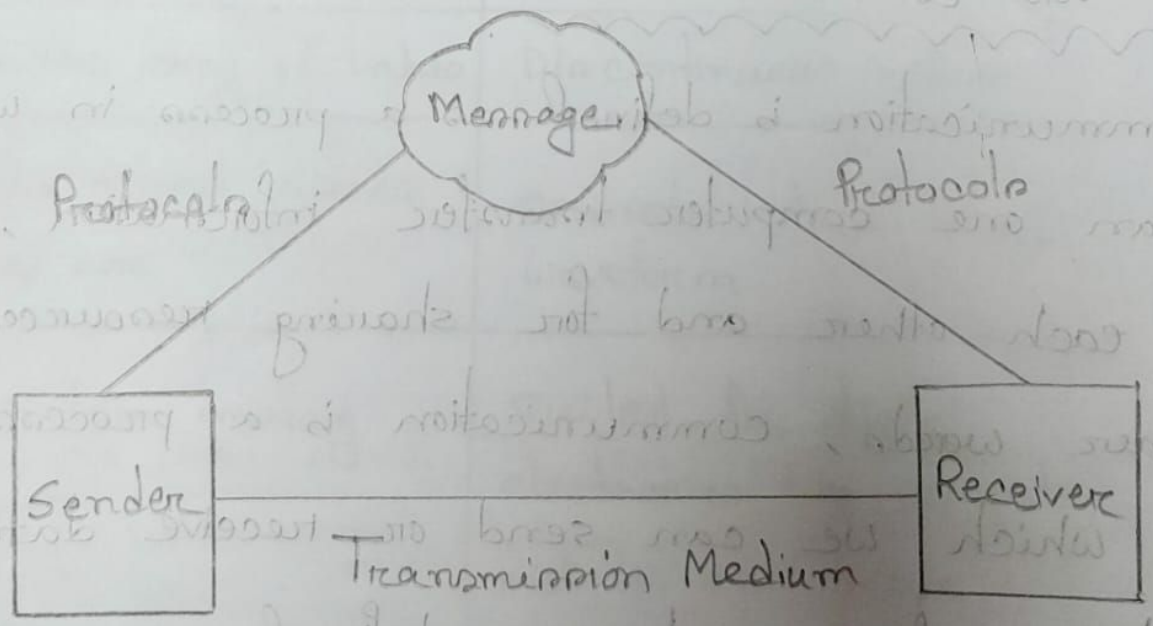
Communication is defined as a process in which more than one computer transfer information, instructions to each other and for sharing resources. Or in other words, communication is a process or act in which we can send or receive data. A network of computers is defined as an interconnected

collection of autonomous computers. Autonomous means no computers can start, stop or control another computers.

Component of Data Communication :-

A communication system made up of the following components :

1. Message
2. Senders
3. Receiver
4. Transmission Medium / Communication channels
5. Set of rules (Protocol)



(b) Bandwidth :-

The term "bandwidth" refers to the quantity of data that may be sent through a specific network connection or link in a particular time length. Ordinarily, it is expressed in bits per second (bps) or megabits per second (Mbps).
A network connection's speed is determined by its Bandwidth, a fundamental idea in computer networking. A wired or wireless network's available capacity is gauged by its bandwidth. It is the most data that can be moved through the web at a specific time. The faster a user can access and download data from the network, the higher the Bandwidth.

There are two primary types of bandwidth:

1. Symmetric Bandwidth.
2. Asymmetric Bandwidth.

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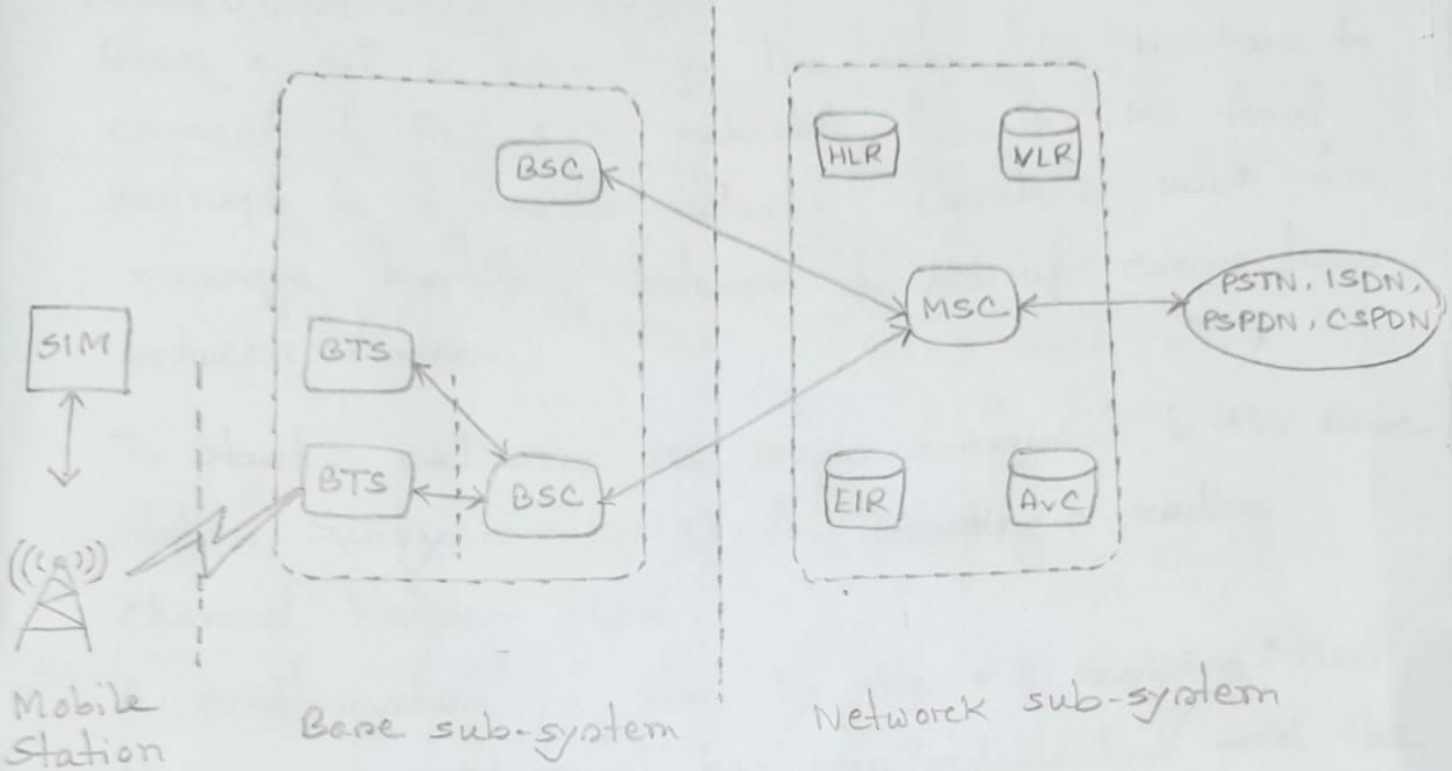
Ans. to the Q. No - 02

(a) Cellular mobile calls generate system :-

Cellular mobile call systems, also refferced to as personal communication systems (PCS) are extremely popular and lucrative worldwide. these systems have sparcked much of the optimism about the future of wireless networks.

GSM stands for Global system for Mobile communicati

This article explains two of the functionalities of GSM networks, which are mobile-originated and mobile terminated voice calls. Whether or not a call is made from the mobile station, the mobile station always communicats with the Base Transceiver station (BTS) by sending are receiving "HELLO" signals.



GSM is the most widely used mobile communication system worldwide. It is a second-generation (2G) mobile communication system that uses digital technology to transmit voice and data. In a GSM network, calls are routed and transmitted through a combination of various components such as mobile station (MS), Base station system (BSS), and Mobile switching center (MSC).

Mobile originated call :

When a call is made by the user, the MS has to connect to the GSM network. For the MS first connects to a radio network, which is used for message handling between to set up connections between devices.

To start a call, the MS sends a request to the Base station Subsystem (BSS) for creating a radion channel between them.

A confirmation is sent by the MS implying that the radio channel has been established and the BSS can now create a connection to the MSC.

The MSC reserves a voice channel between the MSC and the BSS. The change to voice mode is notified by the BSS, and the MS returns a confirmation message.

Mobile Terminated call :

A terminated call in the GSM network is a call received on a mobile device. When a call is made, the country code of the phone number

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is used to find the location of the receiver and also to find the MSC which the subscriber is linked to.

After that all the BSCs are paged by the MSC and also the BTSs are paged by the BSC.

After that a radio channel is established between MS and BTS.

Procedure for call Establishment :-

When a call is made to a mobile phone in a GSM network, it is first received by the nearest Base station system (BSS). The BSS then establishes a connection with the mobile switching center (MSC) which acts as a control center for the entire network.

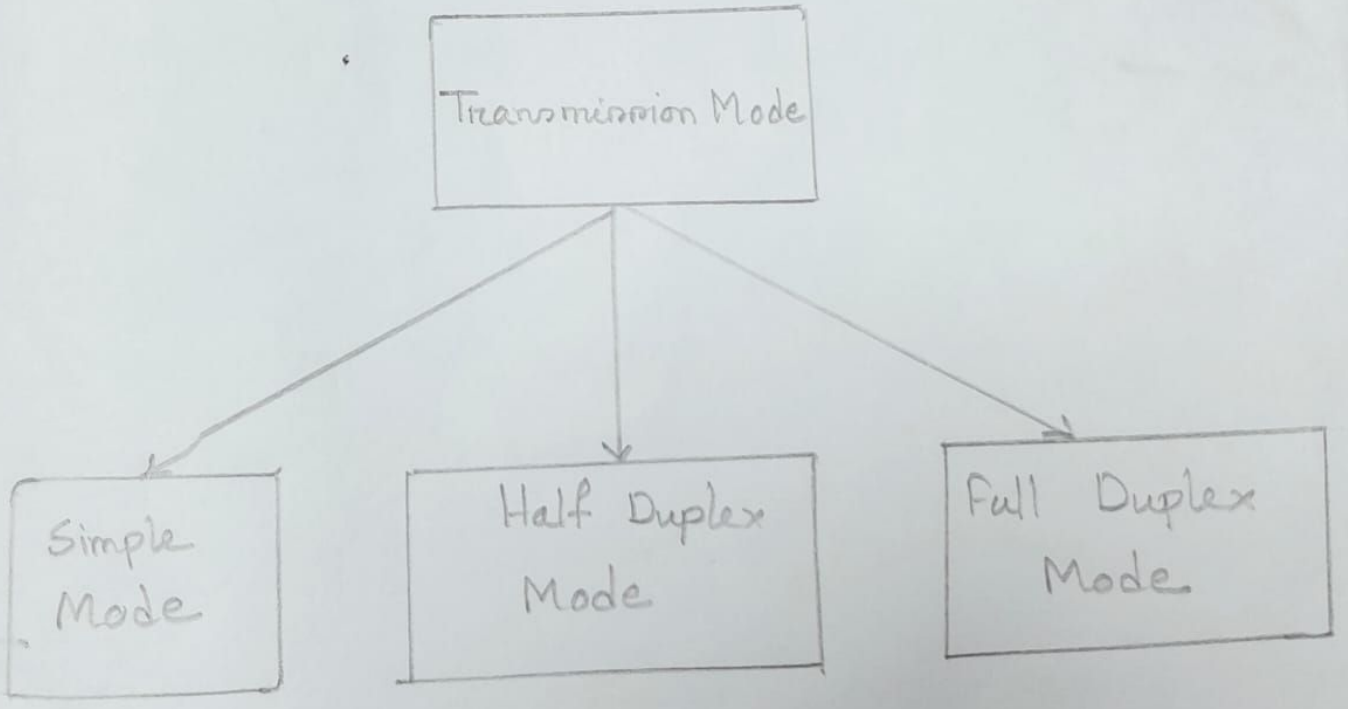
Once the connection is established, the audio signals are transmitted between the calling and called parties through the BSS.

(B) Transmission Modes in Computer Networks :-

Transmission mode means transfering data between two devices. It is also knows as a communication mode.

There are three types of transmission mode :-

1. Simple Mode
2. Half Duplex Mode
3. Full Duplex Mode



These are explained as following below :

1. Simplex Mode :-

In simplex mode, the communication is unidirectional, as on a one-way street. Only one of the two devices on a link can transmit, the other can only receive.

Example :- Keyboard and traditional monitors. The keyboard can only introduce input, the monitor can only give the output.

2. Half-Duplex Mode :-

In half-duplex mode, each station can both transmit and receive, but not at the same time. When one device is sending, the other can only receive, and vice versa. The entire capacity of the channel can be utilized for each direction.

Example :- Walkie-talkie in which message is sent one at a time and messages are sent in both direction.

3. Full-Duplex Mode :-

In full-duplex mode both stations can transmit and receive simultaneously. In full deplex mode signals going in one direction share the capacity of the link with signals going in another direction, this sharing can occurs in two ways.

→ Either the link must contain two physically separate transmission paths, one for sending and the other for receiving.

→ Or the capacity is divided between signals travelling in both directions.

Example :- Telephone network in which there is communication between two persons by a telephone line, through which both can talk and listen at the same time.

Ans. to the Q. No – 04

(a) Network classification based on area :-

There are various types of computer networking options availble. The classification of network in computers can be done according to their size as well as their purpose.

Following are the popular types of computer network:

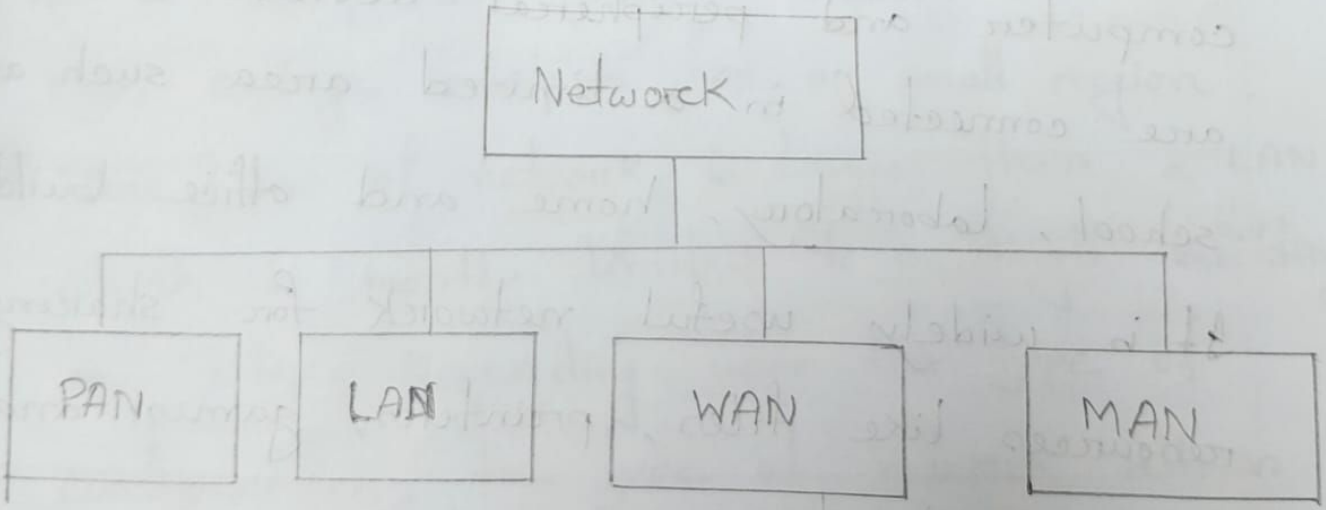


Fig: Network classification

PAN :-

PAN (Personal Area Network) is a computer network formed around a person. It generally consists of a computer, mobile, or personal digital assistant. PAN can be used for establishing communication among these personal devices for connecting to a digital network and internet.

LAN :-

A Local Area Network (LAN) is a group of computer and peripheral devices which are connected in a limited area such as school, laboratory, home and office building. It is widely useful network for sharing resources like files, printers, games, and other application.

WAN :-

Wide Area Network (WAN) is another important computer network that which is spread across a large geographical area. WAN network system could be a connection of a LAN which connects with other LAN's using telephone lines and radio waves. It is mostly limited to an enterprise or an organization.

MAN :-

A Metropolitan Area Network (MAN) is consisting of a computer network across an entire city, college campus, or a small region. This types of network is large than a LAN, which is mostly limited to a single building or site. Depending upon the type of configuration, this type of network allows you to cover an area from several miles to tens of miles.

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(b) Difference between 2G and 3G Cellular Network :-

2G	3G
Network Construction and maintenance is cheaper.	Network construction an maintenance is costlier.
It provides slower download speed and slower access to applications.	Faster access and download speed for applications.
It is less secure than 3G	Highly secure as 3G network permits validation measures.
Video calls can not be made.	Video calls can be made.
Downloading and uploading speed is upto 236 Kbps.	Downloading speed is upto 21 Mbps and uploading speed is upto 5 Mbps.
Can be availed from any region.	3G network is not available in certain regions due to the frequency problem.