

Department of Computer Science & Engineering

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Mid Assessment

Ans. to the Q. No - 01

(a) There are mainly five components of a data communication system :-

1. Message
2. Sender
3. Receiver
4. Transmission Medium
5. Set of rules (Protocol)

Message :-

This is most useful asset of a data communication system. The message simply refers to data or piece of information which is to be communicated.

② A message could be in any form, it may be in form of a text file, an audio file, a video file, etc.

### 2. Sender :-

To transfer message from source to destination, someone must be there who will play role of a source. Sender plays part of a source in data communication system.

### 3. Receiver :-

It is destination where finally message sent by source has arrived. It is a device that receives message, same as sender, receiver can also be in form of a computer, telephone, mobile, workstation, etc.

### 4. Transmission Medium :-

In entire process of data communication, there must be something which could act as a bridge between sender and receiver. Transmission medium plays that part. It is physical path by which data or message travels from sender to receiver.

### 5. Set of rules (Protocol):

To govern data communications, various sets of rules had been already designed by the designers of the communication system, which represents a kind of agreement between communicating devices.

# Advantages and Disadvantages of Network Topology:-

Topology	Advantages	Disadvantages
Bus	In expensive simple to expand Easy to implement.	Prone to faults Limited Scalability Difficult to isolate faults.
Ring	Equal access Deterministic Avoid collision.	Fault in any link affects whole network Difficult to add or remove nodes.
Mesh	Redundant Fault-tolerant Highly scalable	Very expensive Difficult to setup and configure the number of links grows exponentially with nodes.
Star	Easy to setup Easy to expand Fault isolation	Hub is a single point of failure Limited bandwidth.
Tree	Expansion of star some fault tolerance Low-cost	Bus cable is a single point of failure Difficult to configure
Hybrid	Flexibility Fault tolerance High performance	Complex costly to implement Difficult to troubleshoot.

④

## (b) Micro Waves :-

Microwaves are defined as electromagnetic radiations with a frequency ranging between 300 MHz to 300 GHz.

In contrast, the wavelength ranges from 1 mm to around 30 cm. Microwave radiation is commonly referred to as microwaves. They fall between infrared radiation and radio waves in the electromagnetic spectrum.

## Characteristics of Micro waves :-

### 1. Shorter Wavelengths :-

Microwaves have shorter wavelengths than radio waves, which allows for more focused and directed energy transmission.

### 2. Higher Frequency :-

Microwaves have higher frequencies than radio waves, which means they carry more energy and can transfer data at faster rates.

### 3. Non-ionizing :-

Like radio waves, microwaves are non-ionizing radiation, meaning they do not have enough energy to ionize atoms or molecules or remove tightly bound electrons.

### 4. Penetration and Absorption :-

Microwaves can penetrate various materials, such

as plastics, glass, and ceramics, but they are readily absorbed by water molecules and other polar substances, which makes them suitable for heating and cooking applications.

### 5. Propagation :-

Microwaves can travel through the Earth's atmosphere or free space, depending on the frequency and the conditions of the medium.

### (c) Disadvantage of LAN :-

#### \* Limited distance :-

Local area networks are used only in buildings or apartment complexes it cannot be occupied in bigger areas.

#### \* Information security issue created :-

If the server equipment is not programmed correctly then unapproved users can retrieve data and there is a technical mistake.

#### \* Installing LAN is expensive :-

It is expensive to install and establish a LAN. Hence specialized software is essential to install a server.

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\* Limited scalability :- LAN's are limited in terms of the number of devices that can be connected to them.

\* Single point of failure :- LANs typically have a single point of failure, such as a central server. If this server fails, the entire network can go down.

Disadvantages of WAN :-

\* Security Issue :- WAN faces more security problems than LAN and MAN networks due to WAN networks more technologies are merged.

\* Installation Cost :- WANs are default complex and complicated because of large geographical area coverage.

\* Troubleshooting Issue :- Troubleshoot is the big challenge on the WAN network and it requires more time.

\* Maintenance Issue :- In a WAN network, it is difficult to maintain the network especially a data center that operates 24/7 is the biggest challenge out of all.

Disadvantage of MAN :-

\* The problem of less security :-

It is difficult to secure the system from hackers because of the large area.

\* Wired Required :-

More cables are required to connect MAN from one place to another.

\* Technical assistance :-

Here, skilled technicians and administrators are required. This can overall increase the installation cost.

\* Difficult to manage :-

MAN consumes a large area then there is difficult to manage a large network, Here is a chance of attacking hackers on the network.

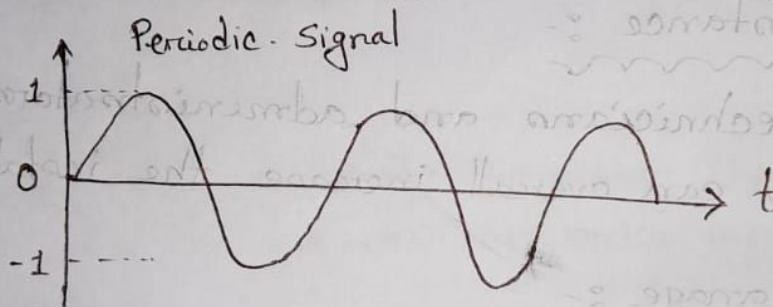
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Ans. to the Q. No-02

(a)

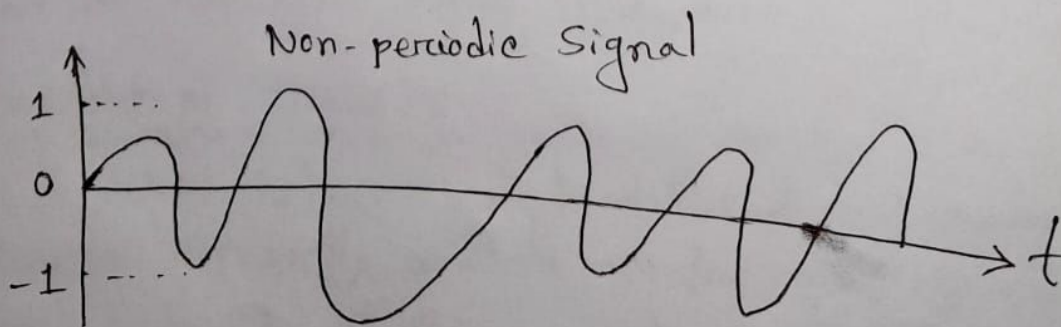
Periodic Signals :-

A periodic signal is a signal that repeats itself at regular intervals of time. A periodic signal can be represented as a sum of sinusoidal functions with frequencies that are integer multiples of the fundamental frequency of the signal.



Non-Periodic Signals :-

A non-periodic signal is a signal that does not repeat itself at regular intervals. This means that it does not have a fundamental frequency, and its frequency spectrum is generally not composed of discrete frequencies.





## b) Transmission Impairment :-

Transmission impairment occurs when the received signal is different from the transmitted signal. As we know, a signal can be transmitted as Analog signal or it can be transmitted as a digital signal.

In analog signals due to transmission impairment the resulting received signal gets different amplitude or the shape. In the case of digitally transmitted signals at the receiver side we get changes in bits (0's or 1's).