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Course Title : Data Communication

Ans to the Ques No-1-(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 casset of a data Communication system. The message simply refers to data or piece of information which is to be communicated. 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 form source to destination. Someone must be there who will pay role of a sourse. Sender plays part of a source in data communition system.

③ Transmission medium :-

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

④ 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 from of a computer, telephone mobile, workstation etc.

⑤ Set of rules (Protocol):— To govern data communications various sets of rules had been already designed by that designers of the Communication System, which represents a kind of aggrement between communicating devices.

Advantages and Disadvantages of network Topology:

Topology	Advantages	Disadvantages
Bus	In expensive simple to expend easy to implement	Prone to faults limited Scalability dificult to add or remove nodes.
Ring	Equal access Deterministic avoid Collision.	very expensive Difficult to setup and configure that number of links grows exponentially with nodes.
Mesh	Redundant Fault-tolerecant Highly scalable.	Fault in any link affects whole network difficult to add or remove 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

Ans to the Ques No-1(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 refferd to as microwaves. They fall between infrared radiation and radio waves in the electromagnetic spectrum.

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 frequencyes than radio waves, which means they carry more energy and can transfre data at faster rates.

③ **Non-ionizing:-** Like radio, waves, microwavers are non-ionezing 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 plasties, glass, and ceramics, but they are readily absorbed by water molecules and other polar substances, which makes them suitable for heative 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.

Ans to the ques No:—1(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 sever 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 establish a LAN. Here specialized software is essential to install a server.

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

* Single point of failure:—

LAN's 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 of WAN:- WAN faces more security problems than LAN and MAN networks are ~~defau~~ due to WAN networks more technologies are merged

* Installation cost: WANS are default complex and complicated because of large geographical area coverage

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

* Maintenence Issue:- In a WAN network, it is dificult 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.

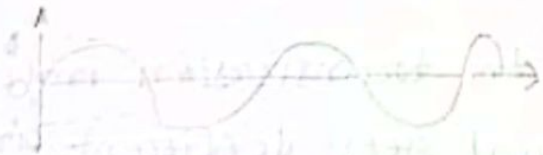
* wired required:- More cables are requred to connect MAN from place to another.

* Technical assistance:- Here, skilled technions and administrators are required. This can overall increse the installation cost.

* Difficult to manage:- MAN Consums a large area then there is dificult to Consums a large network, Here is a chance of attacking hackers on the network.

Ans to the ques No- 2(a)

Periodic Signals:- A periodic signal is a signal that repeats itself at regular intervals of time. A Periodic singnal can be represended as a sum of sinussidal fuhetions with frequencies. that are integer multiples of the fundamental frequency of the singnal-



Non-periodic Singnals:-

A non-peridic signal is a singnal that does not repeat its if at regular intervals. This means that it does not heave a fundamental frequency, and its frequency sepetrum is generally not composed of discrete frequencies-

Non-periodic signal

Ans to the ques No-2(b)

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

In analog signals due to transversestion impairment the resulting received signal gets deffierent amplited or the shape. In the case of digitally transmitted signals at the receiver side we get enenyes in bits (0's or 1's