Q1.    Select the correct answer of the given ones.                                      (10)


1) Interactive transmission of data independent of a time sharing system may be best suited to
   (a) simplex lines     (b) half-duplex lines     (c)  full-duplex lines     (d) biflex lines

   B) **half-duplex lines**

2) The loss in the signal power as of an Electromagnetic signal is called
   (a)  attenuation     (b) propagation        (c) scattering            (d) interruption

   A)**attenuation**

3) Early detection of packet losses improves _____ acknowledgment performance.
   (a) odd                (b) even                (c) positive      (d)  negative

   **D)Negative**

4) Additional signal introduced in the desired signal in producing hypes is called
   (a) fading                    (b) noise

   (c) scattering                (d) dispersion

   **B) NOISE**

5) Token is a **Frame** that rotates around the ring.

6) Ring may have up to **24bits** (802.5) or  **2**  (IBM) nodes.

7) FDDI can support a maximum of **500** stations.

8) Error-correcting codes are **intelligent** enough to handle all errors.

9) ACK is a small **Control frame** confirming reception of an earlier frame

10) Electronics are **organized** as compared to optics



**A2) Error Correction:**

When ever the data is transmitted from a sender to a receiver .error correction is used to detect those errors and correct them.

**Error Detection:**

is an error in a situation when the message that is received at the receiver end in not identical to the original message that was transmitted by the sender, when the date is transmitted from party A to party B the system does not guarantee weather the data received from party A to party B are the same or not.

**Error detection technique :**

**Checksum :**

A checksum is a value that is used by IT professionals to detect high level errors in data transmission . a value that represents the number of bits in a transmission messages.

**Example :**

Suppose the sender wants to send 4 frames of 8 bit each. Where frames are 10101010,11001100 , 11110000 , 11000011 the receiver performs 1s complement arithmetic sum of all the frames including the checksum and the result is found to be 0.

**cyclic redundancy check (CRC):**

this technique is commonly used in digital networks and storage devices to detect changes occurred accidentally to the raw data .the massive data entering the systems get a short check value attached which is based on the remainder of a polynomial division of their contents.

Example:

Consider the CRC generator is $x^7 + x^6 + x^4 + x^3 + x + 1$

The binary pattern is obtained as  1x7+1x6+0x5+1x4+1x3+0x2+1x1+1x0

From the given CRC pattern the binary pattern is **11011011.**

**A3) Encoding:**

**Encoding** is a process of converting the data into some specified format for the reliable transmission of data .

Example:

I send a message Hello and I add a +1 key which means that the data is encoded the receiver will add +1 to every alphabet and will get it decoded message to see the original message .

**Types of encoding**

The following are the types of encoding

**Acoustic encoding:**

Is used in hearing to implant memories .this is known as phonological loop. This loop is a process by which sound are sub vocally rehearsed in order to be remembered.

**Elaborative encoding**:

Uses the information that is already known and relates it to the new information being experienced .the nature of a new memory becomes dependent as much on previous information as it does on the new information.it has been observed that the long term retention of information is greatly improved through the use of elaborative encoding.

**Visual Encoding :**

Is the process of encoding images and visual sensory information which means the people can convert the new information that they have stored into mental.

**Characteristics of AM, FM and PM**

**Amplitude Modulation:**

AM id the process in which the carriers signals amplititude is varied in accordance with the information signal .

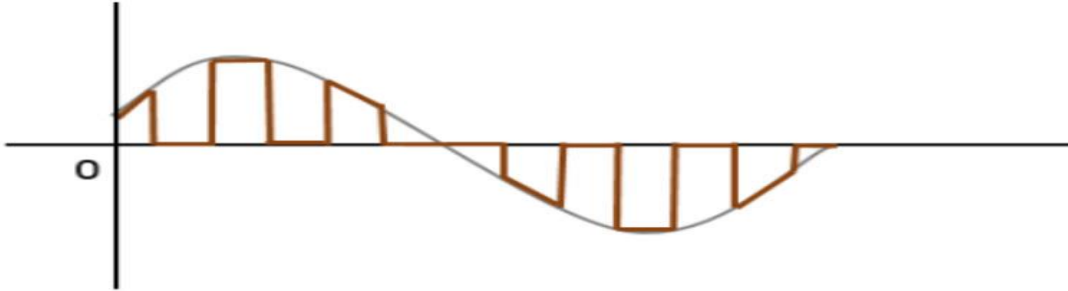mathematical equations:

B sib2pfa t

**Frequency Modulation:**

is the process in which carrier signals frequency is varied by the modulating signal while the amplitude remains constant .the big advantage of FM is its noise reduction ability.in FM the amplitude of the signal is hold fixed.

mathematical equations:

f=fc + Df Sin2pfa t.

**Pulse Modulation:**

In this the transmission of the voice signal is represented by voltage signal that varies with time.in AM and FM the signal is varied in analog manner .the time division multiplex system use PM .in PM the continuous signal is converted into series of pulses each proportion to the amplitude of the signal and corresponding in time to it. Thus in PM a series of pulses carries the information instead of continuous modulated signal.

mathematical equations:

$y(t) = [A + m(t).c(t)$

## A4)

### Ethernet Concept :

is a standard protocol for communication purpose which is embedded in hardware devices and software .it is used for building small networks like LAN knows as local area network. The LAN network is a computer network that interconnects a group on systems or computers together and share data and information mostly through cables or wires.it supports speed up to 10Mbps.cables used are mostly fiber optics and can provide connectivity up to 10KM.

In Ethernet a computer network interface NIC is installed on each computer and it is assigned a unique address. Ethernet cables runs from NIC that is connected to a switch or a hub both of theses acts as a relay. They both handle the networks flow or traffic receiving and directing data packets across the LAN thus Ethernet networking creates a communication system that allows sharing of data and resources including printers, scanner and fax machines etc

**Illustration of Ethernet working**
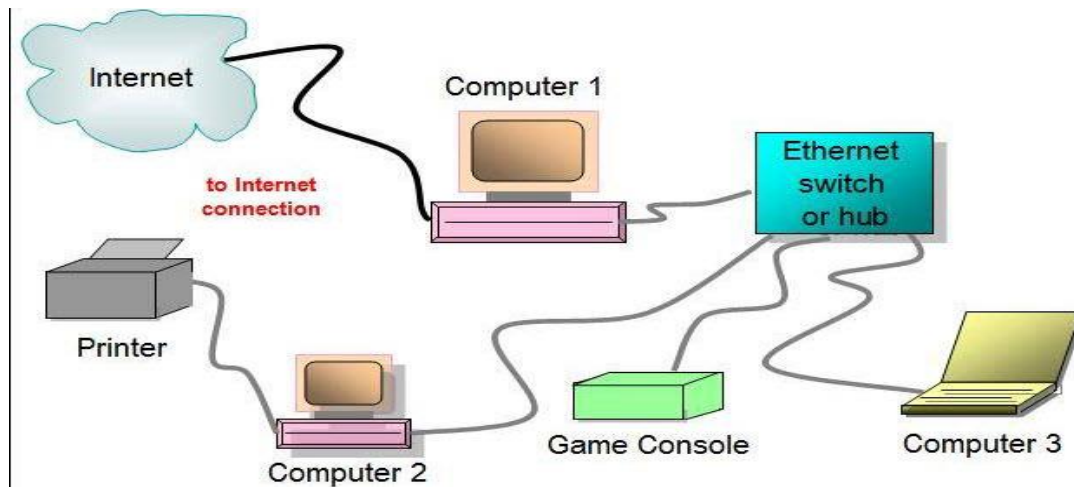


**Token Ring Concept :**
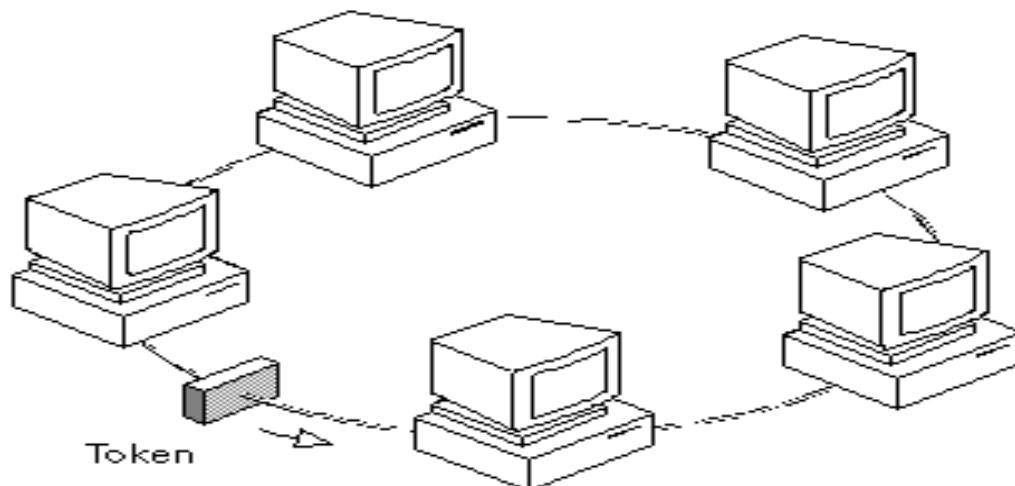


A token ring network is a local are network LAN in which all the systems or computers are connected in a ring or star topology and pass one or more logical tokens from host to host only that host can send data which holds a toke with it and tokens are send when the receipt of the data is confirmed token ring networks prevent the collision of the data packets on a network because data can  only be sent by a token holder and the number of tokens available is controlled.

**Opinion About better network**

In my opinion Ethernet is a better technology because in token ring the computer has to wait for the receipt to receive the data that it required the matter of fact token ring takes more time then Ethernet. Due to Ethernet the expense was reduced. Another important distinction the difference in the topologies used in token ring a token passing system is used in which only one workstation can talk at a time. Where as in Ethernet multiple stations can talk at the same time. Another important point is the reliability in token ring if there is a breakdown in cable the system need to wait for the token to pass through all the system in the ring and reach the receiver where as the Ethernet send the data to the unique address of the system.

## A5)

**General Concept of reliable transmission:**

Reliable transmission is a very important and easy concept which in simple words means that .when a sender sends a message "HI" through a medium and the receiver on the other hand receives it in the same order that it was sent with any sort of changes and receiver the message "HI" the phenomena is know and reliable transmission. Reliable delivery is achieved through two important techniques acknowledgment and timeouts.an acknowledge is a small control frame that protocol sends back to its peer saying that it has received an earlier frame .the receipt of acknowledge indicates to the sender of the original frame that its frame was successfully delivered. If the sender does not receive an acknowledgment after some time then it retransmits the original frame .the action of waiting for a reasonable amount of time is called a timeout.

**Review of paper :**

The review says that it has been investigated that the probability that the delay in information of exceed a desired threshold in a point to point communication system with small packets. The packets are generated according to Bernoulli process that is placed in single server and then transmitted over a wireless channel a variable length stop coding feedback coding scheme is used .a general strategy that encompass simple automatic request and more sophisticated hybrid technique as special cases is used by the transmitter to convey the information packets to the receiver .the delay violation and the peak age violation probabilities are characterized without resorting to approximations based on large-deviation theory results illuminate the dependence of delay and peak age violation probability on the system parameters such as the frame size and the undetected error probability on the chosen packet management policy The guidelines provided by our analysis are particularly useful for the design of low-latency ultra-reliable communication systems.

**Diagram: 1**
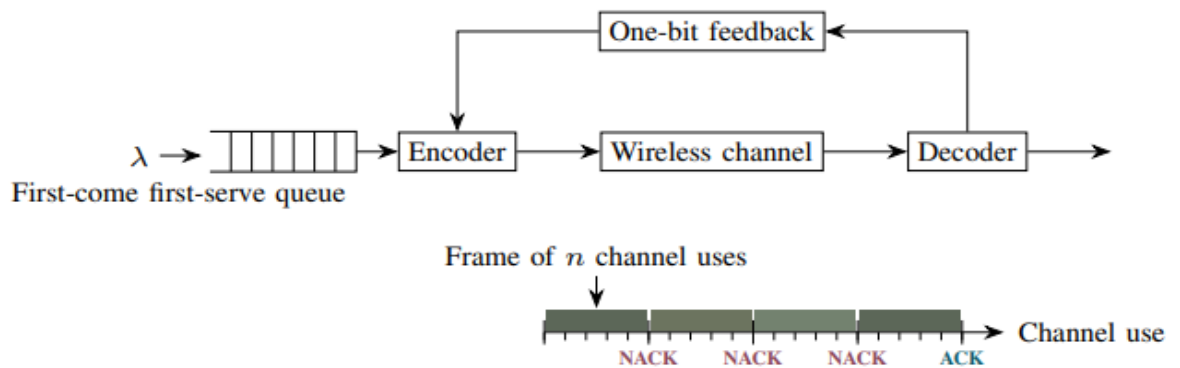
The diagram has been taken from a research paper named as **Reliable Transmission of Short Packets through Queues and Noisy Channels under Latency and Peak-Age Violation Guarantees**

**Link of the research paper is** https://www.researchgate.net/publication/331052736

**Name of the research paper** is Reliable Transmission of Short Packets through Queues and Noisy Channels under Latency and Peak-Age Violation Guarantees.

**Year of the paper** is February 2019

# THE END