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Ans to the question no: 1(a)

* Explain about Process-to-Process Delivery?

Ans:-

The internet model has three protocols at the transport layer: UDP, TCP, and SCTP

The data link layer is responsible for delivery of frames between two neighboring nodes over a link. This is called node-to-node delivery

The network layer is responsible for delivery of datagrams between two hosts. This is called host-to-host delivery. Communication on the Internet is not defined as the exchange of data between two nodes or between two hosts Real communication takes place between two processes. So that we need process-to-process delivery.

Ans to the question no: 1(b)

*Explain about UDP?

Ans:

User Datagram Protocol (UDP) - a communications protocol that facilitates the exchange of messages between compution devices in a network. It's an alternative to the transmission control Protocol (TCP). In a network that uses the Internet Protocol (IP), It is sometimes refferred to as UDP/IP.

UDP divides messages into packets, called datagrams which can then be forwarded by the devices in the network - switches, routers, security gateways - to the destination application/servers while UDP does not number or reassemble the datagrams, it does include port numbers in the datagram header that help distinguish different user requests and an optional checksum capability that can help verify the integrity

of the data transferred.

Ans to the question no: 1(c)

A Write about TCP services and TCP segment?

TCP services :

The second transport layer is called Transmission control Protocol (TCP). TCP, like UDP, is a process-to-process (program-to-program) protocol. TCP therefore like UDP, uses port numbers.

Unlike UDP, TCP is a connection oriented protocol; it creates a virtual connection between two TCPs to send data.

TCP segment :

A packet in TCP is called a segment. The format of a segment is shown in the following figure.

The segment consists of a 20 to 60 byte header, followed by data from the application program. The header is 20 bytes if there are no options and up to 60 bytes if it contains options. The different sections of the header are as follows.

Ans to the question no: 2(a)

* Explain different types of errors in data transmission?

Ans:-

Networks must be able to transfer data from one device to another with an acceptable accuracy. Any time data are transmitted from one node to the next, they can become corrupted in passage. Many factors can alter can alter one or more bits of a message Some applications require a mechanism for

detecting and correcting errors.

Types of error :

1. Single-Bit Error
2. Burst error

Ans to the question no : 2(b)

* Write about Redundancy, Detection versus Correction, Forward Error Correction versus Retransmission and coding ?

Ans :

Redundancy :

The central concept in detecting or correcting errors is redundancy

Detection versus Correction :

The correction of errors is more difficult than the detection. In error detection we are looking only to see if any error has occured. The answer is a

simple yes or no.

Forward Error Correction versus Retransmissio

There are two main methods of error correction.

Forward error correction is the process in which the receiver tries to guess the message by using redundant bits. This is possible if the numbers are small

coding:

Redundancy is achieved through various coding schemes. The sender adds redundant bits through a process that creates a relationship between the redundant bits and the actual data bits

Ans to the question no: 2(c)

Write about block coding and explain how the errors are detected and corrected using Block coding?

Ans:-

In Block coding, we divide our message into blocks, each of k bits, called data words. We add r redundant bits to each block to make the length $n = k + r$. The resulting n-bit blocks are called code words

Error Detection :-

If the following two conditions are met the receiver can detect a change in the original code word by using Block coding technique.

1. The receiver has a list of valid code words
2. The original code word has changed

to an invalid one

Error Correction :

Error correction is much more difficult than error detection. In error detection, the receiver needs to know only that the received code word is invalid, in error correction the receiver needs to find the orginal code word sent. So, we need more redundant bits for error correction than for error detection.

Ans to the question no: 3(a)

→ Fundamentals of Data and signals ?

Ans :

The major function of the physical layer is to move data in the form of electromagnectic signals across a transmission medium.

Analog and Digita Data :

Data can be analog or digital. The term analog data refers to information that is continuous

Digita data refers to information that has discrete states.

Analog and Digital signals:

An analog signal has infinitely many levels of intensity over a period of time. As the wave moves from value A to value B, it passes through and includes an infinite number of values along its path. A digital signal, on the other hand, can have only a limited number of defined values.

Ans to the queshon no: 3(b)

* Write about Transmission Impairment?

Ans: Signals travel through transmission media which are not perfect. The imperfection causes signal impairment.

The three different causes of impairment are attenuation, distortion and noise.

Attenuation :-

Attenuation means a loss of energy. When a signal simple or composite, travels through a medium, it loses some of its energy in overcoming the resistance of the medium.

Distortion :-

Distortion means that the signal changes its form or shape.

Noise :-

Noise is another cause of impairment. Several types of noise such as thermal noise, induced noise, crosstalk.

Ans to the question no: 3(c)

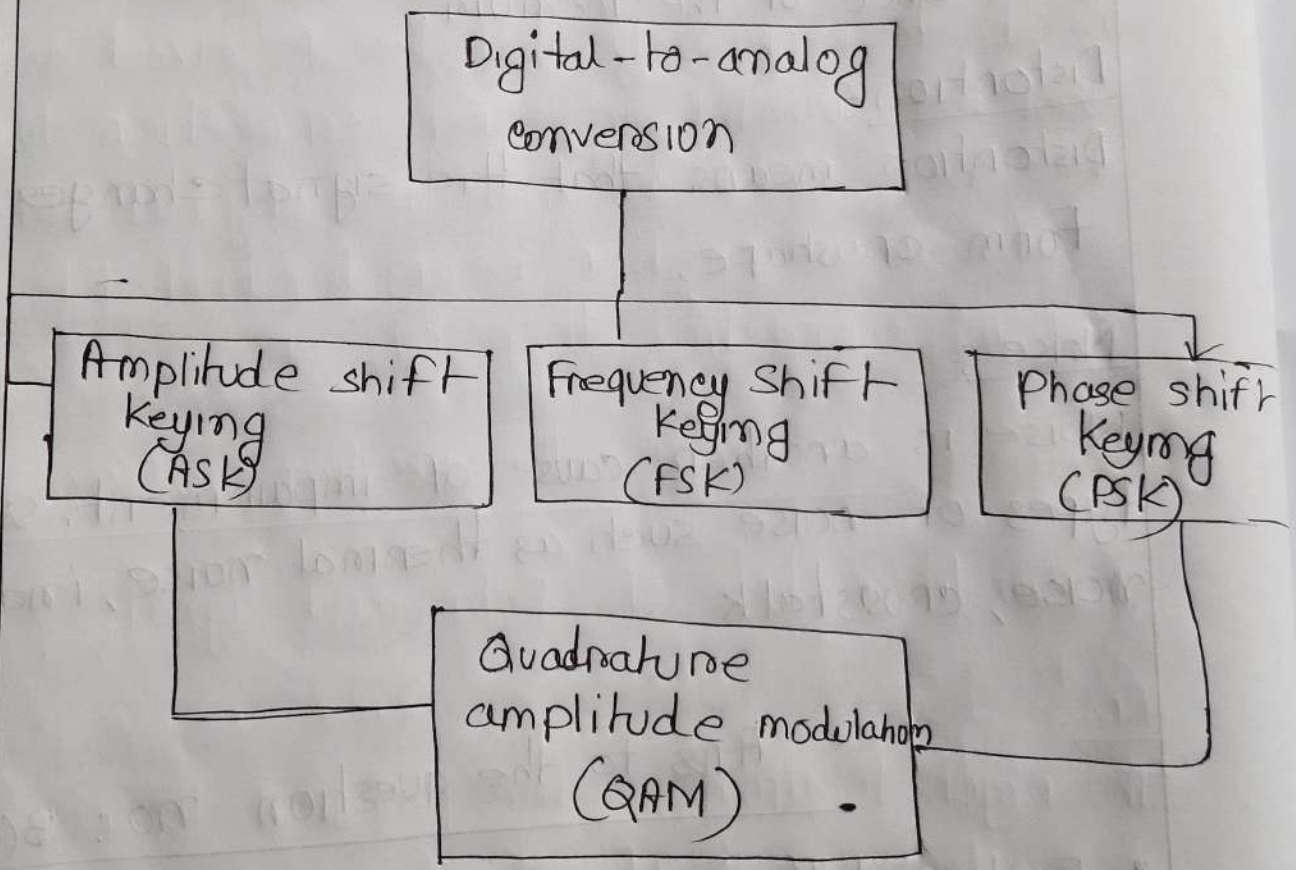
* Explain Different Digital to Analog Conversion Techniques?

Ans :-

Digital-to-analog conversion is the process of changing one of the characteristics of an

analog signal based on the information in digital data.

A sine wave is defined by three characteristics: amplitude, frequency and phase



Ans to the question no: 4(a)

* What is Multiplexing and Explain different types of Multiplexing?

Ans:

Multiplexing:

Multiplexing is the set of techniques that allows the simultaneous transmission of multiple signals across a single data link. Whenever the bandwidth of a medium linking two devices is greater than the bandwidth needs of the devices, the link can be shared.

The three basic multiplexing techniques are

1. Frequency-division multiplexing
2. Wavelength-division multiplexing
3. Time-division multiplexing.

Ans to the question no: 4(b)

* Write about Wavelength-division multiplexing?

Ans:

Wavelength division multiplexing (WDM) is designed to use the high data rate capability of fiber-optic cable. The optical fiber data rate is higher than the data rate of metallic transmission cable. Using a fiber-optic cable for one single line wastes the available bandwidth. Multiplexing allows us to combine several lines into one.

WDM is conceptually the same as FDM, except that the multiplexing and demultiplexing involve optic signals transmitted through fiber-optic channels.

Ans to the question no: 4(c)

* Write about Time Division Multiplexing and Freequence Division Multiplexing?

Ans:

Time Division Multiplexing :

Time Division Multiplexing (TDM) is a digital process that allows several connections to share the high bandwidth of a link Instead of sharing a portion of the bandwidth as in FDM, time is shared. Each connection occupies a portion of time in the link.

Frequency Division Multiplexing :

Frequency Division Multiplexing (FDM) is an analog technique that can be applied when the bandwidth of a link (in hertz) is greater than the combined bandwidths of the signals to be transmitted.

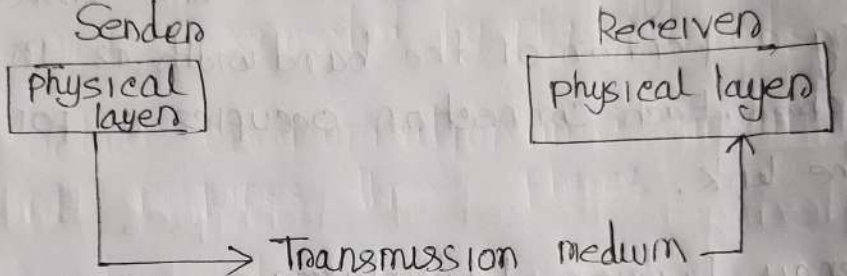
Ans to the question no: 3(a)

* What is transmission medium ? What are the different types of transmission medium ?

Ans:

Transmission media are actually located below

the physical layer and are directly controlled by the physical layer. The following figure shows the position of transmission media in relation to the physical layer.



In telecommunications, transmission media can be divided into two broad categories:

* Guided
* Unguided

Guided media include twisted-pair cable, coaxial cable. Unguided medium is free space.

Ans to the question no: 5(b)

* Write about Guided medium?

Ans:

Guided media, which are those that provide a channel from one device to another, include twisted-pair cable coaxial cable and fiber-optic cable.

Twisted-Pair Cable:

A twisted pair consists of two conductors, each with its own plastic insulation, twisted together

Performance:

One way to measure the performance of twisted-pair cable is to compare attenuation versus frequency and distance

Applications:

Twisted-pair cable are used in telephone lines to provide voice and data channels

Coaxial cable:

Coaxical cable carries signals of higher frequency ranges than those in twisted pair cable.

Ans to the question no: 5(c)

* Write about Circuit switched Network ?

Ans :

A circuit-switched network consists of a set of switches connected by physical links

The actual communication in a circuit switched network requires three phases

* connection setup
* data transfer
* connection teardown

1. Setup Phase :

Before the two parties can communicate, a dedicated circuit needs to be established.

2. Data Transfer Phase :

After the establishment of the dedicated circuit the two parties can transfer data.

3. Teardown Phase :

when one of the parties needs to disconnect a signal is sent to each switch to release the resources.

Ans to the question no: 6(a)

* Write about line coding and its characteristics

Ans:

Line coding is the process of converting digital data to digital signals. The data may be in the from of text, numbers, graphical images, audio or vedio, are stored in computer memory as sequences of bits.

characteristics of line coding :

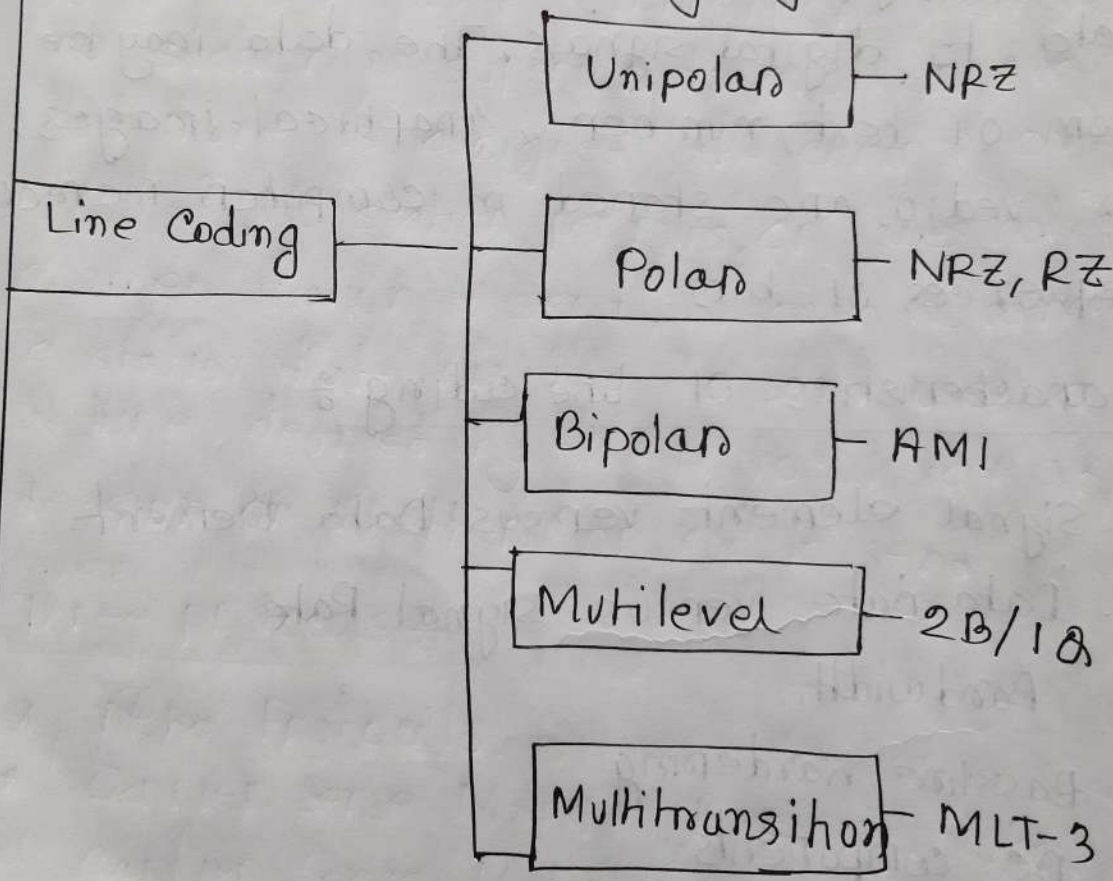
1. Signal element versus Data Element.
2. Data rate versus signal Rate.
3. Bandwidth.
4. Baseline Wandering
5. De components.
6. Self- synchronization
7. Buit-in Error Detection
8. Complexity.

Ans to the question no: 6(b)

* Write about different line coding Techniques?

Ans:

The line coding schemes are categorized as shown in the following figure.



Ans to the question no : 6(c)

* What is Hamming distance and write about minimum Hamming distance ?

Ans:

The central concepts in coding for error control are the idea of the Hamming distance. The Hamming distance between two words is the number of differences between the corresponding bits. We show the Hamming distance between two words x and y as d(x,y).

Minimum Hamming Distance :

The minimum Hamming distance is the smallest Hamming distance between all possible pairs. We use "dmin" to define the minimum Hamming distance in a coding scheme. To find this value, we find the Hamming distances between all words and select the smallest one.

Ans to the question no: 7(a)

* Define Random Access and list three protocols in this category?

Ans:

In random access or contention methods, no station is superior to another station and none is assigned the control over another. No station permits, or does not permit another station to send. At each instance, a station that has data to send uses a procedure defined by the protocol to make a decision on whether or not to send.

Three protocols :

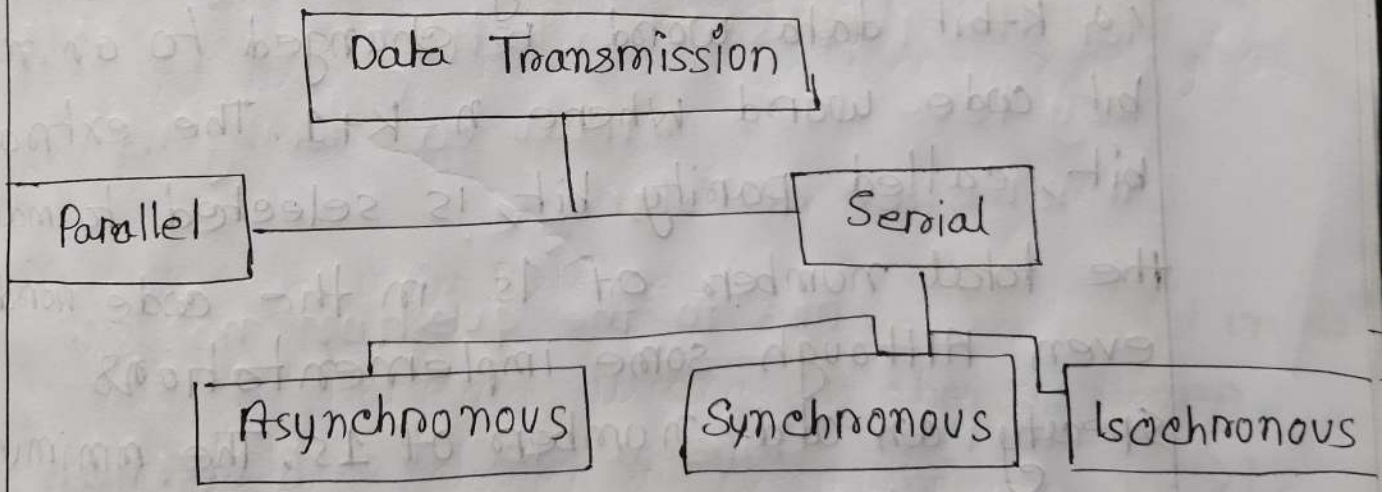
* . Aloha Protocols.
* Carrier Sense Multiple Access Protocol
* Carrier Sense Multiple Access with Collision Detection.

Ans to the question no: 7(b)

* Write about different transmission modes?

Ans:-

The primary concern in the transmission of data from one device to another is the wiring and how to send the data stream each clock tick. The different transmission modes are shown in the following figure



Ans to the question no: 7(c)

* What is meant by linear Block Code and explain Simple Parity-Check code?

Linear Block codes :

A linear block code is a code in which the exclusive OR of two valid code words creates another valid code word.

Simple Parity-Check code :

The simple parity-check code is the most familiar error-detecting code. In this code, a k-bit data word is changed to an n-bit code word where $n = k+1$. The extra bit, called parity bit, is selected to make the total number of 1s in the code word even. Although some implementations specify an odd number of 1s. The minimum Hamming distance for this category is $d_{min} = 2$ which means that the code is a single-bit error-detecting code and it cannot correct any error.

Ans to the question no: 8(a)

* Write about Digital signals and composite signals?

Ans:-

Digital Signals:

Information can also be represented by a digital signal. For example, a 1 can be encoded as a positive voltage and a 0 as zero voltage. A digital signal can have more than two levels.

Composite signals:

A single-frequency sine wave is not useful in data communications. We need to change one or more of its characteristics to make it useful

Ans to the question no: 8(b)

* Explain about Checksum?

The checksum is used in the Internet by

several protocols although not at the data link layer. Link linear and cyclic codes, the checksum is based on the concept of redundancy. Several protocols still use the checksum for error detection.

A checksum is a small-sized block of data derived from another block of digital data for the purpose of detecting errors that may have been introduced during its transmission or storage.

Ans to the question no: 8(c)

* Different Criteria for the performance of Networks.

Ans:

Performance of the network.

One important issue in networking is the performance of the network. The

different factors which effects performance of the Network are as follows:

1. Bandwidth
   (a) Bandwidth in Hertz
   (b) Bandwidth in Bits per seconds
   (c) Relationship

2. Throughput:

The throughput is a measure of how fast we can actually send data through a network.

3. Latency
4. Propagation Time
5. Transmission time
6. Queuing Time
7. Jitter