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1. (a) Define physical layer. when does crosstalk happen? 3

(b) What is error rate? What are the difference between circuit switching and packet switching? 5

(c) Explain the following transmission media. 6

i) Twisted pair cable
ii) co-Axial cable
iii) Fiber optics.

2. (a) what is multiplexing and De-mulbeplexing? Explain. 3

(b) Difference between Synchronous and Asynchronous serial transmission media. 5

(c) Explain the following Digital-to-a Analog conversions with example. 6

i) ASK
ii) PSK

3. (a) what is data encoding? Mention the types of data Encoding. 4

(b) Digital data stream:

0 1 0 0 1 1 0 0 0 1 1

i) Encoding Using NR2-L
ii) Encoding Using Manchaster 6
iii) Encoding Using Bipole

(c) What is pulse code modulation? What are the differences between Sampling and Quantization? 4

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(d) Explain briefly the following transmission. 6

i) Radio transmission.
ii) microwave transmission.
iii) Infared transmission.

5. (a) Define network switching. 3

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6. (a) What is the transport Layer? 3

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(b) Difference between Tcp and UDP. 4

(c) Write short note on addressing port number and well known port number. 7

Answer to the ques. No. 01

(a)

Question (a): Define physical layer. When does crosstalk happen?

Answer: physical layer in the OSI Model plays the role of interacting with actual hardware and signalling mechanism. physical layer is the only layer of OSI network model which actually deals with the physical connectivity of two different stations. This sort of nois happens when a foreign signal enters into the media. This is because signal in one medium affects the signal of second medium.

(b)

Question: What is error rate? What are the different between circuit switching and packet switching?

Answer: Error-rate: Incorrect reception of information because of noise.

The different between circuit switching and packet switching are given below:

	circuit switching	packet switching
1)	A circuit needs to be established to make sure that data transmission takes place.	2) Each packet containing the information that needs to be processed goes through the dynamic route
3)	It is most ideal for voice communication while also keeping the delay uniform.	2) It is used mainly for data transmission as the delay is not uniform.

(c).

Question: Explain the following transmission medeia.

(i) Twisted pair cable

(ii) Co-Axial cable

(iii) Fiber optics

Answer: (i) Twisted pair cable: A twisted pair cable is made of two plastic insulated copper wire twisted together to form a single media. Out of these two wire, only one carries actual signal and another is used for ground reference. The twist between wires are helpful in reducing noise (electro-magnetic interference) and crosstalk. There are two type of twisted pair cables.

(1) Shielded Twisted pair (STP) cable

(2) UnShielded Twisted pair (UTP) cable.

(ii) Co-axial cable: co-axial cable has two wire of copper. The core wire lies in the centre and it is made of solid conductor. The core is enclosed in an insulating sheath. The second wire is wrapped around over the sheath and too in turn encased by insulator sheat. The wrapped structure provides it a good shield against noise and cross talk. Coaxial cables provides high bandwidth rates of up to 450 mbps. There are three categories of coax. cable namely.

1) RG-59 (cable TV)
2) RG-58 (Thin Ethernet)
3) RG-11 (Thick Ethernet)

(iii) Fiber optic: Fiber optic works on the properties of light. when light ray at critical angle it tends to refracts at 90 degree. This property has been used on in fiber optic. The care of fiber optic cable is made of high quality glass or plastic. From one end of it light is emitted It comes in two modes, one is single mode fiber and second in multimode fiber. Single mode fiber can carry a single ray of light whereas multimode is capable of carrying multiple beams of light.

Ans: to the qus. No. 02

(a)

Question: What is Multiplexing and De-multiplexing? Explain.

Answer:

Multiplexer: Multiplexer is a technique which ~~takes information~~ to mix and send multiple send multiple data streams over a single medium.

De-multiplexing: De-multiplexing is a technique which takes information from the medium and distributes to different destinations.

(b)

Question: The difference between synchronous and Asynchronous serial transmission mode

Answer: Given below:

Synchronous Transmission	Asynchronous Transmission
i) In synchronous transmission Data is sent in form of blocks or frames.	i) In asynchronous Transmission data is sent in form of byte or character.
ii) Synchronous transmission is fast	ii) Asynchronous transmission is low.
iii) Synchronous transmission is costly.	iii) Asynchronous transmission is economical
iv) In synchronous transmission There is no gap present between data.	iv) In Asynchronous transmission. There is present gap between data.

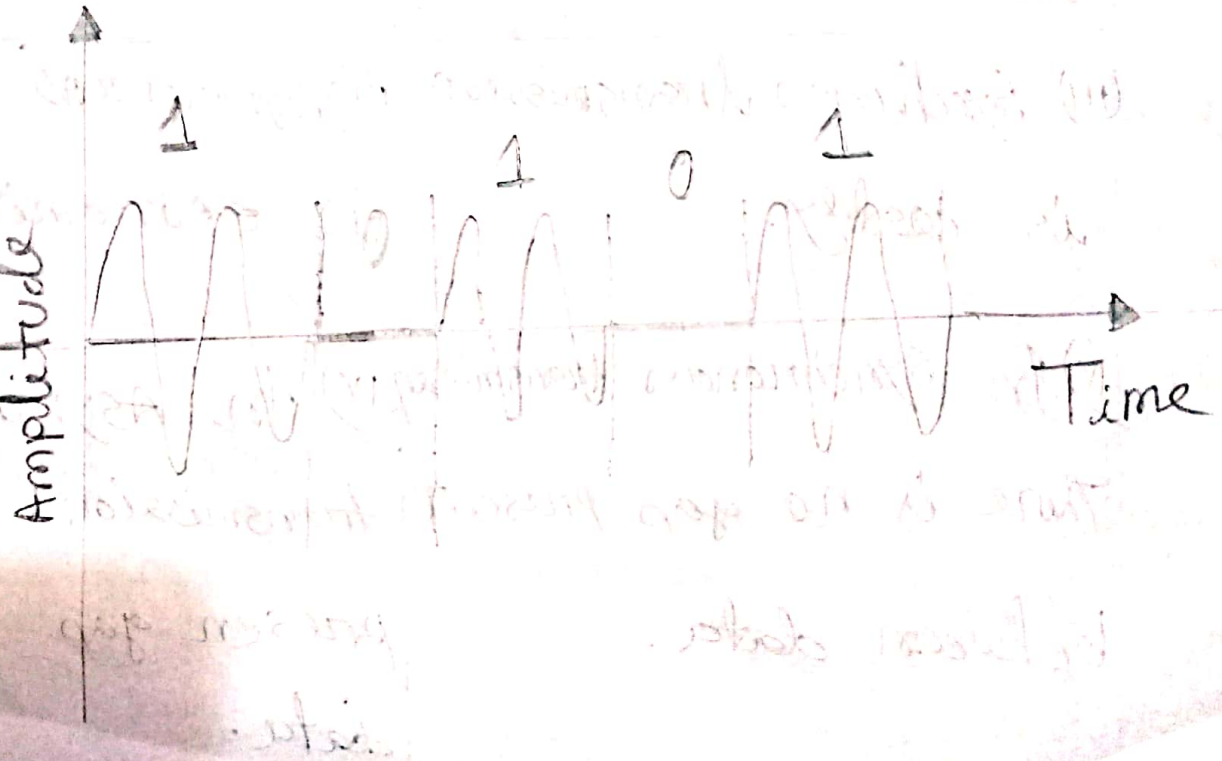
Question: (c)

Explain the following Digital-to-Analog conversions with example. (i) ASK
(ii) PSK
~~(iii) PSK~~

Answer:

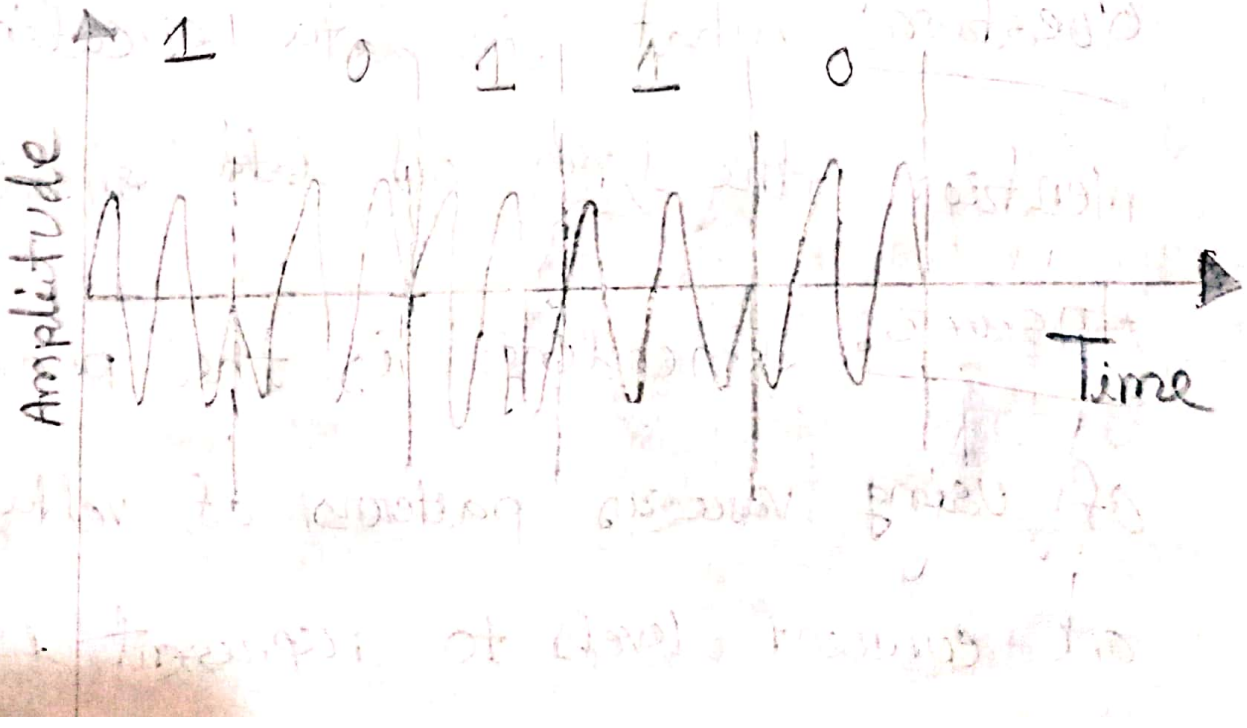
(i) Amplitude shift keying (ASK):

In this conversion technique, the amplitude of analog carrier signal is modified to reflect binary data.



When binary data represents digit 1, the amplitude is held; otherwise it is set to 0. Both frequency and phase remain same as in the original carrier signal.

(ii) Frequency shift keying (FSK): In this conversion technique, the frequency of the analog carrier signal is modified to reflect binary data.



This technique uses two frequencies, f1 and f2, one of them, for example f1, is chosen to represent binary digit 1 and the other one is used to represent binary digit 0. Both amplitude and phase of the carrier wave are kept intact.

Ans. to the qus. No. 03

Question: What is data encoding? Mention the types of data encoding.

Answer: Encoding is the process of using various patterns of voltage or current levels to represent 1s and

@s of the digital signals on the transmission link.

The common types of line encoding are Unipolar, polar, Bipolar etc.

Uni-polar: Unipolar encoding schemes use single voltage level to represent data. In this case, to represent binary 1, high voltage is transmitted and to represent 0, No voltage is transmitted. It is also called unipolar-non-return-to-zero, because there is no rest condition i.e. it either represent 1 or 0.

Polar Encoding: polar encoding schema uses multiple voltage levels to represent binary values

Bipolar Encoding: Bipolar encoding uses three voltage levels, positive, negative and zero. Zero voltage represents binary 0 and bit 1 is represented by alternating positive and negative voltage.

(b)

Question: Digital data stream: 0

0 1 0 0 1 1 0 0 0 1 1

(i) Encoding using NR2-L.

(ii) Encoding using Manchaster.

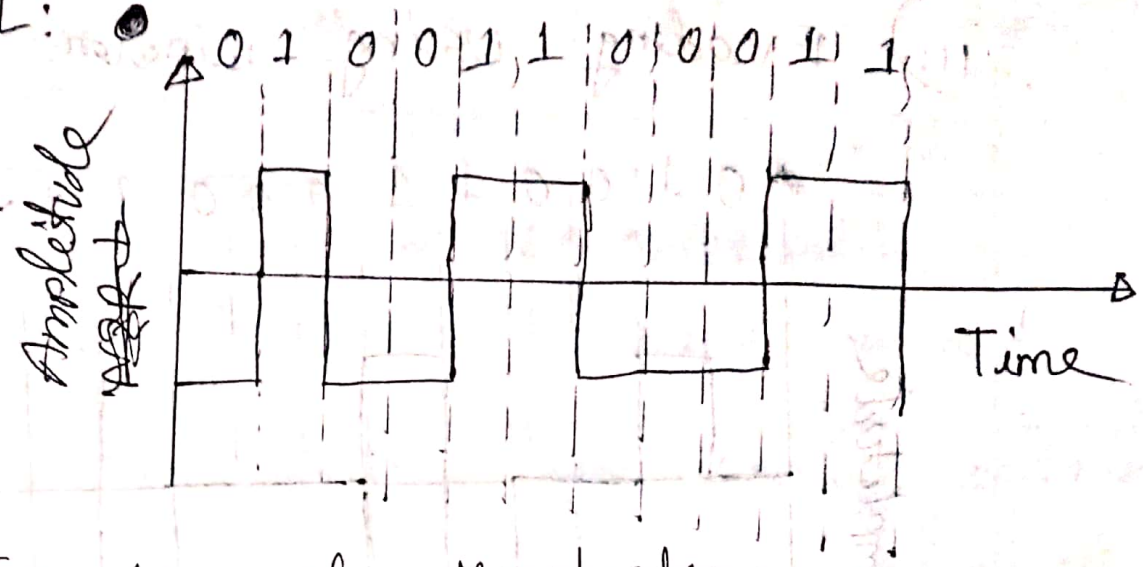
(iii) Encoding using Bipolar.

Answer: Digital data stream is

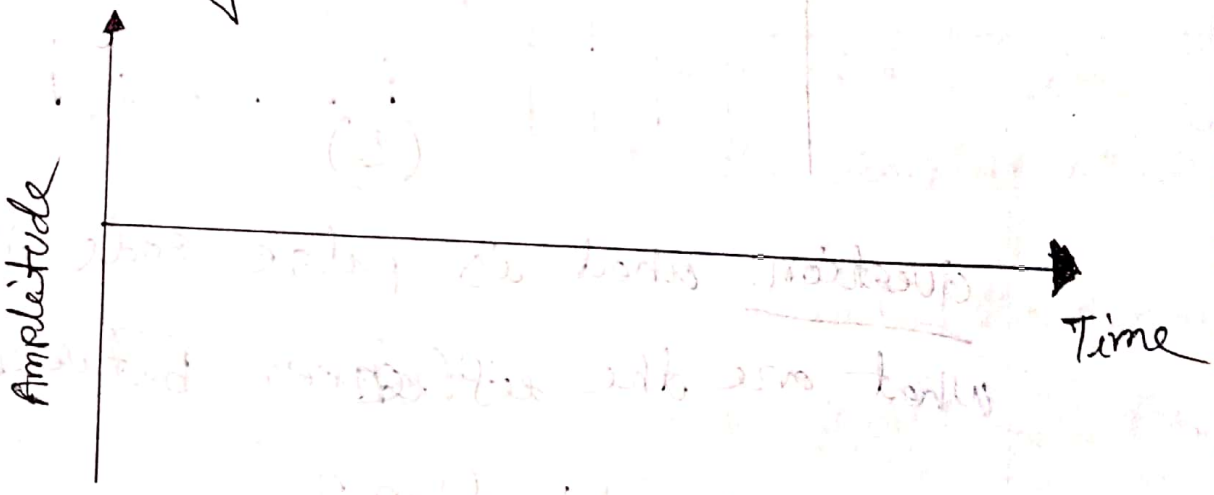
0 1 0 0 1 1 0 0 0 1 1

(i) Encoding of NRZ-L:

NRZ-L:



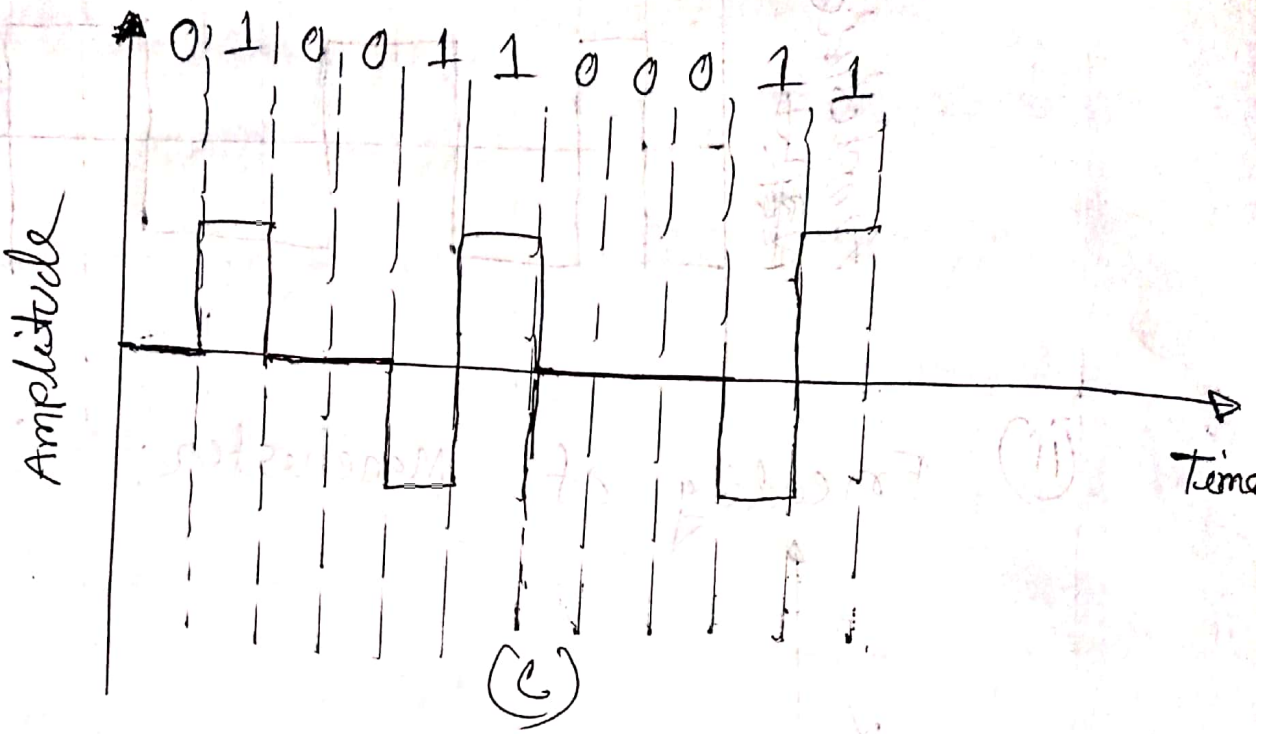
(ii) Encoding of Manchester:



(iii) Encoding with Bipolar:

Question (c)

iii) Encoding using Bipolar:



(c)

Question: what is pulse code Modulation? What are the differences between Sampling and Quantization?

Answer: Analog data is a continuous stream of data in the wave form whereas digital data is discrete. To convert analog wave into digital data, we use pulse code Modulation (PCM).

pcm is one of the most commonly used method to convert analog data into digital da

Sampling	Quantization
i) Digitization of co-ordinate values.	ii) Digitization of amplitude values.
ii) x-axis (time) – discretized. y-axis (amplitude) - continuous.	ii) x-axis (time) - continuous y-axis (amplitude) - discretized
iii) Sampling is done prior to the quantization process.	iii) Quantization is done after the sampling process.
iv) It determines the Spatial resolution of the digitized images.	iv) It determines the number of grey levels in the digitized images.
v) It reduces c.c. to a series of tent poles over a time.	v) It reduces c.c. to a continuous series of stair steps.

Ans to the qus. No. 04

(a)

Question: ~~Wireless transmission is a form of unguided media~~

Question: What is wireless transmission?

Answer: wireless transmission is a form of unguided media. Wireless communication involves no physical link established between two or more devices, communicating wirelessly. Wireless signals are spread over in the air and are received and interpreted by appropriate antennas.

(b)

Question: Write Short Note of Bandpass and Low-pass.

Answer: Bandpass: The filters are used to filter and pass frequencies of interest. A bandpass is a band of frequencies which can pass the filter.

Low pass: Low-pass is a filter that passes low frequencies signals.

(c)

Question: Why modulation technique is used in data communication?

Answer: TWo answer this question. lets Consider a channel that essentially acts like a bandpass filter: both two lowest

frequency components and the highest frequency components are attenuated or unusable in some way, with transmission only being practical over some intermediate frequency range. If we cannot send low-frequency signals, then we need to shift our signal up the frequency ladder. Modulation allows us to send a signal over a bandpass frequency range. If every signal gets its own frequency range, then we can transmit multiple signals simultaneously over a single channel, all using different frequency ranges.

Another reason to modulate a signal is to allow the use of a smaller antenna.

Question: (d)

Explain briefly the following transmission:

i) Radio transmission
ii) Microwave transmission
iii) Infared transmission.

Answer:

i) Radio Transmission: Radio frequency is easier to generate and because of its large wavelength it can penetrate through walls and structures alike. Radio waves can have wavelength from 1mm - 100,000 km and have frequency ranging from 3 Hz (Extremely low frequency) to 300 GHz (Extremly High Frequency). Radio frequencies are sub-divided into six bands. Radio waves at Lower frequencies can travel through walls whereas

higher RF can travel in straight line and bounce back the power of low frequency waves decreases sharply as they cover long distance. High frequency radio waves have more power. Lower frequencies such as VLF, LF, MF bands can travel on the ground up to 1000 kilometers, over the earth's surface.

ii) Microwave Transmission: Electromagnetic waves above 100 MHz tend to travel in a straight line and signals over them can be sent by beaming those waves towards one particular station. Because microwaves travels in straight lines

both sender and receiver must be aligned to be strictly in line-of-sight. microwaves can have wavelength ranging from 1 mm - 1 meter and frequency ranging from 300 MHz to 300 GHz. microwaves transmission depends highly upon the weather condition and the frequency it is using.

(iii) Infrared Transmission: Infrared wave lies in between visible light spectrum and microwaves. It has wavelength of 700 nm to 1 mm and frequency ranges from 300 GHz to 430 THz. Infrared travels in a straight line hence it is directional by nature. Because of high frequency range, Infrared

cannot cross wall-like obstacles.

Ans. to the qus. No. 05

(a)

Question: Define network Switching

Answer: Switching is a mechanism by which data/information sent from source towards destination which are not directly connected. Networks have interconnecting devices, which receives data from directly connected sources, Stores data, analyze it and then forward to the ~~next~~ ~~inter~~ interconnecting device closest to the destination.

(6)

Question: Why code division multiplexing is used in data transmission?

Answer: Multiple data signals can be transmitted over a single frequency by using code Division multiplexing. FDM divides the frequency in smaller channels but CMD allows its users to full bandwidth and transmit signals all the time using a unique code, called chip. Signals travel with these codes independently, inside the whole bandwidth. The receiver knows in advance the chip code signal it has to receive.

Question: (c)
Different between FDM and TDM

Answer: write down the different between FDM and TDM.

TDM	FDM
i) TDM stands for Time division multiplexing.	i) FDM stands for Frequency division multiplexing.
ii) TDM works with digital signals as well as analog signals.	ii) while FDM works with only analog signals.
iii) TDM has Low conflict.	iii) while it has high conflict
iv) Wiring or chip of TDM is simple.	iv) while its wiring or chip is complex rather than simple.

continue. Different between TDM and FDM.

v) TDM is efficient.	v) while it is inefficient.
vi) In TDM, time sharing takes place	(vi) while in this, frequency sharing takes place.
(vii) In TDM, Synchronization pulse is necessary	(vii) while in it Guard band is necessary.

~~Ans. to the ques. no.~~

Ans. to the qus. NO. 06

Question: What is the transport layer?

Answer: The transport layer is the fourth layer in the open system interconnection (OSI) model, and is responsible for end-to-end communication over a network.

It provides logical communication between application processes running on different hosts within a layered architecture of protocols and other network components.

In a nutshell, the transport layer collects message segments from application, and transmits them into the network (layer 3). There the segments are reassembled into

fully fledged messages, and passed on to layer 7.

The transport layer is also responsible for the management of error correction, providing quality and reliability to to the end user.

(b)

Question: What are the function of transport layer?

Answer: The function of transport layer are:

i) This layer is the first one which breaks the information data, supplied by Application layer in to smaller units called segments, It number every byte in the segment and maintains their accounting

(ii) This layer ensures that data must be received in the same sequence in which it was sent.

(iii) This layer provides end-to-end delivery of data between hosts which may or may not belong to the same subnet.

(iv) All server processes intend to communicate over the network are equipped with well-known Transport Service Access points (TSAPs) also known as port numbers.

(c)

Question: Why need switching concept?

Answers: Switching concept is developed because of the following reasons:

- Bandwidth: It is defined as the maximum transfer rate of a cable. It is a very critical and expensive resources. Therefore, switching techniques are used for the effective utilization of the bandwidth of a networks.
- Collision: Collision is the effect that occurs when more than one device transmits the message over the same physical media, and they collide with each other.

To overcome this problem, Switching technology is implemented so that packets do not collide with each other.

Ans. to the qus. No. 07

(a)

Q:
What are the reasons behind TCP retransmission?

Answer: TCP is used for organizing data in a way that ensures the secure transmission between the server and client. It guarantees the integrity of data sent over the network, regardless of the amount. For this reason, it is used to transmit data from other higher-level

protocols that require all transmitted data to arrive.

(b)

Question: Differentiate TCP and UDP.

Answer:

TCP	UDP
1) Tcp is reliable as it guarantees delivery of data to the destination router.	1) The delivery of data to the destination cannot be guaranteed in UDP.
2) TCP provides extensive error checking mechanisms. It is because it provides flow control and ~~ackno~~ acknowledgement of data.	2) UDP has only the base'e error checking mechanism using checksums..
3) TCP is comparatively slower then UDP.	3) UDP is faster, simple and more efficient then TCP.

continue Different between Tcp and UDp.

4) Sequencing of data is a feature of transmission control protocol (TCP). This means that packets arrive in-order at the receiver.	4) There is no sequencing of data in UDP. If ordering is required, it has to be managed by the application layer.
5) Retransmission of lost packets is possible in TCP, but not in UDP.	5) There is no retransmission of lost packets in User Datagram protocol (UDP)
6) TCP is used by HTTP, HTTPS, FTP, SMTP and Telnet.	7) UDP is used by DNS, DHCP, TFTP, SNMP, RIP, and VOIP.

Answer (c)

Question: Write short note on addressing port number and well known port numbers

Answer: Addressing port number: ports are identified for each protocol and address combination by 16-bit unsigned numbers, commonly known as the port number. The most common protocols that use port numbers are the Transmission control protocol (TCP) and the User Datagram protocol (UDP). A port number is always associated with an IP address of a host and the protocol type of the communication. It completes the destination or origination network address

of a message. Specific port number are commonly reserved to identify specific service. So that an arriving packet can be easily forwarded to a running Application

Well known port number: port numbers 0 to 1024 are reserved for privileged services and designated as well-known ports. This list of port number are specific in RFC 1700. In TCP/IP and UDP networks, a port is an endpoint to a logical connection and the way a client program specifies a specific server program on a computer in a network. The port number identifies what type of port it is.