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Q1(a) Briefly describe the layers in the internet model are the network support layers?

Ans The network support layers are.

1. Physical
2. Datalink.
3. network layer.

PHYSICAL:

Physical layer is the bottom (layer 1).

It is responsible for the actual physical connection between the devices.

DATALINK:

Datalink layer is responsible for maing frames from one node to the next.

NETWORK LAYER:

Network layer is the responsible for the source to destination delivery of a packets across multiple networks.

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Q1 (b) Describe three types of transmission impairment.

Ans The three types of transmission impairment are.

1|- Attenuation
2|- Distortion.
3|- Noise

ATTENUATION:

It means loss of energy. The strength of signal decreases with increasing distance which cause loss of energy in overcoming resistance of medium.

DISTORTION:

It means change in the shapes of signals. This is generally seen in Composite signals with different frequencies.

NOISE:

The random or unwanted signals that mixup with the original signal is called as noise.

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$Q_1^{(c)}$ What does the shannon capacity have to do with communications?

Ans Shannon information capacity has long been used as a measure of the goodness of electronic communication channels. It specifies the maximum rates at which data can be transmitted without error if an apporiate code is used.

$Q_1^{(d)}$ Compare flow control & Error Control?

Ans

Flow control	Error Control.
→ flow control is meant for the proper transmission of the data from sender to reciver.	Error control is meant for delivering the error-free data to reciver.
→ Avoid overrunning of receivers buffer & Prevents the data loss.	Detects & Corrects the errors occurred in the data.

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Flow control	Error Control.
Feedback based flow control & rate base flow control are the approaches to achieve the proper flow control.	Parity checking, cyclic Redundacy code (CRC) & check sum are the approaches to detect the error in data.

$Q_1^{(e)}$ Explain Piggybacking & its usefullness. In which layer of OSI it is used & why?

Ans PIGGYBACKING:

Piggybacking means to ride over something. In Piggybacking the sender sends a data packet along with the aknowledgement, if any acknowledgement needs to send at the time of transmission of the data packet.

USEFULNESS: Better use of bandwidth. The underlying cable & intermedite switches routers etc will be less loaded.

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Q2 (A) Brief HDLC w.r.t station types, transfer modes, frame types supported flag field purpose?

Ans TRANSFER MODES:

HDLC supports two types of transfer modes.

1. Normal Response Mode (NRM).
2. Asynchronous Balanced Mode (ABM).

NORMAL RESPONSE MODE (NRM):

Here two types of ~~transfer~~ stations are there, a primary station that send commands & secondary station that can response to recivid command.

ASYNCHRONOUS BALANCED (NRM):

Here, the configuration is balanced i-e each station can both send command & responde to commands. It is used for only point-to-point communication.

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TYPES OF HDLC FRAMES:

There are three types of HDLC frames.

I-Frame:

I-frame or information frame carry user data from network layer.

S-Frame:

S-frames or Supervisory fram do not contain information field.

U-Frame:

U-frame or Un-numbered frames are used for myriad miscellaneous functions like link management. It may contain field information, if required.

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Q1(g) Brief the protocols for noiseless channels?

Ans SIMPLE PROTOCOL:

It has no flow or control. It is a unidirectional protocol in which data frames are traveling in only one direction - from the sender to receiver.

STOP-AND-WAIT PROTOCOL:

If data frames arrive at the receiver site faster than they can be processed, the frames must be stored until their use.

In stop-and-wait protocol the sends one fram. stop until it recives conformation from the reciver. & then sends the next frame.

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Q1 (h) What is differential encoding? Also explain the difference between NRZ-L & NRZI. name the coding schemes of multiplevel binary & bi-phase.

Ans DIFFERENTIAL ENCODING:

Encoding in which signals significant conditions represent binary; data such as '0' & '1' are represented as changes to succeeding values.

Non return-to-zero-level (NRZ-L) is a data encoding scheme in which a negative voltage is used to represent binary one and a positive voltage is used to represent zero. As with NRZ-L, NRZI maintain a constant voltage pluse for the duration of a bit time.

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Q2. Suppose a Computer sends a Packet at the network layer to another Computer somewhere in the internet. The logical distination adress of the Packet is corrupted. what happens to the Packet? How can the source Computer be informed of this situation?

Ans Generally before using the distination adress in an itermediate or the destination node, the packet goes through error checking that may help the node find the corruption (with high probability) & discard the Packet. Normally the upper layer protocol will inform the source to resend the Packet.

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Q2(j) A device is sending out data at the rate of 1 Mbps. How long does it takes to send out a single character (8 bits)?

Ans

See 1 Mbps = 8000000 bits that means each second 8000000 bits are sent through the device so time required to send 8 bits or 1 charact will be = 8/8000000 = 0.000001 second.

Q2(k) we have a channel with 4KHz bandwidth. If we want to send data at 100kbps. what is the minimum SNR_{dB}? what is SNR?

Ans. In this question we have

bandwidth = 4*103 & capicity = 100*103

we can find SNR_{db} & SNR by putting values in formula so capacity

= bandwidth * log2(1+SNR) that means capicity / bandwidth ~~log2(1+SNR)100*103~~

$= \log_2(1+SNR)100*103/4*103.$

$= \log_2(1+SNR)25$

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$= \log_2(1+SNR)225 = 1+SNR225-1$

$= SNR.33554432-1 = SNR33,554,431$

$= SNR$ And $SNR_{bd} = 10.\log 10(SNR)$

$SNR_{bdB} = 10.\log 10(33,554,431) \approx 75$ dB.

SNR:

SNR is signal-to-noise ratio (SNR or S/N) is a measure used in science & engineering that compares the level of a desired signal to the level of background noise.

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Q3(1) The waveform here belongs to manchester encoded binary data stream. Determine the beginning & end of bit period (i-e extract clock information) & give the data sequance:

Ans

A manchester stream at the given waveform is a manchester binary data stream.

In the manchester encoded binary stream, a transition occures in the middle of each bit period. The middle transition in the data stream serves as a data bit & clock period.

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Q3 (m)

Ans a) Because only one frame can be sent at a time & transmission must stop until an acknowledgment is received, there is little effect in increasing the size of the message if the frame size remains the e. All that this would affect is Connect & disconnect time.

b) Incresing the number of frames would decrease frame size (number of bits/frame). This would serve to lower link efficiency, because the Propagation time is unchanged but more acknowdgements would be needed.

c) For a given message size, increaseng the frame size decreases the number of frames This would serve to increase link efficiency Science the propagation time is unchanged but ACK's are needed.