

PAPER : CCN

MID Term Summer

ID # 14895

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Q1.

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

Ans:-

Physical layer, data link layer and Network <sup>support</sup> layer and session, presentation and application are user support layers. The transport layer links these layers by segmenting and reorganizing the data.

→ These layers deals with the electric specification, physical connection, transport timing and reliability the user support layers are

- Session layer.
- Presentation layer.
- Application.

(b)

Describe three types of transmission impairment?

Ans. The three types of transmission impairment are

- 1) Attenuation.
- 2) delay distortion.
- 3) Noise.

1) Attenuation:-

The impairment is caused by strength of signals that degrades with distance over a transmission link. Three factors are related to the attenuation

- 1) The received signal should have sufficient strength to be intelligently interpreted by a receiver. An amplifier or ~~repeater~~ ~~booster~~ is needed to boost the strength of signal.
- 2) A signal should be maintained at a level higher than the noise so that error will not be generated.
- 3) Attenuation is an increasing function of frequency than at lower frequency.

2) Delay distortion:-

The velocity of propagation of a signal through a guided medium varies with frequencies; it is fast at the center of the frequency, but



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It falls off at the two edges of frequencies  
& equalization techniques can be used  
to smooth out the delay distortion.

- 5) Noise: - Impairment occurs when an unwanted signal occurs  
thermal noise this noise is a function of  
temperature and bandwidth. It  
cannot be eliminated. The thermal  
noise is proportional to the  
temperature and bandwidth as  
in equation:  $\text{thermal noise} = K(\text{constant})$   
\* temperature \* bandwidth.

• Intermodulation: -

~~noise~~ this noise is  
caused by nonlinearity in  
the transmission system.

• Cross talk: -

This type of noise is  
caused by electrical coupling  
in the near by twisted pair or  
by unwanted signal picked by  
microwave antennas.

• Impulse noise: -

Irregular pulses and  
short duration of relative high  
amplitude cause impulse noise  
this noise is also caused by  
lightning and faults in the  
communication system.

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c) what does the Shannon capacity have to do with communications-

Ans:-

It is used in communication to convert analog into digital. Shannon information capacity  $C$  has long been used as a measure of the goodness of electronic communication channels. It specifies the maximum rate at which data can be transmitted with error if an appropriate code is used.

d) Compare and contrast flow control and error control?

Ans:-

**Flow control:-**

(i) Flow control is meant for the proper transmission of the data from sender to receiver.

(ii) Feedback-based flow control and rate based flow control are like approaches to achieve the proper flow control.

**Error control:-**

(i) error control is meant for delivering the error-free data to receiver.

(ii) detects and correct the error occurred in the data.



e) Explain Piggybacking and its usefulness in white layer of OSI in it used and why?

Ans:-

### Piggybacking and Usefulness:-

Piggybacking is used to improve the efficiency of bi-directional transmission. When a frame is carrying data from point A to point B, it can also carry control information about frames from B when A frame is carrying data from B to A it can also carry control information.

Piggybacking is sometimes referred to as Wi-Fi squatting. The usual purpose of piggybacking is simply to gain free network access rather than any malicious intent, but it can slow down data transfer for legitimate users of the network.

It is used in the network layer of OSI model layer by using the Acknowledgment protocol.

f) Brief HDLC in.r.t station type, transfer modes, frames types supported and flag field purpose?

Ans: HDLC Transfer mode:-

- Normal response mode
- Asynchronous Balanced mode

HDLC FRAMES:-

- Flag
- Address
- Control
- Payload
- FCS

Types of HDLC Frames:-

- I - Frame
- S - Frame
- U - Frame

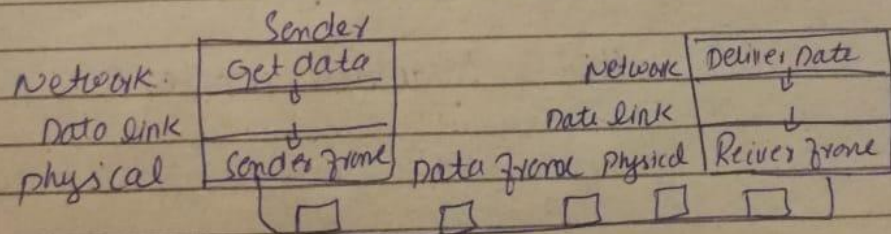
HDLC can be used for point-to-multipoint connections via the original-master-slave modes normal to response mode (NRM).

(g) Brief the protocols for noise channels?

Ans:- Protocols for noise channels:-

1) Simple protocol:-

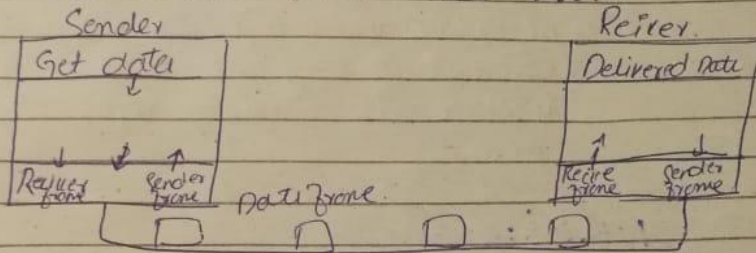
it has no flow or error control. It is a unidirectional protocol in which data frames are travelling in only one direction from sender to receiver.





2) Stop wait protocol:-

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



(1) What is differential encoding? Also explain the difference between NRZ-1 and NRZ. Name the coding schemes of multilevel binary & bi-phase:-

Ans:-

Differential encoding:-

~~Communications~~ ~~Differential encoding~~  
Encoding in which signal significant conditions represent binary data such as "0" and "1", and are represented as changes to succeeding values rather than with respect to a given reference.

Example:-

differential encoding is phase-shift keying (PSK).

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## NRZ-L VS NRZ-I

### NRZ-L:-

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 binary zero.

### NRZ-I:-

maintains a constant voltage pulse for the duration of a bit time.

### Coding Schem Nam:-

Unipolar, polar, bipolar and Manchester encoding.

Q2

i)

Ans:-

Before using the destination address in an intermediate or the destination node, the packet goes through error checking that may help the node find the corruption (with a high probability) and discard the packet. Normally the upper layer protocol will inform the source to resend the packet.



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(j)

Ans:-

$$\begin{aligned} \text{Time required} &= 8/125,000 \\ &= 0.000064 \text{ sec.} \end{aligned}$$

(k)

Ans.

we can use the approximate formula.

$$C = B(\text{SNR}_{\text{db}}/3) \text{ or } \text{SNR}_{\text{db}} = (3C)/B$$

we can say that the minimum

$$\text{SNR}_{\text{db}} = 3 \times 100 \text{ kbps} / 4 \text{ kHz} = 75\#$$

This means that the minimum.

$$\text{SNR} = 10^{\text{SNR}_{\text{db}}/10} = 10^{7.5} \approx 31,622,776\#$$

Q3

(l)

Ans:-

The wave form .... given data sequence.

