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Subject

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Date

24/09/2020

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Question No 1

part (1)

List of layers of Internet-Model

- i- Physical
- ii- Data Link
- iii- Network
- iv- Transport
- v- Application

The layers in the Internet model are the network support layers

- i- Physical
- ii- Network
- iii- Data Link

⇒ Explanation

⇒ Physical

Describe the role of bits in representing a frame as it is transported across the local media.

ii- Network

It is responsible for the source to destination delivery of a packets across across multiple network

iii- Data Link Layer

→ Devices: Switch, Bridge

→ Services:

Framing, Flow Control
Error-Control

⇒ Function

→ Providing a well defined service interface to the network layer.

→ Dealing with transmission error.

→ Regulating the flow of data.

Q1 part 2

There are three type of transmission Impairment

i attenuation:

ii- delay:

iii Distortion:

QNo2 part 3

Shannon Capacity
Formula

$$C = B \log_2 \left(1 + \frac{S}{N} \right)$$

i C = channel capacity in bits per second

ii B = Band width of channel in hertz

S = received signal power

N = total noise

- This is referred to as error Free Capacity

This is a measure of the Capacity on a channel; It is impossible to transmit Information at a Faster rate with error.



Q.62 Part (4)

It is most important responsibilities of Data link layer are

• Flow Control and error Control both are also known as data-link control.

Flow Control refers to a set of procedures used to restrict the amount of data that the sender can send before waiting for the acknowledgment.

⇒ Error control in The Data-link layer is based on automatic retransmission, which is the retransmission of Data.

QNO 1 (5)

Piggy backing

In reliable Full-duplex data transmission, The technique of hooking up acknowledgments onto outgoing data frames is called piggy backing

⇒ Usefulness

Improve The efficiency better use of available channel bandwidth.

Q2(6)

⇒ Station type

station type	configuration	Response Mode
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Primary	un balanced	Normal Response Mode
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Secondary	Symmetrical	Asynchronous balance Mode
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combined station	Balance Configuration	#. ARM
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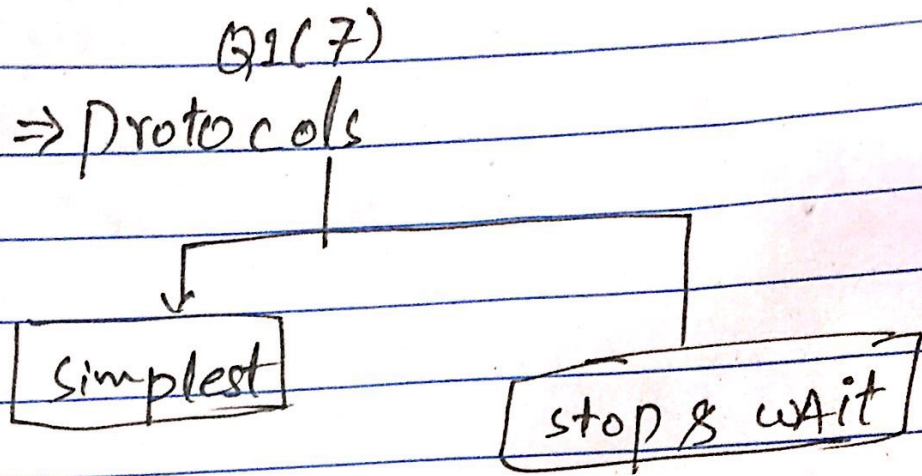
⇒ transfer mode

Three type of frames

i- U- Frame

ii- L- Frame

iii- S- Frame.



stop & wait
→ flow control
→ sender send one frame,
stops until it receives confirmation from receiver then send the next frame. required if data frame arrives at the receiver site faster than they can be processed.

Simplest
No flow and error control
sender assume that the receiver can immediately handle any frame Not used practically.

Q102 (8)

Differential encoding

It is a digital encoding technique whereby a binary value is ~~def.~~ denoted by a signal change rather than a particular signal state.

Difference b/w NRZ-L and NRZI

⇒ NRZ-L

Non return to zero level
The level of the voltage determines the value of the bit.

⇒ NRZ-I

Invert.
Non-return to zero later.

If the bit is (0) zero there is no change. If the bit is one, there is change.

⇒ Bi phase coding

- i- Bi-Phase Manchester
- ii- Differential Manchester.

QND2

Part (1)

Before using the destination address in an intermediate or the destination nodes, the packets go 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.

There is no process with the destination port address running at destination computer.

⇒ what happens?

Most protocols issue a special error message that is sent back to source in this case.

Q No 2 (?)

A device is sending out data at the rate of 1 Mbps

How long does it take to send out a single character (8 bits)?

Solution:-

$$\left(\frac{8}{100} \right)_s$$

$$= 0.008_s$$

$$= 8 \text{ ms}$$

QNo2
part (c)

Band width = 4 kHz

Data Speed = 100 kbps

minimum SNR_{dB} = ?

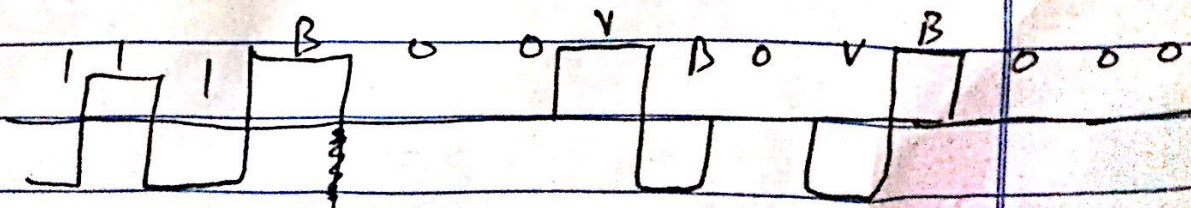
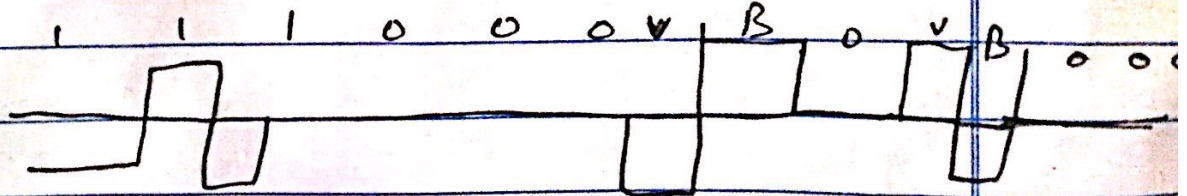
$$C = B (\text{SNR}_{dB} / 3)$$

$$\text{SNR}_{dB} = 3C / B$$

$$\begin{aligned} \text{SNR}_{dB} &= 3 \times 100 \text{ kbps} / 4 \text{ kHz} \\ &= 75 \end{aligned}$$

minimum SNR = $10^{\text{SNR}_{dB} / 10}$

$$\text{SNR} = 10^{7.5} = 31622,776$$



SNR

The SNR value can be used to compare the level of noise attenuation offered by different hearing protectors to determine acoustic pressure on your ears.

$$C = B \times \log_2(1 + \text{SNR})$$

QNO3

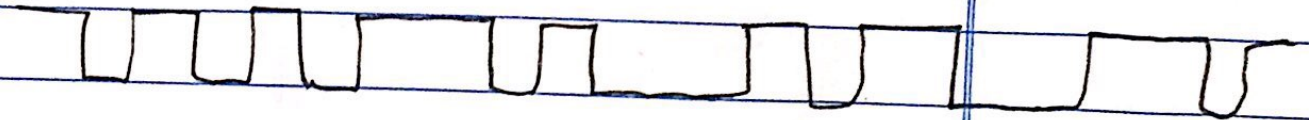
3(1)

The waveform here belongs to a Manchester encoding.
 ————— give the data

solve

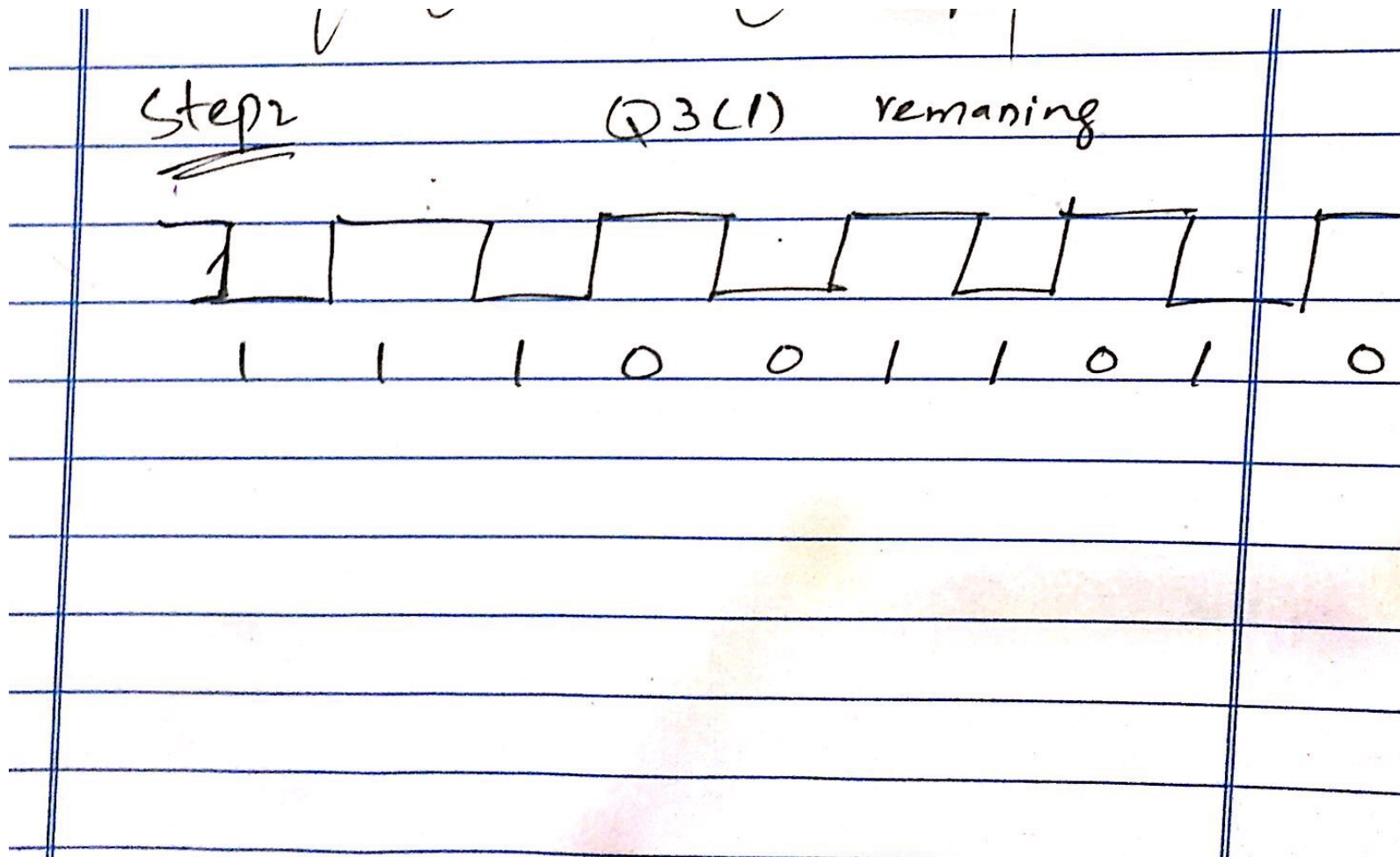
step by step

The given waveform is a Manchester encoded binary data stream



Manchester encoding

In the Manchester encoding data stream, a transition bit period. The midbit transition in the data stream serves as a data stream at a data bit and clock



QNo 3

Part (B)

A Primary maintain a separate logical link with each secondary station another link:-

Combined Station

The combined feature of Primary and Secondary. A Combined station may issue both commands and response.

unbalanced Configuration: consist of one primary and one or more secondary station and supports both full duplex and half-duplex.

Balanced Configuration

Consist of two combined station and support both full and half Duplex

NRM :- used with an unbalanced carrying the Primary may initiate data transfer for a secondary

ABM used with a carrying balanced either combined station may initiate transmission without ~~initiate~~ receiving

ARM :- used with a unbalanced carrying the secondary may initiate transmission without explicit pensis