

Student Details

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Q1	How to calculate Bandwidth from given transmission rate in bits per second?  Give a definition of a Service and a Protocol. Use these definitions or any other discussion to illustrate the fundamental difference between a Service and a Protocol?
Q2	Discuss the use of formal analysis techniques for protocol. Comment on why such techniques are used in analyzing protocols and give some examples of the types of problems that such an analysis can reveal.
Q3	Draw the line code of sequence 010011011 using Polar Manchester.  Draw the line code of sequence 01111011011100 using 2BIQ
Q4	An analogue signal has a bit rate of 8000 bps, and baud rate of 1000 baud. How many data elements are carried by each signal elements? How many signal elements do we need?  In digital transmission the receiver clock is 0.3 percent faster than the sender clock. How many extra bits per second does the receiver receive if the data rate is 1Mbps.

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Q5	A 7-bit hamming code is received as 1011011. Assume even parity and state whether the receive code is correct or wrong. If wrong locate the bit in error.
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GOOD LUCK

Q1 How to Calculate Bandwidth from given transmission rate in bits per second?

Ans The required bandwidth is related to bit rate and the modulation order  $M$ .

It is so that the double sided bandwidth  $W = \text{Symbol rate} = \text{bit rate} / \text{divide by the number of bit per symbol}$  the number of bit per symbol is  $= \log_2 M$  with  $M$  is = QAM

modulation order so the bandwidth  $= W = R_b / \log_2 M$

Q1 Give a definition of a Service (b) and a protocol use these definitions or any other discussion to illustrate the fundamental difference b/w a Service and a protocol?

P - T - O - >

Ans Service and protocol →

This is a Computing function that is provide by one program or machine for another.

Protocol → protocol is a

(Computing) a set of formal rules describing how to transmit or exchange Data especially across network

Service and protocol discussion on Computer Network.

⇒ Network is a Setup with protocol is hierarchy the divide the communication task into several layer A, protocol is a Set of rules for communication within a layer 'A' service is within a layer above it. Through in interface protocol.

Q2 Ans Q2

## Formal Analysis techniques of Network parts - Cols

⇒ Today's internet is becoming increasingly complex and fragile. Current performance centric techniques on network analysis and runtime verification have been inadequate in development of robust network.

⇒ This falls squarely working on recent formal analysis techniques to aid in design implementation and analysis of network protocol.

⇒ There are four representative case studies to present classification and taxonomy of techniques such as (meta routing) etc axiomatic formulation and Alloy based analysis.

→ Formal Methods use for protocol

→ Formal methods are a particular kind of mathematical based techniques that improve network software qualities with guaranteed correctness

- ① addressing
- ② Routing
- ③ Forwarding

① Addressing →

task is to prove target addressing schemes continuous to provide nodes of network

Routing → to verify BGP can efficiently discover loop free routing paths

③ Forwarding → To address various

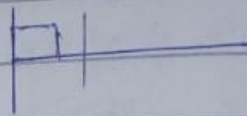
architectural invariants and forwarding operations.

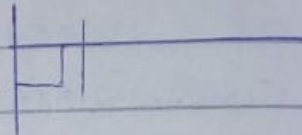
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Q3/A1

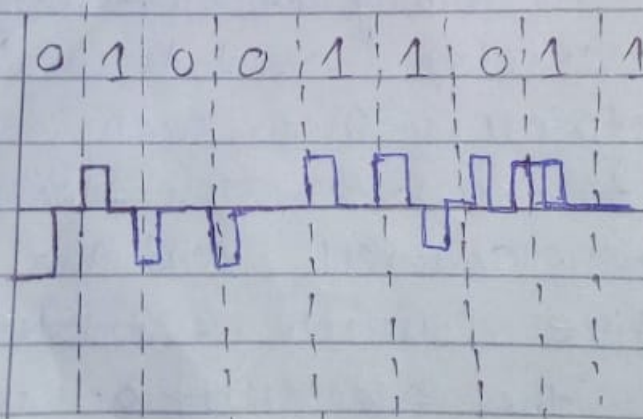
Draw the line code of sequence 01001101 using Polar Manchester

Ans: →

Sequence 1 → 

0 → 

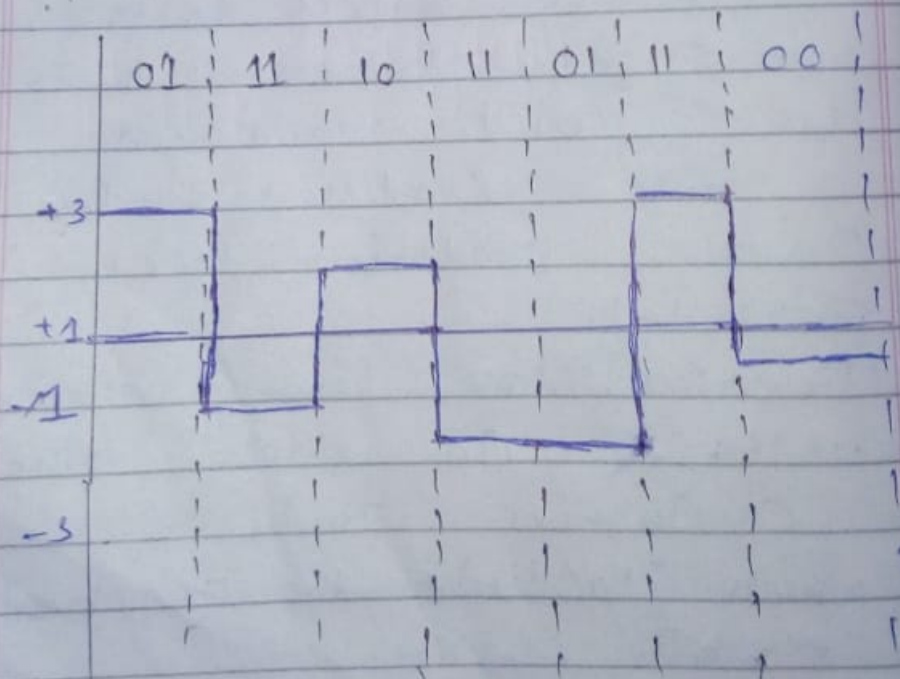
01001101



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(3) Draw the line of code  
(b) of Sequence 0111101100  
using 2B10

	Previous Level positive	Previous Level negative
Bits	Positive Level	Negative level
00	+1	-1
01	+3	-3
10	-1	-1
11	-3	-3



(Q4) An analogue signal has a bit  
(A) rate of 8000bps and baud  
1000 baud. How many data  
elements are carried by  
each signal element how  
many signal elements do  
we need?

Ans: Given Data

$$S = 1000$$

$$N = 8000$$

$\Rightarrow R$  and  $L$  are unknown

$\Rightarrow$  finding the value of  $R$  and  
value of  $L$

Formula  $\Rightarrow S = N \cdot R \cdot \frac{1}{r}$

$$r = \frac{N}{S} = \frac{8000}{1000} = 8 \text{ bit/element}$$

$$r = \log_2 L \Rightarrow L = 2^r$$

$$\Rightarrow \boxed{2^8 = 256}$$



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Q 4 (b)

In digital Transmission the receiver clock is 0.3 Percent faster than the Sender clock. How many extra bits per second does the receiver receive if the data rate is 1 Mbps.

Solution →

Normal Speed when the Sender and receiver clock are same.

The sender would send 1,000,000 bits per second. But since the sender clock is 0.3 percent faster than the receiver clock the data rate would be faster and the sender will be able to send 1,003,000 bits per second.

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Q5 A 7-bit hamming is received  
1011011. Assume even parity  
and whether the receive code  
is correct or wrong locate the  
bit in error

=> We have received a 7 bit  
Hamming code 1011011  
as (1) It's mean's the  
error is there and  
if It's even so the  
value of Parity bit is  
(0) It's mean to detect  
whether there are any errors  
in this receiver hamming  
code.

The End