BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BTECH **SEMESTER : V**
BRANCH: ECE **SESSION : SP/2023**

SUBJECT: EC307 DATA COMMUNICATION

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Define E_b/N_0. How it is related to achievable spectral efficiency. What is the effect of signal strength and data rate on E_b/N_0.	[5]	1	2
Q.1(b)	What is the necessity of converting digital data to digital signal. Draw the bit pattern of the following bit string 10010101101 for Manchester and Differential Manchester coding	[5]	1	3
Q.2(a)	Write down the function of each layer of TCP/IP protocol. Differentiate between TCP/IP and OSI.	[5]	5	3
Q.2(b)	In a CRC scheme, find the frame received at the receiver is 101001110110111. If the generator polynomial P = 110101, determine whether the data received is with error or without error.	[5]	2	4
Q.3(a)	With suitable example explain the link establishment, two way data transfer and termination of the link in HDLC.	[5]	2	3
Q.3(b)	Explain Sliding Window protocol. Justify how the utilization efficiency is improved using sliding window protocol	[5]	3	3
Q.4(a)	Implement a synchronous TDM scheme for the following signals: three 4kHz telephone channels, two 20kHz music channel one 7.5kbps digital line two 9.2Kbps digital line. Find the data rate of the multiplexed signals if 4bit ADC is used for conversion of analog to digital signal.	[5]	3	4
Q.4(b)	Explain the FDM scheme. Explain how FDM is used in digital data transmission over telephone lines.	[5]	3	4
Q.5(a)	A packet switched Network with respective costs for each link marked aside is shown in Figure 1.	[5]	4	3

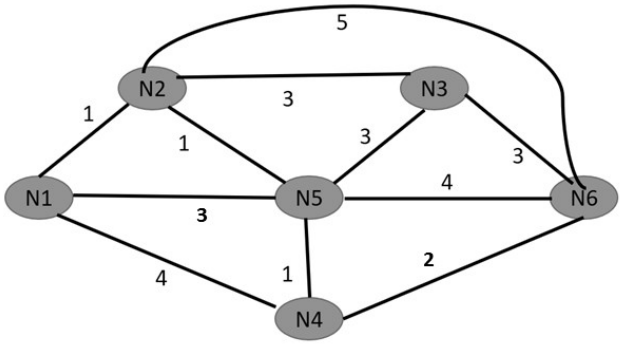

Figure-1

Find the least cost paths for all nodes by Dijkstra algorithm, considering Node 1 as the source node.

PTO

Q.5(b) In original Arpanet source node-5 routing table before update and delay vector sent to source node from neighboring nodes are given below. Find out the source node routing table after update. [5] 4 3

Destination	Delay	Next node		Delay from Node-2	Delay from Node- 4	Delay from Node- 6
1	8	1		4	2	2
2	6	4		0	5	1
3	10	2		3	4	6
4	9	4		5	0	4
5	0	-		2	2	3
6	4	6		8	3	0
7	14	4		6	2	8
8	12	8		4	5	3
9	3	2		2	8	4

::::::22/11/2024::::::M