GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Fifth Semester Regular) Examinations, December – 2023

21BECPC35002 – Digital Communication

(ECE)

Time: 3 hrs   Maximum: 70 Marks

Answer all questions
(The figures in the right hand margin indicate marks)

PART – A   **(2 x 5 = 10 Marks)**

		CO #	Blooms Level
Q.1.	Answer **ALL** questions		
a.	A signal is sampled at Nyquist rate of 8 KHz and is quantized using 8-bit uniform quantizer. Assuming SNR for a sinusoidal signal, calculate the bitrate, SNR and BW.	CO2	K3
b.	What is the need of companding? Draw the block diagram of companding technique.	CO2	K1
c.	Give the Euclidean distance between the signals in BFSK. Compare it with that in BPSK.	CO2	K3
d.	What is eye pattern? What is the impact of ISI on eye opening?	CO3	K1
e.	What is the difference between coherent and non-coherent binary modulation schemes?	CO3	K3

PART – B   **(15 x 4 = 60 Marks)**

Answer **ALL** questions

		Marks	CO #	Blooms Level
2. a.	A signal having bandwidth of 8 MHz is transmitted using binary PCM system. The number of quantization level is 256. So, calculate the number of bits/sample, maximum transmission bandwidth, bit rate, bit duration and SNR.	7	CO3	K3
b.	What do you mean by line coding? Explain about the different line coding techniques in detail.	8	CO1	K4
	(OR)			
c.	Explain about the T1 lines to get T2, T3 and T4 lines and also calculate the bit rate for different lines.	7	CO1	K4
d.	Give the difference between RZ and NRZ. Draw the Unipolar RZ, polar NRZ, AMI and Manchester formats for the data sequence 1100101001.	8	CO3	K3
3. a.	What do you mean by signal space diagram? Draw the signal space diagram of QAM when M = 4, M = 8 and M = 16.	7	CO4	K3
b.	Explain in detail about the M-ary FSK modulation and demodulation technique. Also draw the spectrum of M-ary FSK.	8	CO3	K4
	(OR)			
c.	What do you mean by probability of error? Find out the probability of bit error in BPSK, QPSK and BFSK.	7	CO4	K5

d.	Explain the operation of QPSK transmitter and receiver with suitable diagram.	8	CO4	K4
4.a.	If the input data sequence to the scrambler is 101100000001 then calculate the output of the scrambler. Assume the initial values of the shift registers are zero.	7	CO3	K4
b.	Why timing extraction is required in a digital communication system? Explain in detail.	8	CO1	K4

(OR)

c.	What is known as Inter Symbol Interference (ISI)? What are the primary causes of it? How can it be minimized by pulse shaping?	7	CO4	K5
d.	Draw the block diagram of timing extraction and explain in detail.	8	CO3	K4
5.a.	What do you mean by Integrate and Dump Filter? Calculate signal to noise ratio (SNR) of this filter.	15	CO4	K4

(OR)

b.	Draw and explain in details about the tapped delay line filter. What is the role of this filter in digital communication system?	8	CO2	K4
c.	Derive that correlator and matched filter are providing same output.	7	CO4	K5

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