CLASS: BTECH   SEMESTER : V
BRANCH: ECE   SESSION : MO/2024

SUBJECT: EC301 DIGITAL 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)	Explain Sampling Theorem. Discuss it specifically for lowpass and bandpass signal.	[2+3]	1	2
Q.1(b)	A continuous-time signal x(t) is given by: $x(t)=5\cos(2\pi 1000t) +2\cos(2\pi 3000t)$	[3+2]	1	2,3

Determine the minimum sampling frequency required to satisfy the Nyquist criterion.
Explain Delta Modulation system in detail.

			CO	BL
Q.2(a)	Explain Correlation Receiver.	[5]	2	2
Q.2(b)	Defined Matched Filter. Derive an expression to evaluate the possible minimum value of probability of error for the matched filter.	[2+3]	2	2

			CO	BL
Q.3(a)	Explain QPSK Modulation-Demodulation system in detail.	[5]	3	2
Q.3(b)	Evaluate Probability of error for BPSK system.	[5]	3	2

			CO	BL
Q.4(a)	Explain Shannon's theorem of channel capacity. Discuss Bandwidth S/N tradeoff.	[3+2]	4	2,3
Q.4(b)	Define the term Entropy and evaluation rate also derive an expression to evaluate entropy, extend it to evaluate the information rate.	[3+2]	4	2,3

An analog signal is bandlimited to B Hz sampled at Nyquist rate and samples are quantized into 4 levels. The Quantization levels Q1,Q2,Q3 and Q4 (messages) are assumed independent and occur with probability p1=p4=(1/8) and p2= p3= (3/8) . Find the information rate of the source.

			CO	BL
Q.5(a)	Discuss Frequency Hop Spread Spectrum. Compare it with Time Hop Spread Spectrum.	[3+2]	5	2
Q.5(b)	For the 3-stage shift register shown in the figure, determine the PN sequence. What is the length of the sequence? Verify the balanced and the autocorrelation/shift property from the generated PN sequence.	[3+2]	5	2,3

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