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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**

Branch: Electronics and Communication Engineering **Duration: 3 hrs.**

Course Code: 19EC6PCCT2 **Max Marks: 100**

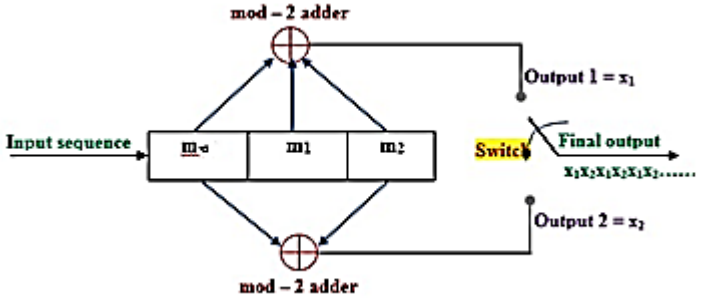
Course: Communication Theory II

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	*CO*	*PO*	Marks
1	a)	Discuss the line coding for a binary stream11010011.sketch the following line codes. NRZ-Polar, RZ-Polar, Bipolar, Manchester code formats	*1*	*1*	**10**
	b)	With the structure of waveform coding using Delta modulation, analyze its effectiveness as compared to standard PCM in transmission.	*1*	*1*	**10**
		OR			
2	a)	The T carrier system offered by AT &T accommodates 24 Voice channels. i) Draw the structure of one T1 frame indicating all details. ii) If high speed T3-line is used to multiplex T1 and T2 lines, draw the digital hierarchical structure for the same indicating bitrates at each level. iii) If only voice channels are required, how many such voice channels can be accommodated at T3?	*2*	*2*	**10**
	b)	The Delta Modulator is used for the transmission and reception of audio signal. With mathematical model Analyze its suitability in transmission stating its advantages over DPCM.	*2*	*2*	**10**
		UNIT - II			
3	a)	Design the Optimum receiver structure using bank of Matched filters and indicate its properties.	*2*	*2*	**10**
	b)	With the structure of transmitter and receiver, Illustrate how the message bk={1001100} is transmitted and detected with DPSK .	*2*	*2*	**10**
		OR			
4	a)	Draw correlator type Optimum receiver structures employed in digital communication systems and indicate optimisation metric	*2*	*2*	**10**

			used. If a binary data is transmitted over AWGN channel using BFSK at a rate of 10 Mbps. It is desired to have average probability of error$\leq 10^{-4}$. Noise power spectral density is No/2 = 10^{-10} W/Hz. determine the average carrier power required at coherent receiver.			
		b)	With a neat diagram explain Generation and detection of QPSK	*1*	*1*	**10**
			UNIT - III			
	5	a)	Draw the structure of baseband OFDM system and mention any two applications	*1*	*1*	**10**
		b)	Describe the working of direct sequence spread spectrum systems	*1*	*1*	**10**
			OR			
	6	a)	Explain the generation of frequency hopped spread spectrum signals.	*1*	*1*	**10**
		b)	What is processing gain of DS-CDMA system. Explain how a PN sequence is generated using ML linear shift register	*1*	*1*	**10**
			UNIT - IV			
	7	a)	Enumerate the Various Properties of Source Codes with examples for each	*1*	*1*	**10**
		b)	Apply Huffman's coding to the source signal X_i={A,B,C,D,E,F} with corresponding probabilities {0.3,0.1,0.02,0.15,0.4,0.03}	*2*	*2*	**10**
			OR			
	8	a)	How does bandwidth affect channel capacity? State and prove Shannon's Channel Capacity theorem	*1*	*1*	**10**
		b)	Apply Shannon-Fano coding to the source signal X_i={A,B,C,D,E,F} with corresponding probabilities {0.3,0.1,0.02,0.15,0.4,0.03} and comment on its efficiency	*2*	*2*	**10**
			UNIT - V			
	9	a)	Design a (7,4) linear block code for the parity matrix and write all code words. Draw implementation circuit. Analyze its error detecting and correcting capability. Given parity matrix P = $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$	*2*	*2*	**10**
		b)	For the n=2,k=1,m=2 convolutional encoder with $g_{(1)}$=[1,1,1] and $g_{(2)}$=[1,0,1] find the output sequence for the input message d=10011 using time domain approach	*3*	*3*	**10**

			OR			
	10	a)	Consider a (n,k,l)=(3, 1, 3) convolutional encoder with $g_{(1)}$= (1110), $g_{(2)}$= (0101), $g_{(3)}$= (1111). i. Draw the encoder block diagram ii. Find the generator matrix iii. Find the code word corresponding to information sequence (11010) using time domain and transform domain approach	*3*	*3*	**10**
		b)	Design state diagram and state table for the given encoder 	*3*	*3*	**10**

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