Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Fifth Semester

Bio-Medical Engineering

CBM354 – Communication Systems

Regulations - 2021

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BTL*	*CO*	*Marks*
1.	What is single tone and multi tone modulation?	L1	1	2
2.	Compare AM with DSB-SC and SSB-SC.	L2	1	2
3.	Define Noise Figure.	L1	2	2
4.	What is meant by sensitivity of a radio receiver?	L2	2	2
5.	State Source coding theorem.	L1	3	2
6.	What is meant entropy and redundancy?	L2	3	2
7.	Differentiate coherent and non-coherent detection.	L2	4	2
8.	Draw the signal constellation diagram of QPSK.	L1	4	2
9.	Define Channel coding theorem.	L1	5	2
10.	Find the Hamming distance between codeword 11001 and 10001.	L2	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	What is the need for modulation? Derive the expression for amplitude modulation.	L2	1	8
		ii	Explain the generation of SSB signal using Phase discriminator method.	L2	1	8
			Or			
	b	i	Explain the indirect Armstrong generation.	L2	1	8
		ii	Explain the operation of Foster-Seely discriminator.	L2	1	8
12.	a		Describe the working of superheterodyne receiver with the help of block diagram.	L1	2	16
			Or			
	b		Describe the noise sources classification and explain their types.	L1	2	16

13.	a	A discrete memoryless source has an alphabet of seven symbols and their probabilities are S1:S7-(0.25,0.2,0.15,0.15,0.1,0.1,0.05). Compute Shannon Fano coding for this source. Also Calculate the coding efficiency and redundancy.	L4	3	16
		Or			
	b	A discrete memoryless source has an alphabet of seven symbols and their probabilities are S1:S7-(0.25,0.25,0.0625,0.0625,0.125,0.125,0.125). Compute Huffman coding for this source moving a combined symbols as high as possible. Also Calculate the coding efficiency and redundancy.	L4	3	16
14.	a	Describe with neat diagrams, the generation and detection of coherent binary QPSK. Derive the error probability of QPSK.	L2	4	16
		Or			
	b	Describe with neat diagrams, the generation and detection of coherent binary BFSK. Derive the error probability of BFSK.	L2	4	16
15.	a	Consider a linear block code with generator matrix G given as: $\begin{bmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$	L3	5	16
		i) Determine the parity check matrix ii) Determine the error detecting and capability of the code iii) Draw the encoder and syndrome calculation circuits Calculate the syndrome for the received vector r=[1 1 0 1 0 1 0]			
		Or			
	b	Consider a convolutional code that uses two generator polynomials: G0=[111] and G1= [110]. Design the convolution encoder. If the transmitted message starts with the bits “01011”, what is the sequence of bits produced by the convolution encoder?	L3	5	16