

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, May 2025
 B. Tech. (ECE), Semester VI, 2024-25

Roll No.....

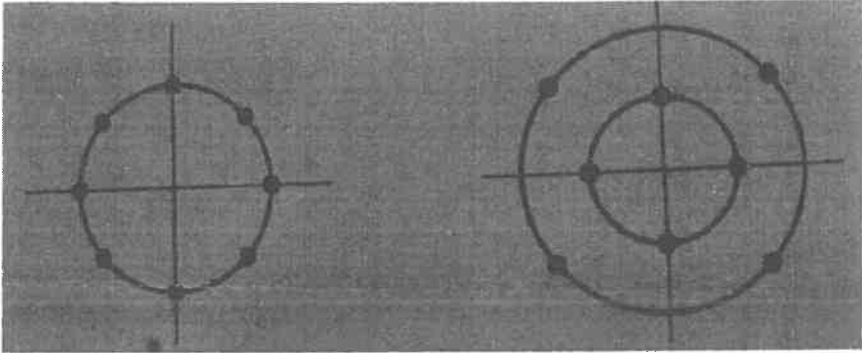
EE1123: Digital Communication

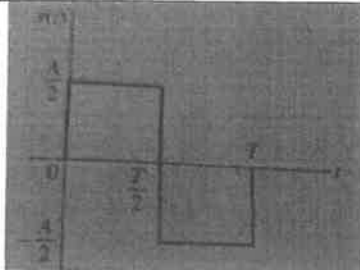
Time: 2 hours

Max. Marks: 30

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Mention all the assumptions for your answers clearly.

Q 1. (a)	Draw the block diagram for baseband binary data transmission and explain the Inter Symbol Interference.	3.0 M (EE1123.1)
Q1. (b)	How can the peak distortion and channel noise be observed in a practical setup. Extend the method for Mary transmission.	3.0 M (EE1123.1)
Q 2. (a)	Explain Pairwise symbol error probability using constellation diagram and derive the expression for average probability of symbol error for an AWGN channel.	3.0 M (EE1123.1)
Q2. (b)	The figure below shows signal constellation for two types of Passband modulation, identify the modulation types  Figure Q 2(b)	3.0 M (EE1123.2)

Q 3. (a)	Explain maximum a posteriori estimation (MAP). Determine the output of maximum likelihood detector, when five transmitted messages are received with following statistics:	3.0 M (EE1123.5)												
	<table><tr><td>Prior probability</td><td>0.6</td><td>0.3</td><td>0.6</td><td>0.9</td><td>0.1</td></tr><tr><td>Posterior Probability</td><td>0.2</td><td>0.3</td><td>0.5</td><td>0.3</td><td>0.5</td></tr></table>	Prior probability	0.6	0.3	0.6	0.9	0.1	Posterior Probability	0.2	0.3	0.5	0.3	0.5	
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Posterior Probability	0.2	0.3	0.5	0.3	0.5									
Q3(b)	Compare different passband modulation schemes wrt average energy per symbol, transmission bandwidth and probability of symbol error.	3.0 M (EE1123.2)												
Q 4.	For the signal shown below, recommend an optimum receiver and find - Impulse response $h(t)$ of the filter/receiver. - Sketch the matched filter output $y(t)$. - Determine the peak value of output $y(t)$.  Figure Q 3(b)	6.0 (EE1123.5)												
Q 5 (a)	Show how the signal constellation of 4 ary QAM can be obtained from 4 ary PAM. Write the message codes for all the 16 messages on the constellation diagram.	3 M (EE1123.6)												
Q 5 (b)	Binary data is to be transmitted at $R_b = 800$ kbps on a radio channel having 250 KHz bandwidth. Recommend the suitable passband modulation method and justify your decision by showing the calculations.	3 M (EE1123.6)												