

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2026		
B. Tech Program Scheme III		
Regular Examination: SY Semester: IV		
Course Code: EXC 402 and Course Name: Analog and Digital Communication Engineering		
Date of Exam: 21/05/26	Duration: 2.5 Hours	Max. Marks: 60

Instructions:

- (1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any two questions out of three: (05 marks each)	10		
a)	Compare AM and FM.		1	Ap
b)	What are the causes of fold over distortion or aliasing? How can it be prevented or removed?		2	U
c)	Explain FDM in detail		3	U
Q 2	Solve any two questions out of three: (05 marks each)	10		
a)	Describe eye pattern with the help of diagram		4	Ap
b)	Describe the working principle of ASK modulator with suitable block diagrams and constellation representation.		5	U
c)	Check the following code is cyclic or not: Code X1=(0000 0101 1010 1111) Code X2=(0000 0110 1001 1111)		6	Ap
Q.3	Solve any two questions out of three. (10 marks each)	20		
a)	Derive AM voltage distribution. Describe AM envelope		1	Ap
b)	Compare PAM, PWM, PPM		2	Ap
c)	Draw a neat block diagram of the AM receiver and explain the function of each block with waveforms.		3	U
Q.4	Solve any two questions out of three. (10 marks each)	20		
a)	In a digital communication system, the signal power is 50 mW and the noise power is 5 mW. The channel bandwidth is 3 MHz. The system transmits data at a bit rate of 12 Mbps using a modulation technique in which each symbol represents 4 bits. Determine: 1. The Signal-to-Noise Ratio (SNR) in dB		4	Ap

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	2. The channel capacity of the system 3. The bit interval 4. The baud rate of transmission.												
b)	Explain QPSK in detail.Also Explain why QPSK is better than PSK?	5	U										
c)	A discrete memoryless source has five symbols with probabilities as shown below: Symbol Probability <table> <tr><td>S1</td><td>0.4</td></tr> <tr><td>S2</td><td>0.22</td></tr> <tr><td>S3</td><td>0.18</td></tr> <tr><td>S4</td><td>0.12</td></tr> <tr><td>S5</td><td>0.08</td></tr> </table> Construct the Shannon-Fano coding code for the source. Calculate: 1. Average code length 2. Entropy 3. Coding efficiency 4. Redundancy	S1	0.4	S2	0.22	S3	0.18	S4	0.12	S5	0.08	6	Ap
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