



PRESIDENCY UNIVERSITY

BENGALURU

Roll No.																			
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Mid - Term Examinations - March 2026

Date: 12-03-2026

Time: 09:30am - 11.00am

School: SOE	Program: B. Tech	
Course Code : ECE3169	Course Name: Digital Communication	
Semester: VI	Max Marks: 50	Weightage: 25%

CO - Levels	CO1	CO2	CO3	CO4	CO5	CO6
Marks	20	15	15	-	-	-

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

5Q x 2M=10M

1	What is the role of source encoder and channel encoder in digital communication?	2 Marks	L1	CO1
2	State the sampling theorem and define the Nyquist rate for a band-limited signal.	2 Marks	L1	CO1
3	What is quadrature sampling of a band-pass signal? Mention one advantage of this method.	2 Marks	L2	CO1
4	Define inter-symbol interference (ISI). How does Nyquist's criterion help in reducing ISI?	2 Marks	L2	CO2
5	What information does an eye pattern provide about a digital communication system?	2 Marks	L1	CO3

Part B

Answer the Questions.

Total Marks 40M

6.	a.	Draw and explain the block diagram of a digital communication system. Explain the role of sampling and signal recovery in the transmitter and receiver.	10 Marks	L1	CO1
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Or					
7.	a.	State and explain the Sampling Theorem using time and frequency-domain arguments. A signal is band-limited to 4 kHz. Determine the Nyquist rate, minimum sampling frequency, and sampling interval. Comment on aliasing if the signal is sampled at 6 kHz.	10 Marks	L2	CO1

8.	a.	Explain quadrature sampling of a band-pass signal and derive its low-pass equivalent representation. Explain the Hilbert Transform and its role in generating the analytic signal.	10 Marks	L1	CO2
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Or					
9.	a.	Discuss practical aspects of sampling and signal recovery, including anti-aliasing and reconstruction filters. Illustrate with suitable spectrum.	10 Marks	L2	CO2

10.	a.	A TDM system multiplexes 4 channels, each of bandwidth 3 kHz. Determine the minimum sampling rate per channel and the overall bit rate assuming one sample per time slot. Draw the schematic diagram of the same	10 Marks	L2	CO2
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Or					
11.	a.	Explain PCM with transmitter and receiver blocks. A PCM system uses 8-bit uniform quantization for a signal with peak amplitude 1 V. Determine the quantization step size and SQNR (assume sinusoidal input).	10 Marks	L2	CO2

12.	a.	Explain DM and DPCM with block diagrams.	10 Marks	L3	CO3
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Or					
13.	a.	Explain ISI and derive Nyquist's criterion for distortionless base-band binary transmission. Discuss correlative coding and explain how the eye pattern is used to assess system performance.	10 Marks	L3	CO3