

**Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)**



B. Tech (Fourth Semester – Regular/Supplementary) Examinations, April 2026

23BECPC24002 – Analog and Digital Communication

(ECE / EE(VLSI))

Time: 3 hrs

Maximum: 60 Marks

**Answer ALL questions
(The figures in the right hand margin indicate marks)**

PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Define modulation index. What is the need of it in AM?	CO1	K1
b. What is slope overload and granular noise? Write the condition to avoid slope over load error.	CO3	K2
c. Mention the need of scrambling in digital communication.	CO5	K2
d. Draw the signal space diagram of QPSK when $\Theta_0 = 0^\circ$.	CO2	K3
e. What do you mean by AWGN?	CO4	K1

PART – B

(10 x 5 = 50 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. Explain the principle of Amplitude Modulation. Also derive the mathematical expression of an AM.	5	CO1	K3
b. What is DPCM? Explain its principle with neat block diagram.	5	CO3	K2
(OR)			
c. Explain about the working principle of a baseband receiver Also, derive the peak signal to RMS noise output voltage ratio of a baseband receiver.	5	CO6	K3
d. Differentiate FM and PM.	5	CO1	K4
3.a. A signal having bandwidth of 4 MHz is transmitted using binary PCM system. The no. of quantization level is 1024. So, calculate the no. of bits/sample, maximum transmission bandwidth, bit rate, bit duration and SNR.	5	CO5	K3
b. Draw and explain in details the delta modulation technique.	5	CO3	K2
(OR)			
c. Explain about the operation of QPSK transmitter and receiver in details.	5	CO2	K2
d. What is known as Inter symbol Interference (ISI)? What are the primary causes of it? How can it be minimized by pulse shaping?	5	CO6	K4
4.a. Illustrate about the Code Division Multiplexing. What is the role of PN code in CDM?	5	CO5	K2
b. Differentiate BPSK and BFSK in terms of waveform, signal space diagram, spectrum and BW.	5	CO2	K4
(OR)			
c. Explain Pulse Width Modulation and Pulse Position Modulation with suitable diagram.	5	CO3	K2
d. Define frequency deviation and modulation index. Derive the equation of an FM wave.	5	CO1	K1,K3

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|------|--|---|-----|-------|
| 5.a. | What is Eye diagram? How it helps in the digital communication system? | 5 | CO4 | K4 |
| b. | What do you mean by SSM? How it is different from conventional modulation techniques? Explain about SSM with suitable diagram | 5 | CO5 | K2 |
| (OR) | | | | |
| c. | Give the difference between RZ and NRZ. Draw the Unipolar RZ, polar NRZ, AMI and Manchester formats for the data sequence 1100101001. | 5 | CO2 | K1,K3 |
| d. | A delta modulator system is designed to operate at five times the Nyquist rate for a signal having a bandwidth equal to 3KHz. Calculate the maximum amplitude of a 2KHz input sinusoid for which the delta modulator does not have slope over-load. Given that the quantizing step size is 250mvolt. | 5 | CO3 | K3 |
| 6.a. | Explain about the BPSK modulation and demodulation techniques in details. | 5 | CO1 | K2 |
| b. | Define quantization. Explain about the quantization process with suitable diagram. | 5 | CO3 | K2 |
| (OR) | | | | |
| c. | Define interpolation. Derive the expression to reconstruct the original signal from sampled signal. | 5 | CO2 | K1,K3 |
| d. | Explain Time Division Multiplexing. Discuss advantages, disadvantages, and applications. | 5 | CO5 | K2 |

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