



**GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY, ODISHA,
GUNUPUR
(GIET UNIVERSITY)**

B. Tech (Fourth Semester - Regular) Examinations, April – 2025

23BECPC24002 - Analog and Digital Communication

(ECE)

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?	CO1	K1
b. Write the advantages and disadvantages of PAM.	CO3	K2
c. Draw the spectrum of BFSK and find out the bandwidth used in it.	CO5	K3
d. What is pulse shaping? Give the examples of pulse shaping filter.	CO4	K1
e. Draw the Polar RZ and AMI formats for the data sequence 101011.	CO2	K3

PART – B

(10 x 5 = 50 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. What do you mean by DSB-C? Explain about DSB-C modulation technique in details.	5	CO1	K2
b. Define Phase Modulation. Derive the expression for Phase Modulation.	5	CO3	K3
(OR)			
c. Explain in detail about the relationship between FM and PM.	5	CO2	K2
d. How can PPM be derived from PWM? Explain.	5	CO3	K1
3.a. Differentiate FDM and TDM.	5	CO5	K2
b. Explain about the code division multiplexing technique in detail. Also find out the PN code when initial content of LSR is 101.	5	CO4	K2
(OR)			
c. With the help of neat block diagram explain the principle of adaptive delta modulation.	5	CO1	K2
d. Define quantization. Explain the process of quantization in detail with neat sketch.	5	CO1	K2
4.a. The bandwidth of an input signal to the PCM system is restricted to 4KHz. The input signal varies in amplitude from -3.8V to +3.8V and has the average power of 30mW. The required SNR is given as 20dB and the PCM modulator produces binary output. Assuming uniform quantization, (i) find the number of bits required per sample, (ii) No. of quantization levels, (iii) Bit rate and (iv) What would be the minimum required transmission bandwidth?	5	CO4	K3
b. Describe the operation of DPSK transmitter and receiver.	5	CO5	K1
(OR)			
c. Define PSD. Derive the expression to find out the PSD of polar signalling.	5	CO6	K3
d. State sampling theorem. Discuss about the graphical analysis of sampling	5	CO2	K2

theorem.

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|------|---|---|-----|----|
| 5.a. | What do you mean by line coding? Discuss about the different line coding techniques. | 5 | CO2 | K2 |
| b. | Draw and explain in details about a regenerative repeater. | 5 | CO6 | K3 |
| (OR) | | | | |
| c. | Explain about BFSK modulator and demodulator circuit with suitable diagram. Draw the BFSK waveform for the data sequence 1011010. | 5 | CO5 | K3 |
| d. | Why QPSK is preferred over BPSK? Give a signal space representation of QPSK when $\Theta_0 = 0^\circ$. | 5 | CO5 | K1 |
| 6.a. | Discuss about the direct sequence spread spectrum modulation technique with suitable diagram. | 5 | CO1 | K3 |
| b. | What do you mean by eye diagram? Why it is used in the communication system? | 5 | CO4 | K2 |
| (OR) | | | | |
| c. | What do you mean by scrambling? Explain in details with suitable diagram. | 5 | CO3 | K1 |
| d. | Define SNR. Derive the expression for SNR in PCM. | 5 | CO5 | K2 |

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