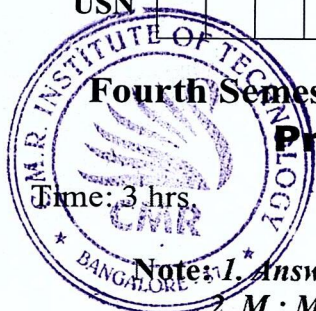


CBCS SCHEME

USN

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BEC402



Fourth Semester B.E/B.Tech. Degree Examination, Dec.2025/Jan.2026 Principles of Communication Systems

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

| | | Module – 1 | M | L | C |
|-------------------|----|--|----|----|-----|
| 1 | a. | Define the auto correlation and cross correlation. Discuss the properties of auto correlation and cross correlation. | 10 | L1 | CO1 |
| | b. | Define probability with an example. Discuss their properties. | 5 | L1 | CO1 |
| | c. | Develop a problem to generate the probability density function of Gaussian distribution function. | 5 | L2 | CO1 |
| OR | | | | | |
| 2 | a. | Determine the characteristic function of a Gaussian random variable with a given mean and variance. | 8 | L2 | CO1 |
| | b. | What is conditional probability? Prove that $P(B/A) = P(A/B) \cdot P(B)/P(A)$. | 6 | L3 | CO1 |
| | c. | Define auto covariance, random variable and probability distribution function. | 6 | L1 | CO1 |
| Module – 2 | | | | | |
| 3 | a. | Derive the expression for Amplitude Modulation (AM) power in terms of modulation index. | 7 | L3 | CO2 |
| | b. | Write G Matlab code to generate amplitude modulation and demodulation wave forms and display its spectrum. | 8 | L3 | CO2 |
| | c. | Explain with neat diagrams, AM demodulator using the diode detector. | 5 | L2 | CO2 |
| OR | | | | | |
| 4 | a. | An AM transmitter has a carrier power of 30W. The percentage of modulation is 85%. Calculate : i. The total power ii. The power in one sideband. | 5 | L3 | CO3 |
| | b. | Explain a general block diagram of an FDM system. | 10 | L2 | CO3 |
| | c. | Explain amplitude modulation in time domain with necessary waveforms. | 5 | L2 | CO3 |

Module – 3

| | | | | | |
|---|----|---|----|----|-----|
| 5 | a. | Define PLL, explain with neat diagram of FM demodulator using the IC 565. | 10 | L2 | CO3 |
| | b. | With neat block diagram, explain the concept of frequency modulation with an IC voltage controlled oscillator (ICNE 566). | 10 | L2 | CO3 |

OR

| | | | | | |
|---|----|---|----|----|-----|
| 6 | a. | Draw the block diagram of a super heterodyne receiver and explain the function of each block. | 10 | L2 | CO3 |
| | b. | Explain with a neat diagram, the frequency spectrum of FM wave. | 10 | L2 | CO3 |

Module – 4

| | | | | | |
|---|----|--|----|----|-----|
| 7 | a. | What is quantization process? Explain the different types of quantization with their important characteristics. | 10 | L2 | CO4 |
| | b. | For the data stream 110011. Draw the following line code waveforms. i. Unipolar RZ ii. Unipolar NRZ iii. Polar NRZ iv. Bipolar NRZ v. Manchester NRZ. | 10 | L3 | CO4 |

OR

| | | | | | |
|---|----|---|----|----|-----|
| 8 | a. | Explain the generation and detection of PPM waves with a relevant block diagram. | 10 | L2 | CO4 |
| | b. | What is multiplexing and why it is required in communication? Explain the working of TDM with a neat block diagram. | 10 | L2 | CO4 |

Module – 5

| | | | | | |
|---|----|---|----|----|-----|
| 9 | a. | Define ISI. Out line base band binary data transmission system with neat block diagram and equations. | 10 | L2 | CO5 |
| | b. | Discuss about Nyquist criterion for distortionless (zero ISI) base band transmission. | 10 | L2 | CO5 |

OR

| | | | | | |
|----|----|---|----|----|-----|
| 10 | a. | Explain in detail about Internal and External noise. | 10 | L2 | CO5 |
| | b. | Develop a code to generate and plot eye diagram. | 6 | L2 | CO5 |
| | c. | An RF amplifier has an S/N ratio of 8 at the i/p and S/N 6 at the o/p. What are the Noise Ratio and Noise Figure? | 4 | L3 | CO5 |
