

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech. II Year II Semester Supplementary Examinations December-2025

ANALOG AND DIGITAL COMMUNICATIONS

(Electronics and Communications Engineering)

Time: 3 Hours

Max. Marks: 70

PART-A

(Answer all the Questions 10 x 2 = 20 Marks)

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|-----|---|-----|----|----|
| 1 a | Explain the advantage of SSB over AM. | CO1 | L2 | 2M |
| b | Explain and give the expressions for single tone FM signal. | CO2 | L1 | 2M |
| c | A 107.6MHz carrier signal is frequency modulated by 7kHz sine wave. The resultant FM signal as a frequency deviation of 50kHz. Determine highest and lowest frequency components by modulated signal, modulation index of FM. | CO3 | L3 | 2M |
| d | How is frequency multiplier different from frequency translator explain? | CO2 | L2 | 2M |
| e | Give the factors influencing the choice of IF. | CO5 | L3 | 2M |
| f | What is Amplitude limiting? | CO1 | L1 | 2M |
| g | Compare PAM and PWM. | CO3 | L2 | 2M |
| h | What is the difference between uniform and non-uniform quantization? | CO1 | L2 | |
| i | Draw the signal space diagram of QPSK. | CO4 | L3 | 2M |
| j | Explain about Eye diagram. | CO3 | L2 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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|-----|---|-----|----|----|
| 2 a | Define standard form of AM and explain the time and frequency domain expression of AM wave. | CO2 | L2 | 5M |
| b | Explain the DSB-SC generation using balanced modulator. | CO2 | L2 | 5M |

OR

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|-----|---|-----|----|----|
| 3 a | Obtain the expression for total transmitted power of AM wave, DSB-SC wave, SSB wave and compare all the three. | CO2 | L3 | 5M |
| b | The total Power content of an AM signal is 1000W. Determine the power being transmitted at carrier frequency and at each side bands when modulation percentage is 100%. | CO3 | L4 | 5M |

UNIT-II

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|-----|---|-----|----|----|
| 4 a | Obtain the Narrow Band FM wave equation for single tone input signal. | CO1 | L3 | 4M |
| b | The equation for a FM wave is $S(t) = 10 \cos[5.7 \times 10^4 t + 5 \sin(12 \times 10^3 t)]$. Calculate i) Carrier frequency ii) Modulation Index iii) Frequency deviation | CO1 | L3 | 6M |

OR

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|-----|--|-----|----|----|
| 5 a | Compare NBFM and WBFM. | CO2 | L2 | 5M |
| b | Discuss FM generation using indirect method. | CO2 | L3 | 5M |

UNIT-III

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|-----|---|-----|----|----|
| 6 a | When a superheterodyne receiver is tuned to 555kHz, its local oscillator provides the mixer with an input at 1010kHz. What is the image frequency? The antenna with a tuned circuit whose loaded Q is 40 is connected, What will be the rejection ratio for the calculated image frequency? | CO2 | L4 | 5M |
| b | Explain the FM Transmitter with help of block diagram | CO2 | L2 | 5M |

OR

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|-----|--|-----|----|----|
| 7 a | Explain the operation of superheterodyne receiver with the help of a block diagram | CO3 | L2 | 6M |
| b | Discuss about the alignment of radio receivers. | CO3 | L3 | 4M |

UNIT-IV

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|-----|---|-----|----|----|
| 8 a | Analyse noise in DSB-SC receiver with coherent detection. | CO4 | L3 | 6M |
| b | Define input signal to noise ratio and explain the significance of Figure of Merit. | CO3 | L2 | 4M |

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| 9 a | Draw the FM noise model and analyse the noise in FM reception. | CO4 | L3 | 7M |
| b | Discuss about FM threshold effect. | CO3 | L2 | 3M |

UNIT-V

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|------|---|-----|----|----|
| 10 a | Explain the generation and detection of BPSK system. | CO2 | L3 | 6M |
| b | Express the signals transmitted in QPSK and draw its space diagram. | CO3 | L2 | 4M |

OR

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|------|---|-----|----|----|
| 11 a | Express the transmitted signals in BFSK. Draw and explain its signal space diagram. | CO3 | L3 | 6M |
| b | Compare the performance of ASK, BPSK and BFSK. | CO2 | L2 | 4M |

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