



B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Fifth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U18ECI5201: Communication Engineering - I

COURSE OUTCOMES

- CO1:** Demonstrate basic building blocks of communication systems.
CO2: Compare the performance of amplitude modulation techniques.
CO3: Implement and analyze angle modulation techniques .
CO4: Discriminate and implement different analog pulse Modulation techniques.
CO5: Apply and demonstrate digital pulse modulation techniques.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

(Answer not more than 40 words)

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|---|-----|-------------------|
| 1. List the types of communication channels. | CO1 | [K ₁] |
| 2. Recall the properties of Hilbert transform. | CO1 | [K ₁] |
| 3. Compare the power and bandwidths of AM-DSBFC, DSBSC & SSBSC. | CO2 | [K ₂] |
| 4. What is Heterodyning process?. | CO2 | [K ₂] |
| 5. Carson's Rule – When to apply and when not to apply? | CO3 | [K ₃] |
| 6. Define modulation indices of PM & FM. | CO3 | [K ₁] |
| 7. List the types of analog pulse modulation schemes. | CO4 | [K ₁] |
| 8. What is capture effect in FM? | CO3 | [K ₁] |
| 9. Define Comanding. | CO5 | [K ₁] |
| 10. List any four-line coding techniques. | CO5 | [K ₂] |

Answer any FIVE Questions:-

PART B (5 x 16 = 80 Marks)

(Answer not more than 400 words)

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|--|---|-----|-------------------|
| 11. a) For a nonlinear Mixer with two input frequencies 3 kHz & 8 kHz, | 8 | CO1 | [K ₃] |
| a) Determine the first three harmonics present in the output for each input frequency. | | | |
| b) Determine the cross products produced in the output for values of m and n of 1 and 2. | | | |

- c) Draw the output frequency spectrum for the harmonics and cross-product frequencies determined in a & b
- b) List and explain the different types of noises associated with communication systems. 8 CO1 [K₂]
12. a) Explain Filter method of generating SSB-SC. 8 CO2 [K₂]
 b) Illustrate the operation of superheterodyne receiver with a neat block diagram. 8 CO2 [K₂]
13. a) Outline the operation of a Crosby direct FM transmitter. 8 CO3 [K₂]
 b) Explain the demodulation of FM using Foster Seeley Discriminator with a neat Schematic. 8 CO3 [K₂]
14. a) Draw the model of DSB-SC receiver using coherent detection and derive the expression for its Figure of merit with an assumption that additive white Gaussian noise is added in the channel. 10 CO4 [K₂]
 b) Explain the generation and detection of Pulse Width Modulation (PWM) with a neat schematic and waveforms. 6 CO4 [K₂]
15. a) Explain delta modulation with its merits and demerits. 8 CO5 [K₂]
 b) For the following sequence {1.2, -0.2, -0.5, 0.4, 0.89, 1.3}, solve and obtain the quantized sequence using a uniform quantizer in the range of (-1.5,1.5) with 4 levels. 8 CO5 [K₂]
16. a) Explain threshold effect in FM. 8 CO3 [K₂]
 b) Compare PCM, DPCM and adaptive DPCM. 8 CO5 [K₂]
