



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

(Regulation 2018)

Third Semester

**INFORMATION TECHNOLOGY**

U18ECT3011: Principles of Communication

**COURSE OUTCOMES**

**CO1: Describe the fundamental concepts of communication systems**

**CO2: Compare analog modulation schemes**

**CO3: Explain digital modulation schemes**

**CO4: Classify standard base band data transmission techniques**

**CO5: Paraphrase the spread spectrum techniques and multiple access techniques**

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 2 = 20 Marks)**

**(Answer not more than 40 words)**

- |  |     |                   |
|--|-----|-------------------|
| 1. Describe about Electromagnetic Spectrum in short.   | CO1 | [K <sub>2</sub> ] |
| 2. Mention the components of electronic communication system.  | CO1 | [K <sub>2</sub> ] |
| 3. Mention the disadvantages of Tuned Radio-Frequency Receiver   | CO2 | [K <sub>2</sub> ] |
| 4. For an AM DSBFC wave with a peak unmodulated carrier voltage $V_c = 10 V_p$ , a load resistance $R_L = 10 \text{ ohm}$ , and a modulation coefficient $m=1$ , determine | CO2 | [K <sub>3</sub> ] |
| a. Powers of the carrier and the upper and lower sidebands   |     |                   |
| b. Total sideband power  |     |                   |
| 5. Mention the advantages of Digital communication and its applications  | CO3 | [K <sub>2</sub> ] |
| 6. Define Amplitude Shift Keying with relevant waveform.   | CO3 | [K <sub>2</sub> ] |
| 7. Explain about M-ary Encoding  | CO4 | [K <sub>2</sub> ] |
| 8. Define sampling process   | CO4 | [K <sub>2</sub> ] |
| 9. Define Pseudo Noise Sequences   | CO5 | [K <sub>2</sub> ] |
| 10. Mention about line coding techniques and its types.  | CO5 | [K <sub>2</sub> ] |

**Answer any FIVE Questions:-**

**PART B (5 x 16 = 80 Marks)**

**(Answer not more than 400 words)**

- |  |    |     |                   |
|--|----|-----|-------------------|
| 11. a) Explain the need for modulation with relevant example.            | 6  | CO1 | [K <sub>2</sub> ] |
| b) Explain each block of AM Superheterodyne receiver with relevant block | 10 | CO2 | [K <sub>2</sub> ] |

diagram.

12. a) One input to a conventional AM modulator is a 500 kHz carrier with an amplitude of 20V<sub>p</sub>. The second input is a 10 kHz modulating signal that is of sufficient amplitude to cause a change in the output wave of  $\pm 7.5$  V<sub>p</sub>. Determine
- a) Upper and lower side frequencies
  - b) Modulation coefficient and percent modulation
  - c) Peak amplitude of the modulated carrier and the upper and lower side frequency voltages
  - d) Maximum and minimum amplitudes of the envelope
  - e) Expression for the modulated wave
  - f) Draw the output spectrum
- b) Explain about the slope detector type of FM Demodulators with relevant diagram. 6 CO2 [K<sub>2</sub>]
13. a) Explain about the amplitude modulated radio transmitter with relevant block diagram. 8 CO2 [K<sub>2</sub>]
- b) Explain about Crosby Direct FM Transmitter with relevant block diagram 8 CO2 [K<sub>2</sub>]
14. a) Explain how the Balanced ring modulator works and generation of BPSK waveform. 6 CO3 [K<sub>2</sub>]
- b) Explain about Quaternary Phase shift keying and explain QPSK modulator with relevant diagram 10 CO3 [K<sub>2</sub>]
15. a) Explain about Time Division Multiplexing with relevant block diagram 10 CO4 [K<sub>2</sub>]
- b) Explain about adaptive delta modulation in detail CO4 [K<sub>2</sub>]
16. a) Explain Direct Sequence Spread Spectrum with Coherent Binary Phase Shift Keying with relevant diagram 10 CO5 [K<sub>2</sub>]
- b) Mention the types of Multiple access techniques and explain with relevant diagrams 6 CO5 [K<sub>2</sub>]