

Seat No. **OCT-NOV 2025 WINTER EXAMINATION****11731 Bachelor of Technology (NEP-2.0)****Sub. Name: Analog & Digital Communication****Sub. Code: 114445/112435****Day and Date: Friday ,05-12-2025****Total Marks: 60****Time: 02:30 PM To 05:00 PM**

- Instructions:**
1. All questions are compulsory
 2. Assume suitable data wherever necessary and mention it boldly
 3. Draw neat labelled diagrams wherever necessary
 4. Figures to the right indicate full marks
 5. Use of Scientific calculator is allowed

Q1) Solve following MCQ. (6 x 2= 12 M)**[12]**

- i. Calculate power in each sideband, if power of carrier wave is 176W and there is 60% modulation in amplitude modulated signal?
 - A. 15.84 W
 - B. 52 W
 - C. 67 W
 - D. 13.36 W
- ii. FM bandwidth is approximated using _____ rule.
 - A. Farady's
 - B. Carson's
 - C. Maxwells
 - D. Armstrong's
- iii. In Pulse time modulation (PTM),
 - A. Amplitude of the carrier is constant
 - B. Position or width of the carrier varies with modulating signal
 - C. Pulse width modulation and pulse position modulation are the types of PTM
 - D. All of the above
- iv. Relation between amount of information and probability of Event is
 - A. Inversely
 - B. Directly
 - C. No any relation
 - D. None of the above
- v. Standard value of μ in μ law companding is
 - A. 255
 - B. 456
 - C. 546

D. 100

- vi. Causes of ISI in communication are
- Multipath propagation
 - Bandlimited Channels
 - Noise and fading channel
 - All of the above

Q2) Attempt any two (2*6=12 M) [12]

- Consider an AM signal $s(t) = 4\cos 1800\pi t + 10\cos 2000\pi t + 4\cos 2200\pi t$. Sketch the spectrum and calculate BW, Power and modulation efficiency. [6]
- Explain Pre-emphasis and De-emphasis with diagram. [6]
- Draw and Explain Generation of PWM with waveforms. [6]

Q3) Attempt any two (2*6=12 M) [12]

- Apply Huffman coding procedure for the following message and find average length per codeword and coding efficiency. [6]
 $[X] = [x_1 \quad x_2 \quad x_3 \quad x_4 \quad x_5 \quad x_6 \quad x_7]$
 $[P] = [0.4 \quad 0.2 \quad 0.12 \quad 0.08 \quad 0.08 \quad 0.08 \quad 0.04]$
 Take $M=2$.
- Explain the types of Uniform Quantization. [6]
- Explain Scrambler and Unscrambler implementation using shift register structure. [6]

Q4) Attempt any two (2*6=12 M) [12]

- With suitable example explain Shannon Fano coding algorithm. [6]
- Draw and Explain Delta Modulation. [6]
- Draw and Explain QPSK Transmitter [6]

Q5) Attempt any two (2*6)=12) [12]

- What is Entropy? Derive expression for entropy. [6]
- If digital data is given as $\{1 \ 0 \ 0 \ 1 \ 1 \ 0 \ 1 \ 0 \ 1\}$. Draw following formats i) [6]
 Bipolar RZ ii) Bipolar NRZ iii) Polar Manchester

c. Draw and Explain DPSK Transmitter.

[6]

End Of Question Paper

Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -

This Question Paper may be distributed for following Subjects as common code.

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1] (1154) B.Tech. CBCS (114445) Analog & Digital Communication Part 2 SEM 3

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