Hall Ticket No:

Question Paper Code :

ANIL NEERUKONDA INSTITUTE OF TECHNOLOGY & SCIENCES
(AUTONOMOUS)
M.E/M.Tech I-Semester Regular Examinations, November 2015
DIGITAL COMMUNICATION TECHNIQUES
(Communication Systems)

Date: **Time: 3 hours**   **Max Marks: 60**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT-I

1.   **a**. Derive an expression for the signal to noise ratio of a Matched Filter.

    b. Assume that you are required to transmit data bit rate 100Mbps in authorized bandwidth of 10MHz.Which modulation technique would you consider. Explain why?

(Or)

2.   **a.** Explain about Trellis coded modulation with relevant diagram.

    b. Derive an expression for error probability for Coherent Frequency Shift Keying .

UNIT-II

3.   **a.** Explain how Syndrome is useful in Error correction

    b. Design a feedback shift register encoder for a cyclic code with a generator matrix $g(x)=1+x+x^2+x^3$. Use the encoder to encode the message sequence 10110 in Systematic form.

(or)

4.   **a**.Explain about hard decision and soft decision decoding.

    b.Give brief explanation about concatenated codewords.

UNIT-III

5. **a**. Explain Viterbi decoding method for convolution codes with relevant figures and examples.

   b. Draw The state diagram, tree diagram and trellis diagram for K=3, rate 1/3 code generated by

$$g_1(x)=X+X^2, \quad g_2(x) = 1+X, \quad g_3(x)= 1+X+X^2$$

(or)

6. **a.** Explain how pulse shaping is useful in Digital Communications.

   b. Explain about various PCM waveforms used in digital communications.

UNIT-IV

7. **a**. Explain how synchronization can be achieved with Continuous Phase Modulation.

   b. Explain the method of carrier synchronization using Costas loop method.

(or)

8. **a.** Explain about Data aided and Non aided methods of synchronization.

   b. Discuss briefly about symbol synchronization schemes.

UNIT-V

9. **a**. Explain briefly about Frequency hopping and direct sequence spread spectrum systems.

   b. Give an expression for the Fourier transform of the maximum length PN sequence with m= 3 and draw its spectral density.

(or)

10. **a.** What are the beneficial attributes of spread spectrum techniques?

    b . In a DS/BPSK system the feedback register used to generate PN sequence has a length of M=15. The system is required to have an average probability of symbol error less than 10^{-5}. Calculate processing gain and jamming margin for the system.