Seat No.

T.E. (Electronics & Telecomm. Engg.) (Semester - VI)
Examination, May - 2015
DIGITAL COMMUNICATION
Sub. Code : 45693

Day and Date : Friday, 08 - 05 - 2015   Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

Instructions :   1)   All questions are compulsory.
                   2)   Figures to the right indicate full marks.
                   3)   Assume suitable data if necessary.

SECTION - I

Q1) Solve any two:

   a)   Explain discrete and continuous RV with Probability Distribution Function.   **[9]**

   b)   Explain the Gaussian probability Distribution Model.   **[9]**

   c)   Explain Ensemble mean, Time Average and Ergodicity of random Process.   **[9]**

Q2) Solve any two:

   a)   With an example, Explain Shannon-Fano Coding.   **[8]**

   b)   Derive the expression for Entropy.   **[8]**

   c)   What is Slope over Load Distortion and granular noise in delta modulation? Explain how it is removed in ADM.   **[8]**

Q3) Solve any two:

   a)   Explain Symmetric Quantizer of midtread and midriser type.   **[8]**

   b)   Draw and explain with block Diagram linear Delta modulation. **[8]**

P.T.O.

c) The voice signal in a PCM system is quantized in 16 levels with the following probabilities: [8]

$p1 = p2 = p3 = p4 = 0.1$, $p5 = p6 = p7 = p8 = 0.05$, $p9 = p10 = p11 = p12 = 0.075$, $p13 = p14 = p15 = p16 = 0.025$, calculate the entropy and information rate, assume $fm = 3KHz$.

SECTION - II

Q4) Solve any three:

   a) Draw and explain Duobinay baseband PAM system. [6]

   b) Explain special classes of cyclic code. [6]

   c) The generator polynomial of $(6, 3)$ code is $g(x) = 1 + x^2$, Find the code word for $D = 0101$. [6]

   d) With neat block diagram explain BFSK transmitter and receiver. [6]

Q5) Solve any two:

   a) Discuss the properties and applications of matched filter. [8]

   b) Explain carrier recovery circuit. [8]

   c) What is equalization? Draw and explain Adaptive equalizer for data transmission. [8]

Q6) Solve any two:

   a) What are the functions of parity check matrix and generator matrix in linear block codes? How they are used to generate code vectors from message block? [8]

b) Explain (n-k) syndrome calculations, error detection and error correction. [8]

c) The parity Check matrix of a linear block code is given by. [8]

$$H = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 1 & 0 & 0 & 1 \end{bmatrix}$$

i) Find the generator matrix.

ii) Lists all code words.

iii) For the received code word, R = 1011110 find the syndrome.