SJ - 787

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Seat No.	

T.E. (E & Tc) (Part - III) (Semester - V) Examination November-2016
Digital Communication Engineering (Revised)
Sub. Code : 66318

Day and Date : Saturday, 26 - 11 - 2016 **Total Marks : 100**

Time : 02.30 p.m. to 05.30 p.m.

Instructions :
1) **All questions are compulsory.**
2) **Use of non programmable calculator is allowed.**
3) **Neat diagrams must be drawn whenever necessary.**
4) **Figures to the right indicate full marks.**

SECTION - I

Q1) Solve any three : **[18]**

a) What is an Ergodic process? State properties of the same.

b) What is entropy? Derive the expression for the Entropy.

c) Explain PCM in detail.

d) Find constant C so that the function

$$f(x) = C(x - 1) \quad 1 < x < 4$$
$$0 \quad \text{other wise}$$

is a density function and find $p(2 < x < 3)$

Q2) Solve any two : **[16]**

a) Derive expression for joint and Conditional entropy.

b) With an example explain the Shannon Fano coding.

c) Apply the Huffman coding procedure for the following message ensemble

$[X] = [X_1\ X_2\ X_3\ X_4\ X_5\ X_6\ X_7]$ with respective probabilities.

[P] = [0.4 0.2 0.12 0.08 0.08 0.08 0.04]. Take M = 3 Determine code efficiency.

P.T.O.

Q3) Solve any two : [16]

a) Explain different types of channels and their models.

b) Explain Adaptive Delta modulation in detail.

c) Compare all the digital pulse modulation techniques.

SECTION - II

Q4) Attempt any two [2 × 8 = 16]

a) Draw and explain matched filter and correlation receiver.

b) Explain optimum detection using ML criteria.

c) Write a note on Burst and random error correction codes.

Q5) Attempt any two [2 × 8 = 16]

a) Draw and explain coherent ASK signaling scheme and discuss about ASK spectrum.

b) Explain the concept of spread spectrum. What are its advantages.

c) Compare digital modulation techniques.

Q6) Attempt any two [2 × 9 = 18]

a) Draw following digital signal using line coding techniques, Unipolar - RZ, NRZ, Bipolar - RZ, NRZ (AMI), Manchester and give explanation.

Digital Data - 101100101

b) Prove that the syndrome S is sum of those columns of the matrix H corresponding to the error locations.

c) Generator polynomial of a (7,4) cyclic code is $X^3 + X^2 + 1$. Construct generator matrix for a systematic cyclic code and find the code word for the message (1101) using generator matrix.

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