SV - 453

Seat No.	

Total No. of Pages : 3

T.E. E & TC (Semester - V) Examination, April - 2018
DIGITAL COMMUNICATION ENGINEERING
Sub. Code : 66318

Day and Date : Saturday, 28- 04 - 2018 **Total Marks : 100**

Time : 10.00 a.m. to 01.00 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 two : **[18]**

a) Write Short notes on :i) Gaussian distribution ii) Binomial distribution iii) Uniform distribution.

b) Explain Ensemble mean, Time average & Ergodicity of random process.

c) Prove relation between Joint and Conditional entropy

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

a) Compare all the digital pulse modulation techniques.

b) Explain Shannon - Hartley theorem.

c) Apply the Shannon 's Fano coding procedure for the following message Ensemble

$[X]= [X_1\ X_2\ X_3\ X_4\ X_5\ X_6\ X_7\ X_8]$ with respective probabilities

[P]= [1/4 1/8 1/16 1/16 1/16 1/4 1/16 1/8] Take M=2. Determine code efficiency

P.T.O.

Q3) Solve any two: [16]

a) Explain Adaptive Delta modulation in detail

b) Explain different types of channel and their model

c) A 1 KHz signal of voice channel is sampled at 4 KHz using 12-bit PCM and a DM system. If 25 cycles of voice signal are digitized find in each case

1. Signaling rate
2. Bandwidth required
3. Number of bits required to be transmitted
4. Comment on results

SECTION-II

Q4) Attempt any two [2 × 8 = 16]

a) Draw and explain FSK signalling scheme.

b) Draw and Explain eye diagram.

c) Explain optimum detection using ML criteria.

Q5) Attempt any two [2 × 8 = 16]

a) Draw and explain 16-QAM scheme with constellation diagram.

b) Explain DSSS technique.

c) Compare carrier modulation techniques.

SUK-74454

Q6) Attempt any two **[2 × 9 = 18]**

1) Explain type of errors and codes , also discuss Hamming distance and it's relation with error detection and correction capability

2) A Generator polynomial of a (7;4) cyclic code is $g(x) = 1+x+x^3$ then find systematic and non -systematic codeword for data vector (1001)

3) For a systematic linear bock code the three parity check digits C_4, C_5, C_6 are given by $C_4 = d_1 + d_3$, $C_5 = d_2 + d_3$ $C_6 = d_1 + d_2 + d_3$

a) Construct parity check matrix.

b) Prepare suitable decoding table.

c) Find syndrome and decode the received words 101100 and 000110.

⊖⊖⊖

SUK-74454