

Seat No.	
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T.E. ETC (Semester - V) (Revised) Examination, November - 2017

DIGITAL COMMUNICATION ENGINEERING

Sub. Code : 66318

Day and Date : Wednesday, 22 - 11 - 2017

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.
 - 5) Assume suitable data if necessary.

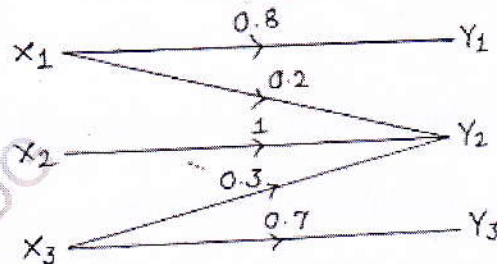
SECTION - I

Q1) Solve any three: (6 marks each)

- a) What is an Ergodic process? What is difference between Ergodic & stationary process?
- b) Write short notes on:
 - i) Gaussian distribution
 - ii) Binomial distribution
- c) Define Entropy and derive an expression for it.
- d) What is CDF? Explain Properties of CDF?

Q2) Solve any two: (8 marks each)

- a) A discrete source transmits messages x_1, x_2, x_3 with the probabilities 0.3, 0.4, 0.3. The source is connected to the channel given in fig. calculate entropies.



- b) With an example explain the Huffman coding.
- c) Apply the Shannon's Fano coding procedure for the following message ensemble

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

$[P] = [0.4 \ 0.2 \ 0.12 \ 0.08 \ 0.08 \ 0.08 \ 0.04]$. Take $M = 2$. Determine code efficiency.

Q3) Solve any two: (8 marks each)

- a) Explain in detail Uniform quantization.
- b) Explain the DPCM with neat block diagram.
- c) Draw and explain with block diagram linear delta modulation.

SECTION -II

Q4) Solve any two:

[2 × 8 = 16]

- a) Draw and explain scrambler & unscrambler implementation using shift register structure.
- b) Draw and explain baseband PAM system.
- c) Write a note on eye diagram.

Q5) Solve any two:

[2 × 8 = 16]

- a) Explain QAM modulation with the help of constellation diagram.
- b) Compare band pass modulation techniques.
- c) Explain DS-SS technique.

Q6) Solve any two:

- a) Generator polynomial of a(7,4) cyclic code is $x^3 + x + 1$. construct generator matrix for a systematic cyclic code and find the code word for the message (1110) using generator matrix.
- b) For a systematic linear block code the three parity check digits c_4, c_5, c_6 are given by $c_4 = d_1 + d_2 + d_3, c_5 = d_1 + d_2, c_6 = d_1 + d_3$.
- Construct generator matrices.
 - Write all codes generated by this matrix.
 - Determine error detecting & correcting capability.
- c) Explain types of errors & types of codes in digital communication.

