Roll No ....

EC-5002 (CBGS)
B.E. V Semester
Examination, December 2017
Choice Based Grading System (CBGS)
Digital Communication

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) In case of any missing data. Make a suitable assumptions.

1. a) Define and explain the following: 7
   i) Cumulative distribution function
   ii) Probability density function
   iii) Correlation and Auto correlation

   b) PDF of a random variable 'X' is given by $f_x(x) = e^{-x}$ for $x \geq 0$. Then find mean E[X], mean square E[X²], variance, standard deviation. 7

2. a) Discuss about the error probability as measured by finite samples. 7

   b) Define sampling and discuss different types of sampling techniques. 7

3. a) Describe data modulation, system. What are its limitations and how can they be overcome? 7

   b) Why companding is needed. Differential between pre-emphasis and De-emphasis. 7
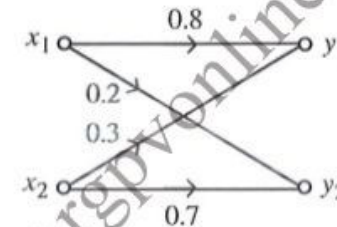
4. a) Explain how PPM and PWM signals are generated from PAM signals, and how these are detected. 7

   b) Explain frequency shift keying. Describe coherent detection of FSK signals. What should be the relationship between bit rate and frequency shift for a better performance. 7

5. What do you mean by M-ary PSK. Explain generation and detection method for M-ary PSK. 14

6. a) What are matched filters? Obtain its transfer function. 7

   b) What is eye pattern? Explain with diagram. Also explain why equalizers are used. Give the working of equalizers. 7

7. a) State and prove Bayes theorem. 7

   b) Find the channel capacity of the channel shown in figure. 7

Given $p(x_1) = 0.6$ and $p(x_2) = 0.4$

8. a) Define the following terms: 7
   i) Information
   ii) Entropy
   iii) Channel capacity
   iv) Rate of information
   v) Coding efficiency

   b) Apply the Huffmann coding procedure for the following message ensemble. 7

   [X] = [x₁   x₂   x₃   x₄   x₅   x₆   x₇]
   [P] = [0.4 0.2 0.12 0.08 0.08 0.08 0.04]
   Take M=2. Also determine the code efficiency.

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