Total No. of Questions :8] *[Total No. of Printed Pages :2*

Roll No .....

MCSE - 202

M.E./M.Tech., II Semester

Examination, June 2014

Information Theory, Coding and Cryptography

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions.
ii) Each question carries equal marks.
iii) Notations have standard meaning.

1. Discuss following probabilities in detail.
   i) The Gaussian probability density.
   ii) Cumulative Gaussian probability
   iii) The Rayleigh probability density.

2. a) Consider the random process
   $V(t) = \cos(\omega_0 t + \theta)$
   Where θ is a random variable with a probability density
   $$f(\theta)=\frac{1}{2\pi} \quad -\pi \le \theta \le \pi$$
   Show that the first and second moments of $V(t)$ are independent of time.
   b) Discuss the concept of autocorrelation and Power Spectral Density of Random Processes.

3. a) Discuss the concept of PSD of Digital data with suitable wave forms.
   b) What do you understand by Huffman coding?

4. a) Explain concept of discrete time birth and death process.
   b) A random process $X(t)$ is defined as $X(t) = A\cos(\omega t + \theta)$ where ω and θ are constant and A, a random variable uniformly distributed over [–1, 1]. Determine whether $X(t)$ is WSS.

5. a) What is cyclic codes? Discuss its properties.
   b) What do you understand by Burst error correction?

6. Discuss following codes and their applications.
   i) Read-Solomon code
   ii) Concatenated codes
   iii) Convolutional coding

7. a) What is viterbi algorithm of MLSE? Discuss its applications in communication.
   b) What do you understand by turbo decoding?

8. Write short notes on two of the following:
   i) Hard and soft decoding
   ii) Cryptanalysis confusion
   iii) Diffusion and confusion
   iv) BCH codes

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