Roll No .....

MCSE - 202

M.E./M.Tech. II Semester

Examination, December 2015

Information Theory Coding and Cryptography

Time : Three Hours

Maximum Marks : 70

Note : i) Answer all questions.
ii) Attempt any two parts from each question.
iii) All questions carry equal marks.

1. a) Define information, mutual information and entropy. State and explain various properties of information.
   b) Write a brief note on random variables, their type and properties.
   c) Discuss the Rayleigh probability density.

2. a) 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.
   b) Describe the discrete birth death processes. What are its properties? Show the process may be applied to queuing theory with an example.
   c) Explain Markov property.

3. a) The parity check matrix of a particular (7, 4) linear block code is given by

$$H = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$$

   i) Find the generator matrix G.
   ii) All the code vectors of this code.
   iii) The minimum weight of this code.
   b) Write a brief note on CRC codes.
   c) Discuss the BCH codes with their properties and decoding methods.

4. Write short note on any two :
   a) RSA algorithm
   b) Diffusion and confusion
   c) Cryptography.

5. a) What do you understand by turbo decoding?
   b) What is reed-solomon code? Describe its decoding process.
   c) Discuss soft decision viterbi algorithm.

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