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

Roll No .....

MEDC-301(A)

M.E./M.Tech., III Semester

Examination, June 2017

Information Theory and Coding

(Elective-I)

Time : Three Hours

Maximum Marks: 70

Note : i) Attempt any five questions.
ii) All questions carry equal marks.

1. A discrete memoryless source has an alphabet of seven symbols with probabilities 0.25, 0.25, 0.125, 0.125, 0.125, 0.0625, 0.0625 respectively. Compute Huffman code for this source. Calculate entropy, average codeword length and variance of this code.

2. a) What do you understand by source coding and channel coding? Explain the criteria to increase the coding efficiency? Give techniques for coding to achieve the desired results.
   b) Explain the Hamming codes with examples.

3. a) State and explain Shannon's channel capacity theorem.
   b) What is linear block code? Discuss systematic and non-systematic codes.

4. a) Explain Viterbi algorithm with an example.
   b) What are convolution codes? How they differ from Block codes?

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5. a) How do you obtain the generator polynomial for the cyclic code? Check the following codes are cyclic or not

Code x_1 = {0000, 0101, 1010, 1111}

Code x_2 = {0000, 0110, 1001, 1111}

   b) Define and explain the term information rate. State the relation between information rate and entropy.

6. a) Design a syndrome calculator for a(7, 4) cyclic Hamming code generated by the polynomial $G(p) = P^3+P+1$. Calculate syndrome for y = (1 0 0 1 1 0 1).
   b) Describe lossy compression methods where we use lossy compression methods? How do we are it?

7. a) What do you mean by Fading Channel. Discuss in detail.
   b) What do you mean by BCH codes. Discuss in detail with example.

8. Write short notes of any two:
   a) Encoding and decoding circuits
   b) Mutual Information and its properties
   c) Bandwidth signal to noise Trade off

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