Registration No:

Total Number of Pages : 02   **M.TECH**

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M.TECH 1ST SEMESTER REGULAR EXAMINATIONS, DECEMBER 2017
INFORMATION THEORY AND CODING
Branch: EC, Subject Code:MECPC1020
Time: 3 Hours
Max Marks : 70
The figures in the right hand margin indicate marks.

PART-A   **(10 X 2=20 MARKS)**
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1. Answer the following questions.

    a. State the channel coding theorem for a discrete memory less channel.

    b. What is the capacity of the channel having infinite bandwidth?

    c. Define Information rate.

    d. Find entropy of a source emitting symbols x, y, z with probabilities of 1/4, 1/2, 1/4 respectively.

    e. What is meant by correlative coding?

    f. What are the error detection and correction capabilities of hamming codes?

    g. What is meant by cyclic code?

    h. How syndrome is calculated in Hamming codes and cyclic codes?

    i. Write syndrome properties of liner block codes

    j. What is the principle of data compression?

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PART-B   **(5 X 10=50 MARKS)**
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Answer any five questions from the following.

2. a. An alphabet contains the five symbols {A, B, C, D, E}, which appear with probabilities   **5**
    p(A) = 1/2 , p(B) =1/8 , p(C) =1/8 , p(D) =1/8 , p(E) =1/8 .
    Design a binary Huffman code for this alphabet.

  b. Define Information .Write the properties of Information.   **5**

3.a. Discuss the MPEG compression techniques   **5**

  b. A discrete memory less source X has five symbols x1,x2,x3,x4 and x5 with probabilities p(x1)   **5**
    =0.4, p(x2) = 0.19, p(x3) = 0.16, p(x4) = 0.15 and p(x5) = 0.1 . Construct a Shannon – Fano
    code for X,and Calculate the efficiency of the code.

4. a. Explain the RSA algorithm with suitable example.

5

b. Explain the Iterative MAP decoding scheme used to code conventional codes.

5

5. a. Determine the generator polynomial of a double error correcting binary BCH code, with block length 15.

8

b. Define Hamming distance.

2

6.a. Prove H(A,B) = H(B)+ H(A|B).

5

b. Construct the addition and multiplication table for F[x]/(x2+1) defined over GF(3).

5

7. a. Discuss the various stages in JPEG standard.

6

b. Differentiate loss less and lossy compression technique and give one example for each

4

8. a) Determine the capacity of the channel shown in the following figure:

6
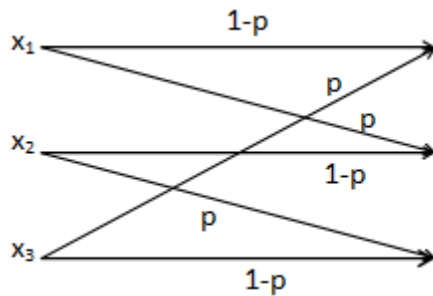
b) State and prove the Kraft inequality.

4

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