Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

ME Semester –I Examination Feb. - 2012

Subject code: 712703N **Date: 17/02/2012**

Subject Name: Information Theory and coding

Time: 10.30 am – 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 (a) State and prove the Mcmillan's theorem **07**

(b) For zero memory sources emit six messages with following probabilities. **07**

Find 4-ary Huffman code. Determine average word length, efficiency and redundancy.

Messages	M1	M2	M3	M4	M5	M6
Original source probabilities	0.3	0.25	0.15	0.12	0.10	0.08

Q.2 (a) What is meant by binary symmetrical channel? Find channel capacity of BSC **07**

For following fig-1

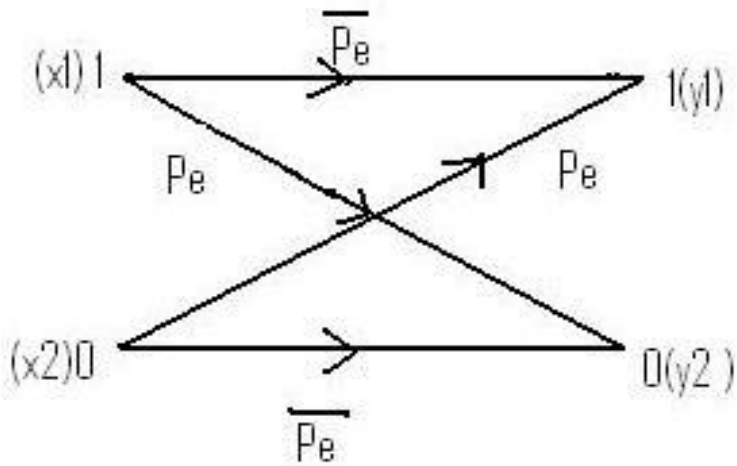

Fig-1

(b) Explain error free communication over noisy channel **07**

OR

(b) State and explain Shannon's fundamental theorem **07**

Q.3 **(a)** For a (6,3) code the generator matrix G is **07**

$$G = \begin{bmatrix} 100 & 101 \\ 010 & 011 \\ 001 & 110 \end{bmatrix}$$

$$\underbrace{}_{I_k} \quad \underbrace{}_{P}$$

For all eight possible data words find corresponding code words

(b) Describe in brief : (1) Channel capacity (2) Information rate **07**

OR

Q.3 **(a)** Describe comparison of coded and uncoded system **07**

(b) Explain the viterbi's algorithm in detail with suitable example. **07**

Q.4 **(a)** Explain Kraft's inequality theorem with example **07**

(b) Describe sequential decoding **07**

OR

Q.4 **(a)** Give the types of arithmetic coding and explain any one. **07**

(b) Explain RSA algorithm in detail **07**

Q.5 **(a)** Define : Cryptosystem, cryptography, Encryption and decryption **07**

Give the difference between public key algorithm and private key algorithm

(b) Explain data encryption standard algorithm **07**

OR

Q.5 **(a)** Describe encryption based on large prime numbers **07**

(b) Define : Compression also explain the types of compression And where it is used give with suitable example. **07**

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