Code No: NR411202 **NR**

IV B.Tech I Semester Supplementary Examinations, April/May 2005
INFORMATION THEORY AND CODING
(Information Technology)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. The joint probabilities of the transmitted and received messages of a communication system is given as

		Y1	Y2	Y3	Y4
P(X,Y)	X1	1/4	0	1/10	0
	X2	0	1/4	0	1/20
	X3	0	0	1/10	1/20
	X4	0	1/20	0	1/10
	X5	0	0	0	1/20

   Calculate P(X1, X2, X3, X4, X5); P(Y1, Y2, Y3, Y4); H(X); H(Y); H(Y/X); H(X/Y); H(X,Y) and the mutual information I(X,Y).

2. (a) Explain shannon's second fundamental theorem on coding for memory less noise channels.
   (b) Show that for a discrete channel I(x,y) >= 0.

3. (a) State & explain Shanon-fano theorem.
   (b) What are the factors responsible for increasing the channel capacity.

4. Give the following ensemble S={S1,S2,S3,S4,S5,S6,S7}
   P(S)={1/3,1/3,1/9,1/9,1/27,1/27,1/27}
   (a) Find H(S) & H(S^3) .
   (b) Find a compact Huffman code when X=[0,1] & X=[0,1,2].
   Find the average length & efficiency for both the above codes.

5. (a) Design a Linear block code with a minimum distance of 3 and a message block size of 8 bits. Give the [G] and [H] matrices.
   (b) Distinguish between channel coding and source coding.

6. Explain the following
   (a) Performance of codes
   (b) Application of codes
   (c) Block Interleaving

7. (a) What is FEC (forwar error correcting)? Compare it to an ARQ procedure.
   (b) Why is "stop and wait" inefficient? What is the effect of half duplex on efficiency.

8. (a) Draw the block diagram of modified Doubinary Technique and explain with necessary wave forms.
   (b) What is the need for precoder in modified duobinary signaling scheme.

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