

Total No. of Printed Pages:2

SUBJECT CODE NO:- H-125
FACULTY OF SCIENCE AND TECHNOLOGY
T.E. (EC/ECT/E&C) (Sem-II)
Signal Coding & Estimation Theory
[OLD]

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

1. Q .no. 1 and Q.no.6 are compulsory
2. Solve any two questions from in each section
3. Assume suitable additional data if necessary.

Section -A

- Q.1 Solve any two 10
- i) Explain Mutual information with its properties.
 - ii) Explain binary erasure channel.
 - iii) Explain source coding Theorem.
- Q.2 a) What do you mean by channel capacity? State & explain channel capacity theorem. 07
- b) Apply Shannon fano coding for following message ensemble 08
- $$[X] = [x_1 \ x_2 \ x_3 \ x_4 \ x_5 \ x_6 \ x_7]$$
- $$[P] = [0.45 \ 0.15 \ 0.1 \ 0.1 \ 0.08 \ 0.08 \ 0.04]$$
- Q.3 a) Explain channel capacity of BSC 07
- b) Find capacity of following channel whose channel matrix is 08
- $$P(Y/X) = \begin{bmatrix} P & 1-P \\ 1-P & P \end{bmatrix}$$
- i) Draw channel diagram.
 - ii) If sources are equally likely find probabilities of output if $p=0.8$
 - iii) Find capacity of the channel for $P=0.8$
- Q.4 a) Prove the following relationship 07
- $$I(X, Y) = H(X) - H(X/Y)$$
- b) The Generator matrix for a (6,3) block code is given below. Find all code vectors of this code 08

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

		H-125
Q.5	a) Find out channel capacity of Binary erasure channel.	07
	b) Explain Run length coding.	08

Section – B

Q.6	Solve any two (short notes)	10
	i) Maximum likely hood estimation	
	ii) Encoder ckt for LBC	
	iii) Transform domain approach	
Q.7	a) For a (7,4) cyclic code find out the generator matrix if $G(D)=1+D+D^3$	07
	b) Explain syndrome decoding of LBC.	08
Q.8	a) Explain procedure to obtain CRC.	07
	b) Explain matrix description of convolution codes.	08
Q.9	a) Construct the (7,4) linear code word for the generator polynomial $G(D) = 1 + D^2 + D^3$ for the message bits 1001	07
	b) Using generator polynomial $g(x) = 1 + x^2 + x^3$ generate the systematic & nonsystematic cyclic code words for the message vector 1011	08
Q.10	a) Explain	07
	i) Tree diagram	
	ii) Trellies diagram	
	b) What is Estimation Theory? Explain any one method in detail.	08