

B. Tech. Sem -VI (E & TC Engg.) (2014 COURSE) (CBCS) :
WINTER - 2018

SUBJECT: INFORMATIN THEORY & CODING

Day: Saturday
Date: 17/11/2018

W-2018-2516

Time: 10.00 AM TO 01.00 PM
Max. Marks: 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.

Q.1 State and explain all property of information? Also explain entropy? (10)

OR

Q.1 Determine Lempel-Ziv code for the following bit stream (10)
[0100111110010100000010]
Recover the original sequence from encoded?

Q.2 From the given channel matrix find out the mutual information with probability (10)
 $P(x_1)=0.5$, $P(x_2)=0.3$, $P(x_3)=0.2$ with probability matrix is:

$$P(Y/X) = \begin{matrix} x_1 & \begin{bmatrix} 0.5 & 0.5 & 0 \end{bmatrix} \\ x_2 & \begin{bmatrix} 0.5 & 0 & 0.5 \end{bmatrix} \\ x_3 & \begin{bmatrix} 0 & 0.5 & 0.5 \end{bmatrix} \end{matrix}$$

Calculate all the entropy and mutual information with channel?

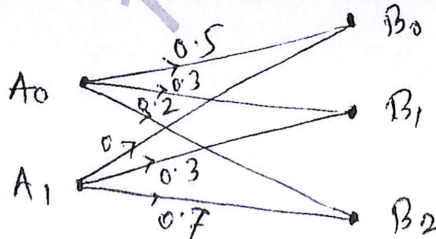
OR

Q.2 A channel has band width of 5KHz and a signal to noise power ratio 53. (10)
Determine the B.W. needed if the SNR power ratio is reduced to 31. What will
be the signal power required if channel B.W. is required to 5KHz?

Q.3 Find the entropy of source having probability 1/8, 1/6, 1/4. (10)

OR

Q.3 Find capacity of channel shown in figure: (10)



Q.4 For (6,3) linear block code with matrix: (10)

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

The received code word at receiver are (000110) and (110111)
Check whether they are correct or not?

OR

P. T. O.

- Q.4 Systematic linear block code with (10)
- $C_4 = d_1 \oplus d_2 \oplus d_3$
 $C_5 = d_1 \oplus d_3$
 $C_6 = d_1 \oplus d_2$
1. Construct generator matrix
 2. Decode the received code word
 - a. 101100
 - b. 100010

- Q.5 Find generator matrix and parity check matrix for systematic (7,3) cyclic code. (10)
- The generator polynomial are
 $g(x) = 1 + x + x^2 + x^3$

OR

- Q.5 A (15,5) BCH double error correcting code has the generator polynomial (10)
- $g(x) = x^8 + x^7 + x^6 + x^4 + 1$. Find transmitted code word if the received code word is $x^4 + x^3$. Consider primitive polynomial is $x^4 + x + 1$.

- Q.6 A convolution encoder $r = 1/2$ (10)
- $g_1 = [111]$, $g_2 = [101]$
- 1) draw code tree
 - 2) state diagram
 - 3) trellis diagram if message is =10011.

OR

- Q.6 Give comparison between code tree and trellis diagram in convolution code (10)
- with example.

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