

**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:

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

Calculate all the entropy and mutual information with channel?

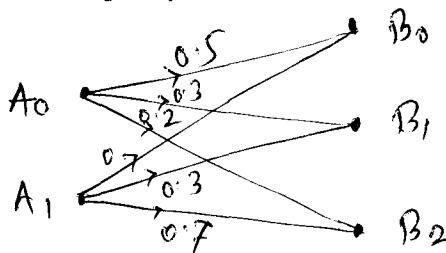
**OR**

**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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