

3. a) Find the mutual information for the channel shown in fig. 2.

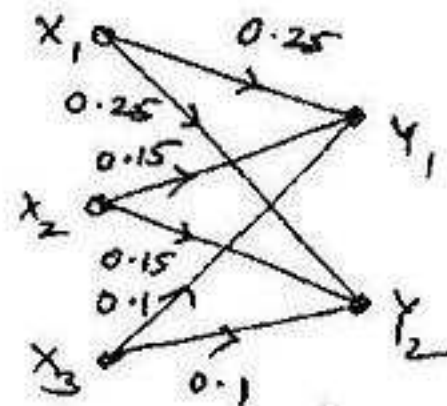


Fig. 2

- b) Explain the bandwidth and S/N trade off of a Gaussian channel.
4. Derive the expression of channel capacity of BSC. Then determine the channel capacity of the channel shown in fig 3 for i) $p = 0.9$ and ii) $p = 0.6$

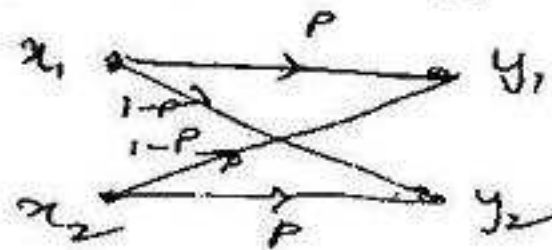


Fig. 3

5. a) Discuss about the Galois field and its construction in $GF(2^m)$ and its basic properties.
b) Discuss about the systematic codes and its encoding circuits.
6. a) Discuss about the cyclic codes and its basic properties.
b) Explain the coding and decoding of cyclic codes with the help of circuit diagram.
7. a) Explain the encoding and decoding of BCH codes.
b) Explain about the viterbi algorithm for maximum likelihood decoding.
8. Write short notes on any two of the following:
i) Prefix coding ii) Block codes
iii) Hamming codes

MEMT - 203

M.E./M.Tech., II Semester

Examination, June 2014

Information Theory and Coding

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions.

ii) All questions carry equal marks.

1. a) Discrete source transmit messages x_1, x_2 and x_3 with the probabilities 0.3, 0.4 and 0.3. The source is connected to the channel given in fig.1. Calculate all entropies.

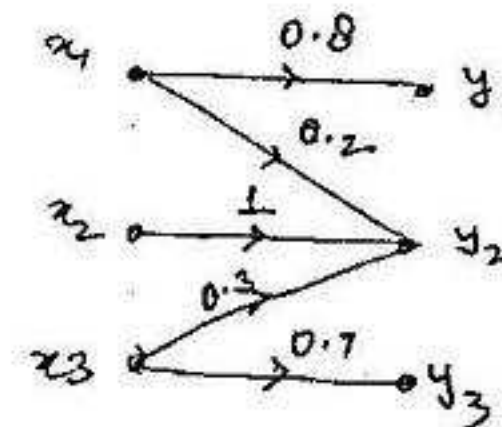


Fig. 1

- b) Derive the formula of mutual information in terms of entropy.
2. a) Explain the Lempel -zin coding technique.
b) Apply Huffman coding procedure for the following message ensemble. Take $M = 2$
 $[X] = [x_1 \ x_2 \ x_3 \ x_4 \ x_5 \ x_6 \ x_7]$
 $[P] = [0.4 \ 0.2 \ 0.12 \ 0.08 \ 0.08 \ 0.08 \ 0.04]$
Also calculate the efficiency of the code.