

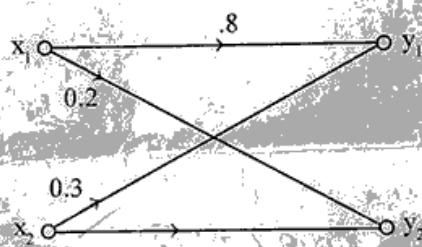
[3]

OR

8. a) State and prove Bayes theorem.  
b) Calculate probability of error for BPSK signal.

**Unit - V**

9. a) What is entropy? Show that the entropy is maximum when all the symbols are equiprobable. Assume  $M = 2$ .  
b) Find the mutual information and channel capacity of the channel shown in Figure given  $p(x_1) = 0.6, p(x_2) = 0.4$ .



OR

10. a) Apply the Sharman - Fame coding procedure to find coding efficiency for the following message ensemble.  
 $(1)$   $[X] = [x_1 \ x_2 \ x_3 \ x_4 \ x_5 \ x_6 \ x_7 \ x_8]$   
 $[p(x)] = [0.2, 0.2, 0.15, 0.15, 0.1, 0.1, 0.05, 0.05]$   
b) What is coding efficiency. Show that the coding efficiency is maximum when  $p(0) = p(1)$ .