**Q3c)**

**Output for all the 12 cases from Matlab code:**

P(C1|x) = 0.027027, P(C2|x) =0.972973 for P(C1) = 0.200000 and x = (0,0)

P(C1|x) = 0.692308, P(C2|x) =0.307692 for P(C1) = 0.200000 and x = (0,1)

P(C1|x) = 0.027027, P(C2|x) =0.972973 for P(C1) = 0.200000 and x = (1,0)

P(C1|x) = 0.692308, P(C2|x) =0.307692 for P(C1) = 0.200000 and x = (1,1)

P(C1|x) = 0.142857, P(C2|x) =0.857143 for P(C1) = 0.600000 and x = (0,0)

P(C1|x) = 0.931034, P(C2|x) =0.068966 for P(C1) = 0.600000 and x = (0,1)

P(C1|x) = 0.142857, P(C2|x) =0.857143 for P(C1) = 0.600000 and x = (1,0)

P(C1|x) = 0.931034, P(C2|x) =0.068966 for P(C1) = 0.600000 and x = (1,1)

P(C1|x) = 0.307692, P(C2|x) =0.692308 for P(C1) = 0.800000 and x = (0,0)

P(C1|x) = 0.972973, P(C2|x) =0.027027 for P(C1) = 0.800000 and x = (0,1)

P(C1|x) = 0.307692, P(C2|x) =0.692308 for P(C1) = 0.800000 and x = (1,0)

P(C1|x) = 0.972973, P(C2|x) =0.027027 for P(C1) = 0.800000 and x = (1,1)

**Q4)**

**Table of error rate of each prior on the validation set:**

Num of correct pred: 68, Error rate: 23.5955% and sigma: -5

**Num of correct pred: 71, Error rate: 20.2247% and sigma: -4**

Num of correct pred: 69, Error rate: 22.4719% and sigma: -3

Num of correct pred: 70, Error rate: 21.3483% and sigma: -2

Num of correct pred: 68, Error rate: 23.5955% and sigma: -1

Num of correct pred: 64, Error rate: 28.0899% and sigma: 0

Num of correct pred: 64, Error rate: 28.0899% and sigma: 1

Num of correct pred: 60, Error rate: 32.5843% and sigma: 2

Num of correct pred: 60, Error rate: 32.5843% and sigma: 3

Num of correct pred: 60, Error rate: 32.5843% and sigma: 4

Num of correct pred: 61, Error rate: 31.4607% and sigma: 5

**Best performance on validation set for sigma = -4 with error rate = 20.2247%**

**Error rate using the best prior on the test set:**

**Error Rate using the best prior: 14.6067%**