B.TECH.
THEORY EXAMINATION (SEM–VIII) 2016-17
PATTERN RECOGNITION

Time : 3 Hours   *Max. Marks : 100*

Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.

SECTION – A

1. **Explain the following:**   **10 x 2 = 20**
   - **(a)** Differentiate Classification with Clustering.
   - **(b)** What do you mean by pattern recognition? Explain.
   - **(c)** What is Learning? Discuss Supervised & Un Supervised Learning.
   - **(d)** Discuss Reinforcement Learning.
   - **(e)** What is Back Propagation Algorithm?
   - **(f)** Discuss Normal Density Function.
   - **(g)** Discuss Cluster Validation.
   - **(h)** What is Conditional Probability?
   - **(i)** Discuss various Pattern Recognition Approaches.
   - **(j)** Discuss Agglomerative Clustering.

SECTION – B

2. **Attempt any five parts of the following questions:**   **5 x 10 = 50**
   - **(a)** Discuss the Design Process of the Pattern Recognition System with suitable block diagram.
   - **(b)** What is Bay's Theorem? Explain. Also discuss Bay's Classifier using some example in detail.
   - **(c)** What do you mean by Clustering? Explain. Discuss K-means clustering algorithm with suitable example.
   - **(d)** What is a Discriminant Function? In a two class problem, the likelihood ratio is given as follows: $P(X|C_1) / P(X|C_2)$. Write the discriminant function in terms of the likelihood ratio.
   - **(e)** What do you mean by Dimension Reduction? Discuss Principal Component Analysis (PCA) algorithm for dimension reduction.
   - **(f)** What do you mean by Fuzzy Decision making? Also discuss the Fuzzy Classification using suitable example.
   - **(g)** Write an algorithm for K-Nearest Neighbor Estimation. Explain.
   - **(h)** Explain the following and discuss their significance in Pattern Recognition with suitable example :
     - (i) Mean and Covariance
     - (ii) Chi Square Test.

SECTION – C

Attempt any two parts of the following questions: **2 x 15 = 30**

3   What is Baysian Decision Theory? Discuss Two Class Category Classification in detail.

4   What is Hidden Markov Model (HMM)? Explain following in HMM:
   - (i) Forward Algorithm
   - (ii). Backward Algorithm.

5   **Write a short note on the following:**
  (i)   Parametric vs. Non-Parametric Pattern Recognition methods.
  (ii)   Parzen Windows
  (iii)   Bayesian estimation