(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2711 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. VII) THEORY EXAMINATION 2011–12

PATTERN RECOGNITION

Time : 3 Hours *Total Marks : 100*

Note :– (i) Attempt **all** questions.

(ii) Make suitable assumption if required.

1. Attempt any **two** parts : **(10×2=20)**

(a) What do you mean by pattern recognition ? Explain. Describe design principles of pattern recognition system with an example.

(b) (i) What do you mean by learning and adaptation ? Explain.

(ii) Write short note on pattern recognition approaches.

(c) Explain the following and discuss their significance in pattern recognition with suitable example :

(i) Mean and Covariance

(ii) Chi Square Test.

2. Attempt any **two** parts : **(10×2=20)**

(a) What is Bay's Theorem ? Explain. Also discuss Bay's Classifier using some example in detail.

(b) What is a discriminant function ? Discuss it in detail. 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.

(c) Describe the following with suitable example :
(i) Normal Density Function
(ii) Utility Theory.

3. Attempt any **two** parts : **(10×2=20)**

(a) What do you mean by dimension reduction ? Discuss Principal Component Analysis (PCA) algorithm for dimension reduction.

(b) Write short notes on the following :
(i) Maximum-Likelihood estimation.
(ii) Expectation-maximization

(c) Write a short note on Hidden Markov Model (HMM).

4. Attempt any **two** parts : **(10×2=20)**

(a) What do you mean by fuzzy decision making ? Also discuss the fuzzy classification using suitable example.

(b) Write an algorithm for K-Nearest neighbor estimation. Explain.

(c) Write a short note on the following :

(i) Parametric vs. non-parametric pattern recognition methods.

(ii) Parzen windows.

5. Write short notes on **two** of the following : **(10×2=20)**

(a) What do you mean by supervised learning and unsupervised learning ? Explain. Discuss any unsupervised learning algorithm with some example.

(b) What do you mean by clustering ? Explain. Discuss K-means clustering algorithm with suitable example.

(c) Write short notes on the following :

(i) Clustering vs. classification

(ii) Cluster validation.