

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

PAPER ID : 2711

Roll No.

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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.