

FACULTY OF INFORMATICS**B.E. 4/4 (IT) II-Semester (Main) Examination, April / May 2013****Subject : Pattern Recognition
(Elective - IV)****Time : 3 Hours****Max. Marks: 75****Note: Answer all questions of Part - A and answer any five questions from Part-B.****PART – A (25 Marks)**

1. Sketch a block diagram to represent a Pattern Recognition system. (3)
2. State Bayes formula and explain terms. (2)
3. What is Segmentation ? Give an example. (3)
4. Define Model Error and Bayes Error. (2)
5. How are error-rate and cost related? Explain. (3)
6. Bring out the significance of parameters estimation. (3)
7. State the goals of HMM. (3)
8. What are principal components of PCA? (2)
9. When can clustering be used in pattern Recognition? (2)
10. What is Decision Surface? (2)

PART – B (5x10=50 Marks)

- 11.(a) Describe the steps involved in design of pattern Recognition System. (5)
(b) Explain how Bayes Decision Theory help in classification. (5)
- 12.(a) Define expected Loss and Bayes Risk. Explain the significance of Bayes Risk in decision making. (6)
(b) Explain Error-Rate with the help of a suitable example. (4)
- 13.(a) Derive Linear Discriminant functions for normal density for the case $\Sigma_i = \sigma^2 I$. (7)
(b) For a minimum - distance classifier which uses linear discriminant functions, explain how a given feature vector is classified. (3)
- 14.(a) Explain Recursive Bayes Incremental Learning. (7)
(b) Write the basic assumptions made to deal with any situation as given in general theory of Bayesian parametric estimation, in which the unknown density can be parameterized. (3)
- 15.(a) For the HMM, state the following: (6)
(i) The Evaluation problem (ii) The Decoding problem (iii) The Learning problem
(b) Explain HMM Learning with the help of Forward-Backward algorithm. (4)
- 16.(a) Write the algorithm for Agglomerative Hierarchical clustering and explain. (5)
(b) Explain how principal component analysis reduces the dimensionality of feature space by reducing attention to those directions along which the scatter is greatest. (5)
- 17.(a) Explain Blind Source Separation in Independent Component Analysis. (5)
(b) Bring out the differences between PCA and ICA. (5)