

Total No. of Questions :12]

SEAT No. :

**P3440**

**[4959]-215**

[Total No. of Pages :3

**B.E. (Computer Engineering)  
PATTERN RECOGNITION**

**(2008 Course) (Semester - II) (Elective - III) (410450)**

*Time : 3 Hours]*

*[Max. Marks :100*

*Instructions to the candidates:*

- 1) *Answer any 3 questions from each section.*
- 2) *Answers to the two sections should be written in separate books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Assume suitable data, if necessary.*

**SECTION-I**

- Q1)** a) Describe steps involved in pattern recognition. [8]  
b) Compare supervised and unsupervised pattern recognition. [8]

OR

- Q2)** a) Explain learning and adaption methods in pattern recognition system. [8]  
b) What is unsupervised pattern recognition? State different methods and explain any one. [8]
- Q3)** a) Explain Bayesian classifier for defining risk for decision making. [8]  
b) Explain with example following terms: [8]
- i) Loss function
  - ii) Bayes risk
  - iii) Feature space
  - iv) Risk

OR

**P.T.O.**

- Q4)** a) Explain Bayes criterion and Maximum a Posteriori (MAP) criterion. [8]  
b) Explain linear discriminant function and decision hyper planes. [8]
- Q5)** a) Explain various parameter estimation methods of pattern classification. [8]  
b) Write a note on Expectation-maximization method. [10]

OR

- Q6)** a) Discuss maximum Likelihood approach used for parameter estimation. [8]  
b) Explain Gaussian mixture model for density estimation in detail? [10]

### **SECTION-II**

- Q7)** a) What is problem of finding the best direction? Explain how scatter matrix is useful to solve this problem. [8]  
b) What is the role of Dimension reduction in pattern recognition? State and explain different methods for Dimension reduction. [8]

OR

- Q8)** a) Explain how Hidden Markov Model (HMM) is effective to solve the problem of multiple decision? [8]  
b) Explain Principal component analysis for dimension reduction. [8]
- Q9)** a) Explain non-parametric techniques for density estimation? Explain Kernel density estimation. [8]  
b) Explain linear Support vector machine in detail. [8]

OR

- Q10)** a) Explain Quadratic and Polynomial discriminant function in detail. [8]  
b) Explain the steps involved in SVM training, in brief. [8]

- Q11)a)** Explain k-Means and fuzzy k-Means clustering algorithm in detail. [8]
- b) What is Non-metric data? State and explain the technique used for classification of Non-metric data. [10]

OR

- Q12)a)** What is the difference between classification and clustering? State and explain various techniques used for clustering. [8]
- b) Justify the significance of Root node, Descendent and Subtree in a classification problem using decision tree with suitable example. [10]

*EEE*