

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: EC467

Course Name: PATTERN RECOGNITION

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

Marks

- 1 a) Define discriminant function. Assuming that the densities $p(x/\omega_i)$ are multivariate Gaussian distribution, derive the discriminant function for normal density, when
a) $\Sigma_i = \sigma^2 I$ b) $\Sigma_i = \Sigma$ c) $\Sigma_i = \text{arbitrary}$.
Discuss the nature of decision surface in each case. (10)
- b) Explain Gaussian mixture models. (5)
- 2 a) Explain loss function? How can it be factored into Bayes Decision theory? (5)
- b) Explain the Principle Component Analysis for dimension reduction. (10)
- 3 a) Differentiate Supervised learning and Unsupervised learning (5)
- b) Explain the concept of expectation maximization with the help of an algorithm. (5)
- c) What is the significance of Hidden Markov Models in classifier design (5)

PART B

Answer any two full questions, each carries 15 marks.

- 4 a) Explain the stopping criteria for splitting of nodes in decision trees. Explain over fitting and pruning (8)
- b) Explain support vector machine classifiers. (7)
- 5 a) Compare Parzen window based method and k nearest neighbour based method for probability density function estimation. (8)
- b) With an algorithm explain the working of simple perceptron. (7)
- 6 a) Induce a decision tree to classify the fruits in a shop (8)
- b) Explain any Linear Discriminant based algorithm (7)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) Explain the working principle of back propagation neural networks with neat architecture diagram (10)

- b) Explain divisive algorithm of clustering. (10)
- 8 a) Examine the basic structure, types and working of artificial neural networks. (10)
- b) Given 7 two dimensional patterns $A=(1,1)$, $B=(1,2)$, $C=(2,2)$, $D=(6,2)$, $E=(7,2)$, $F=(6,6)$, $G=(7,6)$. Using k-means algorithm obtain 3 clusters. (10)
- 9 a) Why is an ensemble of classifiers better than a single classifier? (5)
- b) What are the similarities and differences between Bagging and Boosting? (5)
- c) Differentiate between clustering and classification. Explain the criteria function for clustering. (10)
