

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

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

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|---|----|--|------|
| 1 | a) | Differentiate between supervised and unsupervised learning with examples. | (6) |
| | b) | For a Bayesian classifier, obtain the discriminant function and decision surface for multivariate Gaussian distributions having same covariance matrix and distinct means. | (9) |
| 2 | a) | Explain expectation maximization algorithm. | (7) |
| | b) | Draw the block diagram of a pattern recognition system. Explain the terms i) features ii) training and iii) testing. | (8) |
| 3 | a) | Describe principal component analysis (PCA) as a technique for dimension reduction of features. | (10) |
| | b) | How mixture models are created using Gaussian densities? | (5) |

PART B

Answer any two full questions, each carries 15 marks.

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| 4 | a) | Discuss the non-parametric Parzen window method of estimating an unknown probability density function. | (9) |
| | b) | List different types of activation functions used in perceptron models. | (6) |
| 5 | a) | Explain k-Nearest-Neighbour method for estimating an unknown probability density function. | (8) |
| | b) | Explain the terms i) splitting of nodes ii) attribute selection iii) over-fitting, and iv) pruning in the context of decision trees. | (7) |
| 6 | a) | Illustrate the Perceptron algorithm for two linearly separable classes. | (8) |
| | b) | Describe a Support Vector Machine. | (7) |

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) How does a multi-layer perceptron solve the nonlinear classification problem? (10)
b) Compare between Bagging and Boosting algorithms. (10)
- 8 a) Describe artificial neural network with a diagram. (10)
b) Explain various criterion functions used in clustering. (10)
- 9 a) Illustrate the k-means algorithm in a pattern recognition systems (10)
b) Describe methods for cluster validation. (10)
