Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh semester B.Tech examinations (S), September 2020

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)	Explain the design cycle of a pattern recognition system.	(5)
	b)	Prove that a Bayes classifier is equivalent to a minimum distance classifier, assuming that the feature vector is Gaussian.	(10)
2	a)	Compare supervised, unsupervised and reinforcement learning techniques.	(6)
	b)	Explain the principal component analysis for dimensionality reduction.	(9)
3	a)	Explain Hidden Markov model and its role in the classifier design.	(10)
	b)	What is meant by the curse of dimensionality?	(5)

PART B

Answer any two full questions, each carries 15 marks.

4	a)	Explain the Parzen window method for density estimation.	(9)
	b)	What is pruning in decision tree construction? Explain its significance.	(6)
5	a)	Explain the Perceptron algorithm.	(10)
	b)	Explain the nonparametric methods for density estimation.	(5)
6	a)	Formulate SVM as an optimization problem. How support vector machines can be used for classification of data which are not linearly separable?	(10)
	b)	Illustrate the concept of a decision tree with the help of an example.	(5)

PART C

Answer any two full questions, each carries 20 marks.

7	a)	Explain the boosting approach in classifier ensembles. Give details of Adaboost algorithm.	(10)
	b)	What is X-OR problem in classification? With a neat diagram explain the solution of XOR problem.	(10)

8	a)	Explain artificial neural networks and its parameter optimisation techniques.	(10)
	b)	Define the criterion functions used in clustering.	(10)
9	a)	Differentiate between agglomerative and divisive clustering techniques.	(10)
	b)	Apply K-means clustering algorithm on given data for K=3. Use $C_1(2)$, $C_2(16)$, $C_3(38)$ as initial cluster centres. Data : 2,4,6,3,31,12,15,16,38,35,14,21,23,25,30.	(10)

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