Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S7 (R,S) Examination November 2025 (2019 Scheme).

Course Code: ECT463

Course Name: MACHINE LEARNING

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks. Marks

1		Compare supervised and unsupervised machine learning techniques.	(3)
2		Define training data set, validation data set and test data set.	(3)
3		Bias and variance help to determine the best fit model. Comment.	(3)
4		Explain how various regression models differ from each other.	(3)
5		Examine whether OR logical function can be implemented using a simple perceptron.	(3)
6		What do you mean by sigmoid function? Explain with necessary equation.	(3)
7		Explain single and complete linkage algorithm in clustering.	(3)
8		Ensemble method is better than a single classifier. Justify.	(3)
9		Explain the principle behind Principal Component Analysis.	(3)
10		Define False negative and True positive.	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	Explain overfitting and underfitting with necessary diagrams.	(10)
	b)	What is feature extraction and what is its significance?	(4)

OR

12	a)	Describe the term ‘curse of dimensionality’. Plot and explain how the performance of a classifier varies with increase in dimensionality.	(8)
	b)	In a school the total number of students is 300. 95 students play cricket only, 120 students play football only, 80 students play volleyball only and 5 students play no games. If randomly one student is chosen, find the probability that the student (i)plays volleyball. (ii)plays either cricket or volleyball. (ii)plays neither football nor volleyball.	(6)

Module II

13	a)	State and explain Bayes’ theorem. What is the difference between Priori probability and Posterior probability?	(6)

b) Explain how discriminant function can be used to decide the decision region. (8)

OR

14 a) Differentiate regression and classification with examples (8)

b) Three persons A, B and C have applied for a job in a private company. The chance of their selections is in the ratio 1 : 2 : 4. The probabilities that A, B and C can introduce changes to improve the profits of the company are 0.8, 0.5 and 0.3 respectively. If the change does not take place, find the probability that it is due to the appointment of C. (6)

Module III

15 a) With necessary diagrams, explain how SVM can be used for multiclass classification. (7)

b) Explain the Gradient Descent Algorithm used in machine learning. (7)

OR

16 a) Explain the perceptron algorithm used in classification. (8)

b) Explain the advantages and disadvantages of Support Vector Machine. (6)

Module IV

17 a) Compare agglomerative and divisive clustering**.** (6)

b) Illustrate the concept of decision tree using an example. (8)

OR

18 a) Apply K-means clustering algorithm on given data for K=2. Data set:(1,1), (1.5,2), (3,4), (5,7), (3.5,5), (4.5,5), (3.5,4.5) (9)

b) Illustrate Random Forest algorithm. (5)

Module V

19 a) Explain the terms confusion matrix, recall, precision and accuracy. (8)

b) Describe ROC curve and its significance with neat diagrams. (6)

OR

20 a) Describe Fisher Discriminant Analysis. (5)

b) Explain the different methods used for model evaluation. (9)

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