

GUJARAT TECHNOLOGICAL UNIVERSITY
PGDDS– SEMESTER - I EXAMINATION- SUMMER-2023

Subject Code: 1618003**Date: 26/06/2023****Subject Name: Fundamentals of Machine Learning****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make Suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Use of simple calculators and non-programmable scientific calculators are permitted.

- Q.1** (a) Define following terms with respect to machine learning: **03**
(i) precision (ii) overfitting (iii) concept learning
- (b) What is machine learning? What are key tasks of machine Learning? **04**
- (c) List and explain the types of machine learning in brief. **07**

- Q.2** (a) Discuss candidate-elimination algorithm. **03**
(b) What is Gibbs Algorithm? **04**
(c) What is perceptron? What is perceptron training rule? What are its limitations and by which rule these limitations can be overcome? **07**

OR

- (c) Explain how Naïve Bayes classifier is used in text classification. **07**
- Q.3** (a) Write two strength and weakness of Bayesian classifier. **03**
(b) What is Naïve Bayes classifier? Why is it named so? **04**
(c) What is inductive bias in a decision tree? How to avoid overfitting? Is there any effect on classification due to bias? **07**

OR

- Q.3** (a) Define following terms in decision tree. **03**
1) Leaf node 2) Entropy 3) Information gain
- (b) Consider the following confusion matrix of the win/loss prediction of cricket match. Calculate model accuracy and error rate for the same. **04**

	Actual Win	Actual Loss
Predicted Win	82	7
Predicted Loss	3	8

- (c) Write ID3 Decision Tree Algorithm and explain with suitable example. **07**
- Q.4** (a) Briefly explain Multilayer Feed Forward NN. **03**
(b) Why do we require Pruning in Decision Trees? Explain. **04**
(c) Describe CART. Explain with suitable example. **07**

OR

- Q.4** (a) What is threshold activation function in ANN? **03**
(b) Design a multi-layer perceptron to implement A XOR B. **04**
(c) Describe, in details, the process of adjusting the interconnection weights in a multi-layer neural network. **07**

- Q.5** (a) Briefly explain the properties of Gini Impurity in decision tree. **03**
(b) Discuss application of ANN in face recognition. **04**
(c) Explain Confusion Matrix with respect to detection of "Spam e-mails". **07**

OR

- Q.5** (a) Briefly explain EM Algorithm. **03**
(b) What is recommender system? How machine learning methods can be useful in it? **04**
(c) Explain the concept of Prior, Posterior, and Likelihood with an example. **07**