Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER- VII EXAMINATION-SUMMER 2023

Subject Code: 3170724   **Date: 21/06/2023**
Subject Name: Machine Learning
Time: 10:30 AM TO 01:00 PM   **Total Marks: 70**
Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Compare Different types of Machine Learning	**03**
	(b)	What is Machine Learning? List out its applications and possible ethical issues of machine learning applications?	**04**
	(c)	What do you mean by a well-posed learning problem? Explain important features that are required to well-define a learning problem.	**07**
Q.2	**(a)**	Explain the concept of penalty and reward in reinforcement learning.	**03**
	(b)	What is outlier? How can we take care of outliers?	**04**
	(c)	Consider the following confusion matrix of the win/loss prediction of cricket match. Calculate model accuracy and error rate, sensitivity, precision, F-measure and kappa value for the same.	**07**

	Actual Win	Actual Loss
Predicted Win	85	4
Predicted Loss	2	9

OR

	(c)	While predicting malignancy of tumor of a set of patients using a classification model, following are the data recorded: (a) Correct predictions – 15 malignant, 75 benign (b) Incorrect predictions – 3 malignant, 7 benign Calculate the model accuracy, error rate, Kappa value, sensitivity, precision, and F-measure of the model.	**07**
Q.3	**(a)**	What are the basic data types in machine learning? Give an example of each one of them.	**03**
	(b)	Explain the process of K-fold-cross-validation method	**04**
	(c)	Explain with an example, main underlying concept of feature extraction. What are the most popular algorithms of feature extraction, briefly explain any one.	**07**

OR

Q.3	**(a)**	What are the different techniques for data pre-processing? Explain in brief	**03**
	(b)	What is sampling? Explain Bootstrap sampling.	**04**
	(c)	What is feature selection? Why it is needed? What are the different approaches of feature selection, briefly explain any one.	**07**

Q.4	**(a)**	What is joint probability? What is its formula?	**03**
	(b)	What is likelihood probability? Give an example	**04**
	(c)	Explain the Apriori algorithm for association rule learning with an example.	**07**

OR

Q.4	**(a)**	Define probability of union of two events with equation.	**03**
	(b)	What is concept learning? Explain with example	**04**
	(c)	What is supervised learning? Draw and explain classification steps in detail.	**07**

Q.5	**(a)**	Explain dependent variable and an independent variable in a linear equation with example.	**03**
	(b)	Explain Decision tree algorithm	**04**
	(c)	Explain in detail, the backpropagation algorithm. What are the limitations of this algorithm?	**07**

OR

Q.5	**(a)**	Write the strength and weakness of decision tree method.	**03**
	(b)	Explain K-mean clustering algorithm	**04**
	(c)	What are the different types of activation functions popularly used? Explain each of them.	**07**

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