Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2021

Subject Code:3170724 Date:17/12/2021

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)**	Give the difference between supervised learning and unsupervised learning.	**03**
	(b)	Explain the concept of penalty and reward in reinforcement learning.	**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)**	How can we take care of outliers in data?	**03**
	(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)	Explain SVD as a feature extraction technique with suitable example.	**07**
		OR	
	(c)	Explain K-fold cross validation method with suitable example.	**07**
Q.3	**(a)**	If 3% of electronic units manufactured by a company are defective. Find the probability that in a sample of 200 units, less than 2 bulbs are defective.	**03**
	(b)	Explain how Naïve Bayes classifier is used for Spam Filtering.	**04**
	(c)	Discuss appropriate problems for decision tree learning in detail.	**07**
		OR	
Q.3	**(a)**	In a communication system each data packet consists of 1000 bits. Due to the noise, each bit may be received in error with probability 0.1. It is assumed bit errors occur independently. Find the probability that there are more than 120 errors in a certain data packet.	**03**
	(b)	What is likelihood probability? Give an example.	**04**
	(c)	Discuss the error rate and validation error in the kNN algorithm.	**07**
Q.4	**(a)**	Explain sum of squares due to error in multiple linear regression with example.	**03**
	(b)	Describe the concept of single link and complete link in the context of hierarchical clustering.	**04**
	(c)	Explain how the Market Basket Analysis uses the concepts of association analysis.	**07**
		OR	
Q.4	**(a)**	Explain dependent variable and an independent variable in a linear equation with example.	**03**
	(b)	Describe the main difference in the approach of k-means and k-medoids algorithms with a neat diagram.	**04**
	(c)	Explain the Apriori algorithm for association rule learning with an example.	**07**

Q.5	**(a)**	What are the conditions of a negative slope in linear regression?	**03**
	(b)	Explain Rosenblatt's perceptron model.	**04**
	(c)	Describe, in details, the process of adjusting the interconnection weights in a multi-layer neural network.	**07**

OR

Q.5	**(a)**	What are the factors determining the effectiveness of SVM?	**03**
	(b)	Draw a flow chart which represents backpropagation algorithm.	**04**
	(c)	Explain, with example, the challenge in assigning synaptic weights for the interconnection between neurons? How can this challenge be addressed?	**07**

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