Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2023

Subject Code:3171114 Date:08-12-2023

Subject Name: Introduction of 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 comparison between Supervised Learning and Unsupervised Learning.	**03**
	(b)	Give reasons for overfitting and provide options to resolve overfitting problem.	**04**
	(c)	Discuss K- Nearest Neighborhood classification method with its advantages and disadvantages.	**07**
Q.2	**(a)**	Write down names of three approaches for feature selection.	**03**
	(b)	At a certain University,4% of men are above 6 feet tall and 1% of women are over 6 feet tall. The total student population is divided in the ratio of 3:2 in favor of woman. If a student is selected at random from among all those over six feet tall, what is the probability that the student is woman?	**04**
	(c)	Write three techniques to measure feature redundancy and explain each in detail.	**07**
		OR	
	(c)	A mechanical factory production line is manufacturing bolts using three machines, A, B and C. The total output, machine A is responsible for 25%, machine B for 35% and machine C for the rest. The machines that 5% of the output from machine A is defective, 4% from machine B and 2% from machine C. A bolt is chosen at random from the production line and found to be defective. What is the probability that it came from (1) Machine A (2) Machine B (3) Machine C.	**07**
Q.3	**(a)**	Write down applications of Support Vector Machine (SVM) classifier.	**03**
	(b)	Give advantages and disadvantages of K – means Clsutering algorithm.	**04**
	(c)	Differentiate between Clustering and Classification.	**07**
		OR	
Q.3	**(a)**	Write down desirable properties of Clustering Algorithm.	**03**
	(b)	Give a comparison between SVM and Neural Network.	**04**
	(c)	Explain the need for Kernel Method in SVM and explain use of Kernel Method in SVM.	**07**
Q.4	**(a)**	Write advantages of Neural Network.	**03**
	(b)	Write down the steps for the selection of number of hidden units for backpropagation method.	**04**
	(c)	Explain Adaptive Linear Neuron (ADALINE) Network Model in detail.	**07**
		OR	
Q.4	**(a)**	Write application of Neural Network.	**03**
	(b)	Write the advantages and disadvantages of Backpropagation method.	**04**
	(c)	Explain Multi Layer Feed Forward Network in detail.	**07**
Q.5	**(a)**	Define Cross Validation.	**03**
	(b)	Explain Variance reduction and Bias reduction in the context of Ensemble	**04**

Method.

	(c)	Explain Vapnik- Chervonenkis (VC) dimension in detail.	**07**

OR

Q.5	**(a)**	Write equations for Accuracy rate, recall, and Specificity in terms of True Positive (TP), true Negative (TN), False positive (FP), and False Negative (FN).	**03**
	(b)	Explain Voting and Stacking approaches for Combining Ensemble methods.	**04**
	(c)	Write down the steps for Bagging and mention its advantages and disadvantages.	**07**

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