Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – SUMMER 2025

Subject Code:3170724 Date:08-05-2025

Subject Name: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. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	What is machine learning? What are key tasks of machine learning?	**03**
	(b)	What do you mean by a well-posed learning problem? Explain important features that are required to well-define a learning problem.	**04**
	(c)	Explain qualitative and quantitative data in details. Differentiate between the two.	**07**
Q.2	**(a)**	What are different shapes of histogram? What are 'bins'?	**03**
	(b)	Explain, in details, the different strategies of addressing missing data values.	**04**
	(c)	Write a short note on: holdout method.	**07**
		OR	
	(c)	Write a short note on: lazy vs. eager leaner.	**07**
Q.3	**(a)**	What is a feature? Explain with an example.	**03**
	(b)	What is conditional probability means? What is the formula of it?	**04**
	(c)	What are Bayesian Belief networks? Where are they used? Can they solve all types of problems?	**07**
		OR	
Q.3	**(a)**	Differentiate feature transformation with feature selection.	**03**
	(b)	What is Poisson distribution? What is the formula?	**04**
	(c)	What is regression? Differentiate between logistic and linear regression with suitable example.	**07**
Q.4	**(a)**	What is cost of misclassification in SVM?	**03**
	(b)	What are the advantages of the *k*NN algorithm?	**04**
	(c)	Distinguish between supervised learning, semi-supervised learning, and unsupervised learning.	**07**
		OR	
Q.4	**(a)**	What are the factors determining the effectiveness of SVM?	**03**
	(b)	What are the disadvantages of the *k*NN algorithm?	**04**
	(c)	What is overfitting in decision tree? Explain the technique to avoid the overfitting.	**07**
Q.5	**(a)**	What is a dendrogram? Explain its use.	**03**
	(b)	Explain about Hierarchical clustering algorithm.	**04**
	(c)	Explain the basic structure of a multi-layer perceptron. Explain how it can solve the XOR problem.	**07**

OR

Q.5	**(a)**	What are different clustering techniques?	**03**
	(b)	Explain about EM algorithm.	**04**
	(c)	Explain, in details, the backpropagation algorithm. What are the limitations of this algorithm?	**07**

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