Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VII EXAMINATION – WINTER 2025

Subject Code:3170724 Date:13-11-2025

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)**	Define Machine Learning & Human Learning. Give at least two differences between machine learning and human learning.	**03**
	(b)	What is reinforcement learning? State key features of reinforcement learning.	**04**
	(c)	State the different techniques for data pre-processing? Explain, in brief, dimensionality reduction and feature selection.	**07**
Q.2	**(a)**	What is under-fitting in context of machine learning models? State its major causes.	**03**
	(b)	Can all problems be solved using machine learning? Explain your response in detail.	**04**
	(c)	How would you evaluate the success of an unsupervised learning model? What are the most popular measures of performance for an unsupervised learning model? Explain any two with example.	**07**
		OR	
	(c)	What is feature selection in context of machine learning? Why is it needed? List the different approaches of feature selection? Explain any one with example.	**07**
Q.3	**(a)**	What are predictive models? Explain with the help of an example.	**03**
	(b)	What are the different types of supervised learning? Explain them with a sample application in each area.	**04**
	(c)	Explain Naïve Bayes classifier with an example of its use in practical life.	**07**
		OR	
Q.3	**(a)**	What are descriptive models? Explain with the help of an example.	**03**
	(b)	What are the different types of unsupervised learning? Explain them with a sample application in each area.	**04**
	(c)	Discuss the kNN model in detail.	**07**
Q.4	**(a)**	Explain curve linear negative slope and curve linear positive slope in a graph.	**03**
	(b)	What are Bayesian Belief networks? Where are they used? Can they solve all types of problems?	**04**
	(c)	Write a short note on: SVM.	**07**

OR

Q.4	**(a)**	Define simple linear regression using a graph. Explain slope and intercept.	**03**
	(b)	What is decision tree? What are the different types of nodes? Explain with example.	**04**
	(c)	How does the apriori principle help in reducing the calculation overhead for a market basket analysis? Explain with an example.	**07**
Q.5	**(a)**	What is deep learning? Explain in brief with an example.	**03**
	(b)	Explain density-based methods.	**04**
	(c)	Explain the learning process of an ANN. Explain, with example, the challenge in assigning synaptic weights for the interconnection between neurons? How can this challenge be addressed?	**07**

OR

Q.5	**(a)**	Define probability of union of two events with equation.	**03**
	(b)	What is likelihood probability? Explain with an example.	**04**
	(c)	Describe the structure of an artificial neuron. How is it similar to a biological neuron? Explain its main components?	**07**

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