Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

School of Computer Science and Engineering

Mid - Term Examinations - November 2024

Semester: V

Date: 04-11-2024

Course Code: CSE3001

Time: 09.30am to 11.00am

Course Name: Artificial Intelligence and Machine Learning

Max Marks: 50

Program: B. Tech

Weightage: 25%

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks. 5Qx2M=10M

1	Define rational agent?	2 Marks	L1	CO1
2	Is AI a science, or is it engineering? Or neither or both? Explain.	2 Marks	L1	CO1
3	Differentiate between Training data and Testing Data?	2 Marks	L1	CO2
4	How Regression differ from classification?	2 Marks	L1	CO2
5	Differentiate between Supervised and Unsupervised Machine Learning?	2 Marks	L1	CO2

Part B

Answer ALL Questions. Each question carries 10 marks. 4QX10M=40M

6	Describe a scenario where a model-based reflex agent would outperform a simple reflex agent with proper diagram?	10 Marks	L2	CO1
	or			
7	Demonstrate how a utility-based agent can handle uncertain market conditions better than a goal-based agent with proper diagram?.	10 Marks	L2	CO1

8	"Every human, animal and bird is living thing who breathe and eat. All birds can fly. All man and woman are humans who have two legs. Cat is an animal and has a fur. All animals have skin and can move. Giraffe is an animal who is tall and has long legs. Parrot is a bird and is green in colour". Construct a semantic network to represent these relationships.	10 Marks	L2	CO1

or

9	Given the following set of relationships: A dog is an animal. A dog has four legs. A dog can bark. A bird is an animal. A bird can fly. An animal needs food. Construct a semantic network to represent these relationships. Explain how this network could be used to infer that a bird also needs food.	10 Marks	L2	CO1

10	Given the data on prices and the corresponding demand for a product:	10 Marks	L3	CO2

Price (Rs.)	**10**	**12**	**13**	**12**	**16**	**15**
Demand	40	38	43	45	37	43

1. Calculate the regression line equation that predicts demand based on the price of the product.
2. Estimate the likely demand when the price of the product is Rs. 20.
3. Explain the significance of the slope and intercept in this regression model.

or

11	Calculate the regression line equation and predict the missing value for the following data.	10 Marks	L3	CO2

X	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Y	**9**	**8**	**10**	**NA**	**12**	**11**	**13**

12	Using the following dataset, manually construct a decision tree by calculating the **Entropy** and **Information Gain** at each split. You must decide the best attribute for the root node.	10 Marks	L3	CO2

Outlook	Temperature	Humidity	Play Tennis
Sunny	Hot	High	No
Sunny	Mild	Normal	Yes
Overcast	Cool	Normal	Yes
Rainy	Mild	High	No
Rainy	Cool	Normal	Yes

or

13	Apply the **Gini Index** to evaluate the attribute "Marital Status" in the dataset below. Would you recommend this as a good attribute for the first split in a Decision Tree? Justify your answer.	10 Marks	L3	CO2

Marital Status	Credit Score	Approve Loan
Single	Good	Yes
Married	Poor	No
Divorced	Fair	Yes
Married	Good	Yes
Single	Poor	No