UPES
End Semester Examination, December 2023

Course: Machine Learning -Using Data   Semester: III
Program: MCA (All branches)   Time   : 03 hrs.
Course Code: CSAI8002P   Max. Marks: 100

Instructions: Attempt every questions.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Discuss the Artificial intelligence , that can be integrated into healthcare practices to optimize patient health results.	4	CO1
Q 2	Given a dataset of customer transactions, which machine learning algorithm would you use to segment customers into groups and why?	4	CO2
Q 3	Assess the impact of AI in the education sector, considering both the potential benefits and drawbacks.	4	CO3
Q 4	Analyze the principles of unsupervised learning techniques and illustrate their importance through a specific application.	4	CO1
Q 5	Examine the concept of a hyperplane and appraise its role in the functionality of Support Vector Machines (SVM).	4	CO4

SECTION B
(4Qx10M= 40 Marks)

Q 6	Given the following predicted and actual class labels for a binary classification model, compute the True Positive (TP), True Negative (TN), False Positive (FP), and False Negative (FN), and subsequently calculate the Accuracy, Precision, and Recall. Actual Labels: [1, 0, 1, 1, 0, 1, 0, 1, 0, 1] and Predicted Labels: [1, 0, 1, 0, 0, 1, 0, 1, 1, 1].	10	CO5
Q 7	Discuss the general steps of implementing the machine learning model for performing binary class classification.	10	CO4
Q 8	Discuss the difference between the training and tuning the machine learning model.	10	CO3
Q 9	Discuss the difference between Linear Regression and Multiple Regression with appropriate example. OR Discuss the Importance of Hyperplane in Support Vector Machine with appropriate example.	10	CO3

SECTION-C
(2Qx20M=40 Marks)

Q 10	The data includes the age of the car (in years), mileage (in thousands of miles), and the current selling price (in dollars). Here are the details for three of the cars: Car 1: Age 3 years, 30,000 miles, Selling Price $15,000 Car 2: Age 5 years, 50,000 miles, Selling Price $10,000 Car 3: Age 2 years, 20,000 miles, Selling Price $18,000 Car 4: Age 4 years, 50,000 miles, Selling Price $12,000	20	CO5

	Car 3: Age 3 years, 25,000 miles, Selling Price $17,000 construct a multiple regression model to predict the selling price of a car based on its age and mileage. Provide the regression equation and interpret the coefficients for each predictor variable. <center>OR</center> You are working in the marketing department of a company. To understand the effectiveness of different marketing channels, you have been provided with monthly data that includes the amount spent on online advertising, the amount spent on television advertising, the amount spent on radio advertising, and the total sales for the month. Here is a portion of the data: Month 1: Online $20,000, TV $15,000, Radio $5,000, Sales $200,000 Month 2: Online $25,000, TV $20,000, Radio $6,000, Sales $240,000 Month 3: Online $30,000, TV $22,000, Radio $4,000, Sales $260,000 Month 4: Online $35,000, TV $24,000, Radio $4,500, Sales $265,000 Month 5: Online $40,000, TV $26,000, Radio $4,550, Sales $269,000 Formulate a multiple regression model to determine how each type of marketing spend affects sales. Explain your model's findings and what they might suggest about where to allocate marketing resources.		
Q11	Define Ensemble Learning and elaborate on its significance in machine learning. Provide examples of different ensemble methods and explain how they improve the performance of single model predictions. <center>OR</center> Describe what a Regression Tree is and how it differs from a Decision Tree. Discuss its use in modeling where the target variable is continuous, detailing how it predicts the outcome.	**20**	**CO2**