Graphic Era

Term Evaluation (Even) Semester Examination March 2025

Roll no...............................

Name of the Course: MCA
Semester: II
Name of the Paper: Machine Learning-1
Paper Code: TMC211
Time: 1.5 hour   **Maximum Marks: 50**

Note:
(i)   Answer all the questions by choosing any one of the sub-questions
(ii) Each question carries 10 marks.

Q1.   (10 Marks)
a. Define machine learning and describe its three main approaches: Supervised, Unsupervised, and Reinforcement Learning. Provide examples of real-world applications for each approach.   CO1
<center>OR</center>
b. Consider the following dataset:

X	1	2	3	4	5
Y	2	3	5	5	5

Use linear regression to determine the equation of the best-fitting line. Specifically, calculate the slope(m) and the intercept(b) of the line.   CO2

Q2.   (10 Marks)
a. Explain the following data types with an example of each.   CO1
(i) Numerical data
(ii) Discrete data
(iii) Continuous data
(iv) Categorical data
<center>OR</center>
b. Consider the following dataset

X1	6	46	14	46
X2	5	11	14	6
Y	1	0	1	0

Apply the logistic regression using gradient descent. The initial values of the weights are: w0=1, w1=1, w2=1 and the learning rate (α) is 0.5. Perform the first iteration of gradient descent and calculate the updated values of the weights w0, w1 and w2.   CO2

Q3.   (10 Marks)
a. What is Scikit-learn? Discuss its features and functionalities for ML model development.   CO1
<center>OR</center>
b. A classification model has the following confusion matrix for a test dataset:

	Predicted Value	Predicted Negative
Actual Positive	50	10
Actual Negative	5	35

Calculate the accuracy, precision, recall and F1-score of the model.   CO2

Q4.
(10 Marks)
a. Discuss bias-variance tradeoff in Machine Learning. How does it impact model generalization?   CO1

OR

b. Consider the following dataset:

Maths Score	80	70	60	85	65
Science Score	70	80	60	75	65
Status	Pass	Pass	Fail	Pass	Fail

Classify a new student with a Math score of 75 and a Science score of 72 using KNN with k=3.   CO2

Q5.
(10 Marks)
a. What are NumPy and Pandas? Explain their role in data preprocessing and manipulation in Machine Learning projects.   CO1

OR

b. Explain decision tree classification algorithm. Also discuss attribute selection methods.   CO2