

IV B. TECH I SEMESTER REGULAR EXAMINATIONS, NOVEMBER - 2023
MACHINE LEARNING
(COMMON TO CSE, CIC & AID BRANCHES)

Time: 3 hours

Max. Marks: 70

Note : Answer ONE question from each unit (5 × 14 = 70 Marks)

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UNIT-I

- 1 What do you mean by a well –posed learning problem? Explain the important features that are required to well –define a learning problem [14M]

(OR)

- 2 a) Write short notes on PAC learning. [7M]  
 b) Explain in detail about the models of Machine Learning. [7M]

UNIT-II

- 3 Write ID3 Algorithm and explain the procedure in building a decision tree from the dataset given below. [14M]

| S.No. | Age         | Income | Student | Credit-rating | Class label:<br>Buys<br>Computer(Yes/NO) |
|-------|-------------|--------|---------|---------------|------------------------------------------|
| 1     | youth       | high   | No      | fair          | No                                       |
| 2     | youth       | high   | No      | excellent     | No                                       |
| 3     | Middle-aged | high   | No      | fair          | Yes                                      |
| 4     | Senior      | medium | No      | fair          | Yes                                      |
| 5     | Senior      | low    | Yes     | fair          | Yes                                      |
| 6     | Senior      | low    | Yes     | excellent     | Yes                                      |
| 7     | Middle-aged | low    | Yes     | excellent     | Yes                                      |
| 8     | youth       | medium | No      | fair          | No                                       |

(OR)

- 4 a) Explain about Multi class and Multi-label classification. [7M]  
 b) Discuss in detail about Logistic regression. [7M]

UNIT-III

- 5 a) Explain the concept of a Perceptron with a neat diagram. [ 7M]  
 b) Describe Support Vector machines classifier. [ 7M]

(OR)

- 6 Explain in detail about the probabilistic models with examples. [14M]

UNIT-IV

- 7 For the 2D data, {(1, 1), (1, 3), (3, 1), (3, 3), (11, 11), (11, 13), (13, 11), (13, 13)}. Apply K-means clustering with K=2. Let the initial seed point be (1,3) and (13,11). Clearly show the steps followed by the method. Draw appropriate diagrams at each stage. [14M]

(OR)

- 8 a) Given two objects represented by the tuples (22,1, 42, 10) and (20, 0, 36, 8) [7M]  
(i) Compute the Euclidian distance between the two objects  
(ii) Compute the Manhattan distance between the two objects  
(iii) Compute the Minkowski distance between two objects using  $q = 3$ .  
b) Interpret the Outlier analysis with example. [7M]

UNIT-V

- 9 a) Describe ensemble learning methods in detail. [7M]  
b) Write short notes on Bagging and Boosting. [7M]

(OR)

- 10 Illustrate Error correcting output codes in detail with suitable examples. [14M]

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