

**CMR ENGINEERING COLLEGE: : HYDERABAD**  
**UGC AUTONOMOUS**

**II-M.TECH-I-Semester End Examinations (Regular) - January- 2026**  
**AI AND MACHINE LEARNING (PE-V)**  
**(VLSI SD)**

**[Time: 3 Hours]**

**[Max. Marks: 60]**

**Note:** This question paper contains two parts A and B.

Part A is compulsory and carries 10 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, and c as sub-questions.

**PART-A**

**(10 Marks)**

1. a) What are the functions used in a Decision Tree? [1M]
- b) What is Ranking? [1M]
- c) What is dimensionality reduction? Give its importance in learning. [1M]
- d) What is the main purpose of principal component analysis? [1M]
- e) What is statistical Learning? [1M]
- f) State Bagging. [1M]
- g) Why XOR problem cannot be solved by a single-layer Perceptron? [1M]
- h) How does the backpropagation algorithm works? [1M]
- i) State Inference mechanism. [1M]
- j) List defuzzification methods in Fuzzy neural networks. [1M]

**PART-B**

**(50 Marks)**

- 2.a) Machine Learning Can't Solve Every Problem". Is this statement correct? Give justification for your answer with proper explanation. [5M]
- b) Summarize linear classification in detail. [5M]

**OR**

- 3.a) Explain multi-class classification and probabilities. [5M]
- b) What is binary classification? Explain scoring and ranking. [5M]
4. What do you mean by unsupervised learning? Explain about various types of unsupervised learning. [10M]

**OR**

5. How is Principal Component Analysis (PCA) used in dimensionality reduction? Explain. [10M]

6. Describe the statistical Learning theory in detail. [10M]

**OR**

7. How does the random forest model work? How is it different from bagging and boosting in ensemble models? [10M]
8. How does an Artificial neural network work, and how it differs from a Biological neural network? [10M]

**OR**

- 9.a) Why do we need Backpropagation in multilayer neural networks? Explain. [5M]
- b) With a suitable example discuss a radial basis function network. [5M]

10. Elaborate on the Knowledge Representation and Inference mechanism. [10M]

**OR**

11. Illustrate defuzzification methods in Fuzzy neural networks. [10M]

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