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Class Roll No.....

**Second Mid Semester Examination, JUNE 2024**

**Programming Elective - Branch: CSE/AIML Semester: V**

**Time 1:30 Hrs**

**Max. Marks 20**

**Q.1 a) What is Clustering in Machine Learning? Explain K-Means and DBSCAN algorithms.**

**b) What is Dimensionality Reduction. Explain PCA with example.**

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**OR**

**a) What is Anomaly Detection? Explain statistical and ML-based methods.**

**b) Explain Association Rule Mining with Apriori and FP-Growth algorithm. (CO3 7 marks )**

**Q.2 a) Explain Ensemble Learning. Compare Bagging and Boosting with examples.**

**B) What is Random Forest and how does it improve prediction accuracy?**

**OR**

**(CO4 7 marks )**

**a) what is Hyperparameter Tuning? Explain Grid Search and Random Search with examples.**

**b) What are underfitting and Overfitting? How can Cross-Validation help mitigate them?**

**Q.3.a) Explain the architecture of a multilayer perceptron (MLP). What are activation functions?**

**b) What is Backpropagation? Explain the training process using Gradient Descent.**

**OR**

**(CO5 6 marks)**

**a) What is Reinforcement Learning? Explain Markov Decision Process (MDP) and Q-Learning.**

**b) Write a short note on Fairness and Explainability in ML. Why are they important?**

