Question Paper Code: R22A31CS04

R22

ANURAG Engineering College

(An Autonomous Institution)

III B.Tech I Semester Regular Examinations, December – 2024

MACHINE LEARNING

(ARTIFICIAL INTELLIGENCE & MACHINE LEARNING)

Time: 3 Hours **Max. Marks: 60**

Section – A (Short Answer type questions) (10 Marks)

Answer All Questions	Course Outcome	B.T Level	Marks
1. Define Perspectives and Issues in Machine Learning	CO1	L1	1M
2. Define Concept Learning	CO1	L1	1M
3. What is the purpose of hidden layers in Multi-layer Perceptron?	CO2	L1	1M
4. What does PCA do in terms of data transformation?	CO2	L1	1M
5. What is the main purpose of a decision tree in machine learning?	CO3	L1	1M
6. How do Support Vector Machines handle multi-class classification problems since SVM is inherently binary?	CO3	L1	1M
7. What is the main purpose of a Self-Organizing Feature Map (SOM)?	CO4	L1	1M
8. What are some potential issues with the K-means algorithm?	CO4	L1	1M
9. What is the main goal of reinforcement learning in the context of Markov Decision Processes (MDPs)?	CO5	L1	1M
10. What is the main idea behind bagging in ensemble learning?	CO5	L1	1M

Section B (Essay Questions)

Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A)	Explain the version space concept and how the Candidate-Elimination algorithm works to eliminate hypotheses and narrow down the space.	CO1	L2	10M
	OR			
B)	Develop a simple learning system for a classification task.	CO1	L3	10M
12. A)	Explain how the perceptron algorithm works for binary classification and compare it with linear regression.	CO2	L2	10M
	OR			
B)	Explain the theoretical foundations of Principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA) for dimensionality reduction.	CO2	L2	10M
13. A)	Describe the concept of Support Vector Machines (SVM) and how they find the optimal hyperplane to separate different classes.	CO3	L2	10M
	OR			
B)	Explain the structure and working of a decision tree with an example.	CO3	L2	10M
14. A)	Describe the K-means clustering algorithm in detail.	CO4	L2	10M
	OR			

	B) Explain how the Expectation-Maximization (EM) algorithm used to fit a GMM?	CO4	L2	10M
15.	A) Explain the Value Iteration algorithm used for solving a Markov Decision Process. How does it compute the optimal policy, and what are its key steps?	CO5	L2	10M
	OR			
	B) Explain the concept of Random Forests and explain the importance of bootstrap aggregation (bagging).	CO5	L2	10M