

TILAK MAHARASHTRA VIDYAPEETH, PUNE
MASTER OF COMPUTER APPLICATIONS
(Specialization in Artificial Intelligence & Machine Learning)
EXAMINATION : JANUARY- 2025
SEMESTER - III
Sub: Reinforcement Learning (MCAI 23-305)

Date :11/01/2025

Total Marks :60

Time: 10.00 pm to 12.30 pm

Instruction:

1. All questions are compulsory unless and otherwise stated.
2. Bold figures to the right of every question are the maximum marks for that question.
3. Candidates are advised to attempt questions in order.
4. Answers written illegibly are likely to be marked zero.
5. Use of scientific calculators, Log tables, Mollier Charts is allowed.
6. Draw neat and labelled diagram wherever necessary.

Q.1. Answer the following in 2-3lines. (Any 5) (10)

1. Give two examples of reinforcement learning, with reason why these examples belong to category of reinforcement learning?
2. What is the primary characteristic of a Markov Decision Process (MDP)?
3. What does the policy in reinforcement learning specify?
4. What is the key difference between model-based and model-free methods in reinforcement learning?
5. What is the purpose of the Bellman equation?
6. Differentiate between exploration and exploitation in reinforcement learning?
7. What does Batch Reinforcement Learning primarily focus on?

Q. 2. Answer the following in short. (Any 4) (20)

1. What is Function Approximation in Reinforcement Learning?
2. What are hierarchical approaches in reinforcement learning?
3. Explain with justification - which algorithm from among Q-Learning, SARSA, Kernel-Based Approximate Dynamic Programming, and Deep Q-Network uses kernel-based approximate dynamic programming?
4. Explain the concept of policy in reinforcement learning.
5. What are the key differences between value-based and policy-based reinforcement learning?
6. What is a Markov Decision Process (MDP) in continuous state spaces?

Q. 3. Answer the following in detail. (Any 3) (30)

1. Explain in detail the elements of reinforcement learning giving one example.
2. Explain the significance of solving relational and first-order logical Markov decision processes (MDPs) in reinforcement learning.
3. Explain evolutionary computation and its role in RL.
4. How does Approximate Reinforcement Learning differ from Tabular RL? Explain its challenges.
5. What are the approaches to Hierarchical Reinforcement Learning, and how do they improve learning efficiency?
