

316323

25226

3 Hours / 70 Marks

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Use of Non-programmable Electronic Pocket Calculator is permissible.
(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : 10
- a) Enlist applications of Reinforcement Learning in recommendation systems.
 - b) Describe the role of an Agent in the RL environment.
 - c) Define Reinforcement Learning.
 - d) State Multi-armed Bandit problem.
 - e) State the meaning of $V(s)$ in the Bellman value function.
 - f) Define off-policy learning.
 - g) Define Temporal Difference learning in reinforcement learning.

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- 2. Attempt any THREE of the following : 12**
- a) Explain the main components of Reinforcement Learning.
 - b) Explain the role of ϵ (epsilon) in the ϵ -greedy algorithm.
 - c) Differentiate between Value Iteration and Policy Iteration.
 - d) Explain different Monte Carlo control methods.
- 3. Attempt any THREE of the following : 12**
- a) Differentiate between Markov Chain and Markov Reward Process (MRP).
 - b) Describe the working of the Q-function Bellman equation.
 - c) Explain the role of Monte Carlo methods in Reinforcement Learning and list its key characteristics.
 - d) Explain the TD prediction update rule and interpret each term.
- 4. Attempt any THREE of the following : 12**
- a) Differentiate between Model-based learning and Model-free learning.
 - b) Explain exploration and exploitation trade-off with example.
 - c) Describe the practical importance of Bellman equations in real-time applications.
 - d) Differentiate between On-policy and Off-policy Monte Carlo control.
 - e) Explain the basic idea of Temporal Difference learning with suitable reasoning.

5. Attempt any TWO of the following : 12

- a) Differentiate between Supervised Learning, Unsupervised Learning. (Any six point)
- b) Explain Markov Decision Process with components.
- c) Describe step-by-step computation of state value using Bellman equation for a two-state system.

6. Attempt any TWO of the following : 12

- a) Explain the different types of environments in Reinforcement Learning.
 - b) Describe Every-Visit Monte Carlo prediction with a suitable episode example.
 - c) Differentiate between SARSA and Q-learning. (Any six point)
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