Total No. of Questions : 8]

SEAT No. :

PB2513

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B.E. (Artificial Intelligence and Data Science)

REINFORCEMENT LEARNING

(2019 Pattern) (Semester-VIII) (Elective-VI) (417533 D)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q. 5 or Q. 6, Q. 7 or Q. 8.***
2) ***Neat diagrams must be drawn whenever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data, if necessary.***

Q1) a) What is dynamic programming, And how does it apply to solving Markov Decision Processes? **[9]**

b) State the Banach Fixed point Theorem and its significance in dynamic programming. **[9]**

OR

Q2) a) Explain the contraction mapping property of Bellman expectation and optimality operators. **[9]**

b) State and explain the principle of optimality in the context of MDPs. **[9]**

Q3) a) What are monte Carlo Methods, and how are they used in reinforcement learning. **[9]**

b) Explain the idea behind per-decision Importance Sampling and its significance in off-policy learning. **[8]**

OR

Q4) a) What is the difference between On-policy and Off-policy learning in reinforcement learning. **[8]**

b) What is Monte Carlo Tree Search (MCTS), and where is it commonly used? **[9]**

P.T.O.

Q5) a) Enlist the advantages and disadvantages of using model-based and model-free approaches in reinforcement learning. **[9]**

b) Describe the Q-learning algorithm and its main components. **[9]**

OR

Q6) a) Discuss the double DQN algorithm and its advantages over traditional DQNs. **[9]**

b) Explain the concept of Temporal difference (TD) learning in reinforcement learning. **[9]**

Q7) a) How can an agent adapt when the model used for planning is inaccurate? **[9]**

b) How do Rollout Algorithms help in approximating the value function and improving decision-making? **[8]**

OR

Q8) a) Explain the Dyna architecture and how it integrates planning, acting, and learning. **[8]**

b) Discuss the advantages and limitations of using real-time Dynamic programming. **[9]**

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