

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2024

B.Tech-8 Semester (CSE/IT/ECE/CE)

COURSE CODE(CREDITS): 19B1WCI837

MAX. MARKS: 15

COURSE NAME: Reinforcement Learning

COURSE INSTRUCTORS: DHA

MAX. TIME: 1 Hour

Note: (a) All questions are compulsory.

(b) Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q1. a) Explain Markov Property and Markov Decision Process.

b) Give the bellman equations for state value function $V_{\pi}(s)$ and action value function $q_{\pi}(s, a)$ in a MDP. [CO-3, Marks: 2+2]

Q2. Is the MDP framework adequate to usefully represent all goal-directed learning tasks? Justify your answer [CO-3, Marks: 3]

Q3. In a MDP, Suppose $\gamma = 0.5$ and the following sequence of rewards is received $R_1 = -1, R_2 = 2, R_3 = 6, R_4 = 3, \text{ and } R_5 = 2$, with $T = 5$. What are the values of expected Rewards G_0, G_1, \dots, G_5 ? [CO-3, Marks: 3]

Q4. a) What is Information State?

b) What are the different types of Agents in Reinforcement Learning? What are the major components of a RL agent? [CO-1, Marks: 1+2]

Q5. Consider a family that has two children. We are interested in the children's genders. Our sample space is $S = \{(G,G), (G,B), (B,G), (B,B)\}$. Also assume that all four possible outcomes are equally likely. What is the probability that both children are girls given the first child is a girl?

[CO-2, Marks: 2]
