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| **DIT UNIVERSITY DEHRADUN**   |  |  | | --- | --- | | **M.TECH (CSE)** | **MIDTERM EXAMINATION, ODD SEM 2024-25 (SEM I)** | | | | | | | | | | | | | |
| **Roll No.** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Subject Name: Artificial Intelligence and Knowledge Representation** | | | | | | | | | | | | |

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| **Time: 2 Hours** | **Total Marks: 50** |
| **Note: No student is allowed to leave the examination hall before the completion of the exam.**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   |  |  |  |  | | --- | --- | --- | --- | | **SECTION A: Attempt any four questions from the following: [4 x 5= 20]** | | | | |  | | **BTL** | **CO** | | **Q.1)** | Define state space search. How does state space search contribute in improving decision-making in game-solving? | **1,2** | **1** | | **Q.2)** | Explain the following agents with suitable diagrams:   1. Model-Based Reflex agent 2. Utility Based Agents | **2** | **1** | | **Q.3)** | Evaluate the efficiency and applications of Best First Search and A\* Search, focusing on their use of heuristics and performance in solving AI problems. | **3** | **2** | | **Q.4)** | Analyze the structure of an intelligent agent by detailing the roles of perception, reasoning, and action in its functioning. | **3** | **2** | | **Q.5)** | Classify environments in the context of intelligent agents (e.g., deterministic vs. stochastic, fully observable vs. partially observable). Provide examples of each type. | **2,4** | **1** | | **SSECTION B: Attempt any three questions from the following: [3 x 10= 30]** | | | | |  | | **BTL** | **CO** | | Q.6) | In a maze with deep tunnels and dead ends, explain how DFS might outperform BFS in finding the exit more quickly, despite its potential to miss the shortest path. Justify the conditions under which DFS would be more efficient than BFS and analyze the trade-offs in terms of time complexity and memory usage. | **5** | **1** | | Q.7) | Design a novel AI application aimed at enhancing daily healthcare management for patients. Demonstrate the key features of the designed application. Explain how it would function to improve patient care and streamline healthcare processes. | **6** | **2** | | Q.8) | **Evaluate the Practical Applications and Limitations of the Hill Climbing Algorithm.** Implement an Advanced Hill Climbing Algorithm with Mechanisms for Escaping Local Optima. | **5,6** | **3** | | Q.9) | Apply the Constraint Satisfaction Search (CSP) algorithm to solve the Traveling Salesman Problem (TSP) and evaluate its effectiveness in finding efficient solutions. Discuss the specific advantages of using the CSP algorithm for solving constraint-based puzzles like the TSP in AI, including its impact on problem-solving efficiency and solution quality. | **3,4** | **2** | | **-----END OF PAPER ----** | |  |  | | |