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| **DIT UNIVERSITY DEHRADUN**   |  |  | | --- | --- | | **B.TECH (CSE/IT)** | **(Regular/Back) MID TERM EXAM, ODD SEM 2022-23 (SEM V)** | | | | | | | | | | | | | |
| **Roll No.** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Subject Name: Artificial Intelligence** | | | | | | | | | | | | |

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| **Time: 2 Hours** | **Total Marks: 50** |
| **Note: All questions are compulsory. No student is allowed to leave the examination hall before the completion of the exam.**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   |  |  |  | | --- | --- | --- | | **Q.1)** | **Attempt all Parts:** | | |  | **(a)** | **Summarize PEAS description/representation for the vacuum cleaner (agent).** | |  | **(b)** | **Consider the given search tree in Figure 1, apply BFS and DFS algorithms to traverse it where A is the start state and F is goal state.** | |  | **(c)** | **Differentiate between blind search and heuristic search.** | |  | **(d)** | **Define dictionary. Write a python program to create and print a dictionary.** | |  |  | **[4 x 2.5= 10]** | | **Q.2)** | **Attempt all Parts:** | | |  | **(a)** | **Consider the graph given in Figure 2, apply Uniform Cost Search to traverse it where S is the start state. Explain step by step.** | |  | **(b)** | **Apply Minimax strategy on the Game Tree given in Figure 3. Find the optimal strategy for MAX assuming an infallible MIN opponent. Assumption: Both players play optimally.  Explain step by step.** | |  | **(c)** | **Define learning agent and discuss its four components.** | |  | **(d)** | **Write a python program to explain any five arithmetic operators (with output).** | |  |  | **[4 x 2.5= 10]** | | **Q.3)** | **Attempt any Two Parts :** | | |  | **(a)** | **Solve the Cryptarithmetic problem shown below:**  **C R O S S**  **+ R O A D S**  **-------------------------------**  **D A N G E R**  **Where, every character/letter must have a unique and distinct value.** | |  | **(b)** | **Explain the following terms with suitable diagrams:**   1. **Model-Based Reflex agent** 2. **Utility Based Agents** | |  | **(c)** | **You are given two jugs, a 4-gallon one and a 3-gallon one. Neither has any measuring mark on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water into the 4-gallon jug. Explain it with state space.** | |  |  | **[2 x 5= 10]** | | **Q.4)** | **Attempt any Two Parts :** | | |  | **(a)** | **Consider the search problem given in Figure 4, apply greedy best-first search to traverse it where we start from source “S” and search for goal “I”. Explain step by step. Note: Values in the graph represent H(n)** | |  | **(b)** | **Illustrate any five applications of** **artificial intelligence.** | |  | **(c)** | **Apply the concept of constraint satisfaction problem to solve the Map Coloring problem (Given: Coloring different regions of map ensuring no neighboring regions shares the same color where colors are RED, YELLOW, Green and BLUE) given in Figure 5. Identify variables, domains, constraints and solutions. Explain step by step.** | |  |  | **[2 x 5= 10]** | |  | | | | **Q.5)** | **Attempt any Two Parts :** | | |  | **(a)** | **Consider the graph given in Figure 6, apply A\* algorithm to traverse it where S is the start node and G is the goal node. Explain step by step.** | |  | **(b)** | **Given thislist = ["CSE", "IT", "MCA"]**  **Write python program for the following with output(s)**   1. **Print the number of items in the list** 2. **Print the last item of the list using negative indexing** 3. **Change the second value by replacing it with two new values i.e.,**  **"Software Engineering" and "BCA"** 4. **Add an item (i.e., “Data Science”) to the end of the list** 5. **Remove “CSE”** | |  | **(c)** | **Explain the following environments with suitable example of each:**   1. **Deterministic and stochastic.** 2. **Discrete and continuous.** | |  |  | **[2 x 5= 10]** | | **-----END OF PAPER ----** | | | | |

**FIGURE DETAILS**

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| **Figure 1** | **Figure 2** | | **Figure 3** | |
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| **Figure 4** | | **Figure 5** | | **Figure 6** |