|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DIT UNIVERSITY DEHRADUN**   |  |  | | --- | --- | | **B.TECH (CSE)** | **END TERM EXAMINATION, ODD SEM 2024-25 (SEM V)** | | | | | | | | | | | | | |
| **Roll No.** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Subject Name: Artificial Intelligence** | | | | | | | | | | | | |

|  |  |
| --- | --- |
| **Time: 3 Hours** | **Total Marks: 100** |
| **Note: No student is allowed to leave the examination hall before the completion of the exam.**  **Answers from a section must be written together and must not be mixed with answers from other section.**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**   |  |  |  |  | | --- | --- | --- | --- | | **SECTION 1: Attempt any five questions in SECTION 1: [5 x 8= 40]** | | | | |  | |  |  | | **Q.1.1)** | Explain in detail with proper diagrams the different types of Intelligent agents |  |  | | **Q.1.2)** | Explain in detail with proper example, the different components of a well-defined problem. |  |  | | **Q.1.3)** | (a) Explain what is a membership function in Fuzzy logic and also describe its various features.  **[5 marks]** |  |  | | (b) Let A(x) and B(x) be two fuzzy sets with the following values  A= {(X1, 1), (X2, 0.75), (X3, 0.3), (X4, 0.15), (X5, 0)}; B= {(X1, 1), (X2, 0.6), (X3, 0.2), (X4, 0.1), (X5, 0)}. Calculate: (i) A U B, (ii) A B, (iii)  **[3 marks]** |  |  | | **Q.1.4)** | Explain with examples, different types of reasoning. |  |  | | **Q.1.5)** | (a) Explain in detail the terms use in mathematical formula of Bayes Theorem.  **[4 marks]** |  |  | | (b) In a neighborhood, 90% children were falling sick due flu and 10% due to measles and no other disease. The probability of observing rashes for measles is 0.95 and for flu is 0.08. If a child develops rashes, find the child’s probability of having flu.  **[4 marks]** |  |  | | **Q.1.6)** | Differentiate between Supervised, unsupervised and reinforcement learning. |  |  | | **SECTION 2: Attempt any four questions in SECTION 2: [4 x 15= 60]** | | | | |  | |  |  | | **Q.2.1)** | (a) Differentiate between Breadth first search and Depth first search.  **[5 marks]** |  |  | | (b) Apply BFS and DFS to the graph shown in Fig. 1 and find out the traversal sequence in each case using node A as source node. **[Note: Show steps in detail.]**  C:\Users\DIT\Documents\q1.jpg  Fig 1  **[10 marks]** |  |  | | **Q.2.2)** | (a) Apply A\* algorithm to the graph shown in Fig. 2 and find the optimal path and path cost from source node S to goal node G. **[Note: Show each step in detail]**  Example Graph  Fig. 2  **[8 marks]** |  |  | | (b) Explain the different logic connectives used in knowledge representation. Also verify that and are logically equivalent  **[7 marks]** |  |  | | **Q.2.3)** | (a) Explain with example the constraint satisfaction problem in AI.  **[5 marks]** |  |  | | (b) Apply cryptarithmetic to solve the following:      **[10 Marks]** |  |  | | **Q.2.4)** | (a) Explain with example different types of planning.  **[6 marks]** |  |  | | (b) For the problem of goal stack planning shown in Fig. 3, indicate the predicates used and solve to find the steps taken to reach the goal state from start state. Also represent each state using the predicate logic.    Fig.3  **[9 marks]** |  |  | | **Q.2.5)** | (a) Explain in detail, the working of Backpropagation neural network  **[7 marks]** |  |  | | (b) Using the basic perceptron of artificial neural network, implement the following functions indicating the value of weights, bias, threshold and activation function in each case: (i) ANDNOT function (ii) OR function  **[8 marks]** |  |  | | **-----END OF PAPER ----** | |  |  | | |