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| **DIT UNIVERSITY, DEHRADUN**   |  |  | | --- | --- | | **MCA(Regular/Back)** | **: END TERM EXAMINATION, ODD SEM 2023-24 (SEM III)** | | | | | | | | | | | | | |
| **Roll No.** |  |  |  |  |  |  |  |  |  |  |  |  |
| **Subject Name: Artificial Intelligence** | | | | | | | | | | | | |

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| **Time: 3 Hours** | **Total Marks: 100** |
| **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) | List the advantages and disadvantages of AI. | |  | (b) | Find the complement of the given fuzzy set  A = {( X1, 0.3 ), (X2, 0.8), (X3, 0.5), (X4, 0.1)} | |  | (c) | Calculate entropy of the set R = {a,a,a,a,b,b,b}. | |  | (d) | Define any three agents used in AI. | |  |  | **[4 x 5= 20]** | |  | | | | **Q.2)** | **Attempt all Parts:** | | |  | (a) | Compute the net output given inputs 0.3,0.5,0.6 and weighs 0.2,0.1,-0.3 | |  | (b) | Calculate the output after using binary sigmoid function given inputs 0.7, 0.2, 0.1 and weighs 0.1, 0.3, -0.2 and the bias is 0.85. | |  | (c) | Define the types of nodes in Decision Tree with a suitable diagram. | |  | (d) | Discuss three main categories of learning. How do they differ from each other? | |  |  | **[4 x 5= 20]** | |  | | | | **Q.3)** | **Attempt any two parts:** | | |  | (a) | The disease meningitis causes the patient to have a stiff neck, 80% of the time. The prior probability that a patient has meningitis is 1/55,000 and the prior probability that any patient has a stiff neck is 3%. Calculate the probability that a patient has disease meningitis with a stiff neck using Bayes theorem. | |  | (b) | Define and differentiate between deductive and inductive reasoning with examples. | |  | (c) | Find the maximum benefit achieved by the player using Min-Max pruning method.  Mini-Max Algorithm in AI | |  |  | **[2 x 10= 20]** | |  | | | | **Q.4)** | **Attempt any two parts:** | | |  | (a) | To detect burglary, Harry put a new burglar alarm at his home. The alarm is not only capable of detecting a burglary, but it can also detect mild earthquakes. Harry has two next-door neighbors, David and Sophia, who have agreed to notify Harry at work if they hear the alarm. When David hears the alarm, he always phones Harry, but sometimes he gets confused with the phone ringing and calls at that time as well. Sophia, on the other hand, enjoys listening to loud music and occasionally misses the alarm. We'd like to calculate the likelihood of a burglary alarm in this case.  **Calculate the probability that alarm has sounded, but there is neither a burglary, nor an earthquake occurred, and David and Sophia both called the Harry.** | |  | (b) | What is inference in AI? Define any three-inference rule for propositional logic including truth tables. | |  | (c) | I. Find the union and intersection of the given fuzzy set:  A = {( X1, 0.6 ), (X2, 0.2), (X3, 1), (X4, 0.4)}  B = {( X1, 0.1), (X2, 0.8), (X3, 0), (X4, 0.9)}  II. Find the cartesian product of the given fuzzy sets:  A= {( X1, 0.5 ), (X2, 0.3), (X3, 0.9), (X4, 0.2)}  B={( Y1, 0.8), (Y2, 0.4), (Y3, 0.7)} | |  |  | **[2 x 10= 20]** | |  | | | | **Q.5)** | **Attempt any two parts:** | | |  | (a) | In a class, there are 65% of the students who like English and 35% of the students who likes English and mathematics, and then what is the probability of students those who like English also like mathematics? | |  | (b) | Explain the following:   1. Feed Forward Artificial Neural Network. 2. Feed Back Artificial Neural Network. | |  | (c) | Illustrate the architecture of rule-based system with diagram. | |  |  | **[2 x 10= 20]** | | -----END OF PAPER ---- | | | | |