Enrolment No. ☐☐☐☐☐☐☐

S5 (MCA05C17)MCA

MCA 5th Semester End Term Examination- 2023
Name of Subject: ARTIFICIAL INTELLIGENCE
Paper Code: MCA05C17

Full Marks: 50 **Time:2 Hours**

[The figures in the margin indicate full marks for the questions]

SECTION -A

1. Answer the Followings: **(5x2=10)**
   a) What is Uncertainty concerning expert systems?
   b) How to improve the effectiveness of a search-based problem-solving technique?
   c) State the significance of using the heuristic function.
   d) What are the different domains/Subsets of AI?
   e) What do you mean by uncertainty? Why does uncertainty arise?

SECTION -B **(4x5=20)**

1. a) Prepare the merits and demerits of depth-first and breadth-first search with the algorithm. **(3+2=5)**
   b) Briefly discuss the advantages and disadvantages of predicate logic.

2. a) Briefly Explain Structure and Types of Intelligent Agents **(3+2=5)**
   b) Differentiate between Goal Based Agents and Utility-Based Agents.

3. Write the Syntax in First Order Predicate Logic (FOPL) for the following statements: **5**
   (i) Alex is Tom's Sister.
   (ii) Tom has a sister who lives in Australia
   (iii) Tom has no brother.
   (iv) Bill takes Analysis and Geometry.
   (v) No student loves Bill.

4. (a) Explain the resolution algorithm for propositional logic. Now consider the following set of facts as the knowledge : **(3+2=5)**
   (i) The humidity is high and the sky is cloudy.
   (ii) If the sky is cloudy then it will rain.
   (iii) If the humidity is high it is hot.
   (iv) It is not hot.
   (b) Differentiate tree-based breadth-first and depth-first search strategies based on completeness, time, and space complexities.

SECTION -C

(2x10=20)

1. (a) A Water Jug Problem: You are given two jugs, a 4-gallon one and a 3-gallon one, a pump that has unlimited water that you can use to fill the jug, and the ground on which water may be poured. Neither jug has any measuring markings on it. How can you get exactly 2 gallons of water in the 4-gallon jug? **(5+5=10)**

   (b) Construct an auto-associative discrete Hopfield network with vector [1 1 -1 -1]. Text discrete Hopfield Network with missing entries in the first and second. Compute of stored vector.

2. (a) Measure of Belief for particular hypothesis h1 in presence of Evidence e1 is 0.3, h1 in the presence of e2 is 0.4, and h1 in the presence of e3 is 0.7 and measure of b for particular hypothesis h2 in the presence of evidence e1 is 0.6, e2 is 0.4 and e3 is 0.2. Calculate CF(h1 and h2 ,e1 ∩ e2 ∩ e3). **(5+5=10)**

   (b) Implement AND function using perceptron networks for bipolar inputs and targets.