

2019

COMPUTER AND INFORMATION SCIENCE

Paper : CISM - 401

(Elective - I : Artificial Intelligence)

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer **question nos. 1, 2** and **any four** questions from the rest.

1. Answer **any five** questions : 2×5
 - (a) Differentiate between Goal Formulation and Problem Formulation.
 - (b) State the main disadvantage of “Depth Limited Search” technique.
 - (c) State the advantages of Local Search Algorithms.
 - (d) What is Evaluation Function and Heuristic Function with respect to Heuristic Search Strategies?
 - (e) Differentiate between Hard AI and Soft AI.
 - (f) Distinguish between Goal Based Agent and Utility Based Agent.
 - (g) Define a “Zero Sum Game”.
 - (h) What are terms and atomic sentences with respect to First Order Logic?
2. Answer **any five** questions : 4×5
 - (a) What is Artificial Intelligence (AI)? Describe the four approaches of AI with respect to this.
 - (b) Derive the time complexity of “Iterative Deepening Depth First Search”.
 - (c) Does Depth First Search have any advantage over Breadth First Search? Give your views for or against the statement.
 - (d) How does searching correspond to problem solving in the field of AI?
 - (e) Properly define the “8-queens problem” with respect to problem formulation in AI.
 - (f) Write the PEAS description for : (i) Satellite Image Analysis System (ii) Medical Diagnosis System.
 - (g) What is the minimax value and minimax algorithm?
 - (h) Comment on the following terms : Universal Instantiation, Existential Instantiation and Skolemization.
3. Why is Hill Climbing called Greedy Local Search? Why does Hill Climbing get stuck? What is Stochastic Hill Climbing, First Choice Hill Climbing and Random Restart Hill Climbing? 2+4+4

Please Turn Over

4. What are the conditions of Optimality for A* search? Show the optimality of the A* Search Algorithm. 4+6
 5. Calculate the space and time complexities for Breadth First Search Algorithms on a graph and place your comments, if any. Comment on the line : "Uniform-Cost Search expands nodes in order of their optimal path cost." 5+5
 6. Define a Rational Agent. Write about Rational Agent and Rationality with respect to AI. What is agent architecture? Keeping in mind the agent function and the table-driven approach, write the expression for the size of the look up table. Comment on the size of the look up table. 2+4+2+2
 7. In correspondence to Game Theory, answer the following : 2+3+2+3
 - (a) What is meant by the term strategy?
 - (b) What is a pure strategy and a mixed strategy?
 - (c) What is meant by Pay-Off Matrix?
 - (d) What is Maximin-Minimax Principle? Also tell what do you understand by Saddle Point.
 8. What is a knowledge base? How does a knowledge-based agent program work? What is the Wumpus World with respect to knowledge-based agents? Give the PEAS description of the Wumpus World. 2+3+5
 9. What is resolution? What do you understand by CNF? Comment on the conclusion of resolution. 2+4+4
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