

Total number of printed pages—4

3 (Sem-6/CBCS) CSC HC 1

2024

**COMPUTER SCIENCE**

(Honours Core)

Paper : CSC-HC-6016

**(Artificial Intelligence)**

Full Marks : 60

Time : Three hours

**The figures in the margin indicate full marks for the questions.**

1. Answer the following questions as directed :

1×7=7

- (a) \_\_\_\_\_ is the art of creating machines that perform functions that require human-like intelligence.
- (b) \_\_\_\_\_ is an uninformed search algorithm.
- (c) \_\_\_\_\_ is known as Father of Artificial Intelligence.
- (d) Depth first search is an optimal search algorithm. (True/False)

Contd.

(e) Alpha-beta pruning is an improvement over the minimax algorithm.

(True/False)

(f) Unification in first order logic is a process of making two different logical atomic expressions identical by finding a substitution. (True/False)

(g) What are the two types of quantifiers in first order predicate logic?

2. Define the terms :  $2 \times 4 = 8$

- (a) Rational agent
- (b) Constraint satisfaction problem
- (c) Bayes' theorem
- (d) Turing test

3. Answer **any three** of the following questions :

$5 \times 3 = 15$

- (a) What is intelligent agent? Based on the agent program, what are different types of intelligent agents?
- (b) Differentiate between Breadth First Search (BFS) and Depth First Search (DFS).
- (e) Write a prolog program to calculate the factorial of a given number.

(d) A problem-solving agent is kind of goal-based agent that solves problem given the goal information and problem information. The solving starts with proper definition of a problem. A problem can be formally defined using five components. Briefly discuss the components of a problem.

(e) Write the algorithm for the best first search algorithm.

4. Answer **any three** questions :  $10 \times 3 = 30$

- (a) Explain the utility-based agent with suitable diagram. Briefly explain the difference between utility-based agent and goal-based agent.
- (b) State and explain the A\* search algorithm.
- (c) Explain the minimax algorithm with suitable example. How does alpha-beta pruning solve the problem in minimax algorithm?
- (d) Consider the following facts in the knowledge base :
  - 1. Jahir likes all kind of food.
  - 2. Apple and vegetable are food.

3. Anything anyone eats and not killed is food.
4. Gautam eats peanuts and still alive.
5. Yubraj eats everything that Gautam eats.

Proof by resolution that 'Jahir likes peanuts'. (Clearly indicate all the steps)

(e) What is parsing? What are different types of parsing? Explain any one of the parsing techniques.

(f) Write short notes on : (any two)

5×2=10

- (i) Semantic nets
- (ii) Default reasoning
- (iii) Bayesian probabilistic inference
- (iv) Means-end analysis