Roll No. | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech. (Computer Science & Engineering) (Sem.–7)

ARTIFICIAL INTELLIGENCE

Subject Code : BTCS-701

M.Code : 71893

Date of Examination : 03-01-23

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a. Define artificial intelligence as a science. When was artificial intelligence born?

b. Discuss the time and space complexity of A* search algorithm.

c. List the differences between propositional logic and predicate logic.

d. List the salient features of Lisp.

e. Define the operator schemata for the problem of putting on shoes and socks and a hat and coat, assuming that there are no preconditions for putting on the hat and coat. Give a partial-order plan that is a solution.

f. What is Bayesian reasoning? How does an expert system rank potentially true hypotheses? Give an example.

g. How are utility functions used in decision making? Give example.

h. List some practical uses of decision tree learning.

i. What is the role of activation function in a neural network?

j. Define disambiguation in context of communication among agents.

SECTION-B

2. Describe the general algorithm for state space search. Explain why problem formulation must follow goal formulation? Pose the Travelling Salesperson Problem as state space search problem.

3. Discuss the role of heuristic functions in informed search. Write down the best first search algorithm and discuss its performance in terms of space and time.

4. Differentiate between forward chaining and backward chaining. Consider the following sentences. Use backward chaining and draw the proof tree to prove that ‘‘Charlie is a horse.’’

   a. Horses, cows, and pigs are mammals.

   b. An offspring of a horse is a horse.

   c. Bluebeard is a horse.

   d. Bluebeard is Charlie's parent.

   e. Offspring and parent are inverse relations.

   f. Every mammal has a parent.

5. What are the different kinds of inferences made by belief networks? Explain how posterior probabilities of query variables are computed?

6. Explain **any five** tasks of natural language processing.

SECTION-C

7. There are many ways to characterize planners. For each of the following dichotomies, explain what they mean, and how the choice between them affects the efficiency and completeness of a planner.

   a. Situation space *vs.* plan space.

   b. Progressive *vs.* regressive.

   c. Refinement *vs.* debugging.

   d. Least commitment *vs.* more commitment.

   e. Bound variables *vs.* unbound variables.

8. Write a note on inductive learning. Discuss the expressiveness of decision trees. Write down the algorithm for current-best hypothesis search.

9. Discuss the component steps of communication among agents. What are the different types of communicating agents?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.