Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 40402

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Sixth/Seventh/Eighth Semester

Computer Science and Engineering

CS 8691 – ARTIFICIAL INTELLIGENCE

(Common to Mechatronics Engineering)

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define rationality concept in agents.

2. Provide PEAS description for robo navigation problem.

3. Give the significance of using alpha and beta in game playing problems.

4. Write the significance of using heuristic function in search algorithms.

5. Distinguish between predicate and propositional logic.

6. Design a semantic net for the sentence – "John gave AI book to Mary".

7. Compare between static and dynamic environment.

8. List down the characteristics of Intelligent Agents.

9. Give the applications of language models.

10. Distinguish between continuous and conditional planning.

PART B — (5 × 13 = 65 marks)

11. (a) (i) Define the task environment and their characteristics with respect to the following problems :

(1) Travelling salesman problem

(2) 8-puzzle problem

(3) Towers of Hanoi

(4) Chess (8)

(ii) Define Agent Programs and Agent functions with example. (5)

Or

(b) (i) List down the characteristics of Intelligent Agents. (6)

(ii) Explain the architecture of Learning agents with an example. (7)

12. (a) (i) Explain the Min Max game playing algorithm with an example. (8)

(ii) Explain on the parameters to estimate the performance of problem solving algorithms. (5)

Or

(b) (i) What is simulated annealing? Explain the use of simulated annealing in solving any real world problem. (6)

(ii) Explain the recursive best first search algorithm with an example. (7)

13. (a) (i) Explain Justification Based Truth Maintenance System with an example. (6)

(ii) Consider the following facts :

- Team Indian
- Team England
- Final match between India and England
- India scored 350 runs
- England scored 350 runs
- India lost 5 wickets
- England lost 7 wickets
- The team which scored the maximum runs wins
- If the scores are same them the team which lost minimum wickets wins the match.

Represent the facts in predicate, convert to clause form and prove by resolution,

"India wins the match". (7)

Or

(b) (i) Explain the concept of knowledge representation using Frame based system. (7)

(ii) Explain the unification algorithm with an example. (6)

14. (a) (i) In the children's game of rock-paper-scissors, each player reveals at the same time a choice of rock, paper or scissors. Paper wraps the rock, rock blunts scissors and scissors cut paper. In the extended version rock-paper-scissors-fire-water, fire beats rock, paper and scissors; rock, paper and scissors beat water and water beats fire. Write out the payoff matrix and find a mixed strategy solution to this game. (7)

(ii) How communications are handled among agents? Explain with an example. (6)

Or

(b) (i) Explain on the components to build up the Intelligent Agents with a block diagram. (7)

(ii) Explain the concept of Trust and Reputation in Multi-Agent system. (6)

15. (a) Explain on the various phases involved in Natural Language Processing with a block diagram.

Or

(b) (i) Distinguish between Information Retrieval and Information Extraction. (6)

(ii) Explain on the modules involved in the design of a Speech Recognition system. (7)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Explain the constraint satisfaction procedure to solve the cryptarithmetic problem

CROSS

+ ROADS

DANGER. (9)

(ii) Show how JTMS could be used in medical diagnosis. Consider the rules such as, "IF you have a runny nose assume you have cold unless it is allergy season"? (6)

Or

(b) (i) A diagnostic test has a probability 0.95 of giving a positive result when applied to a person suffering from a certain disease and a probability 0.10 of giving a (false) positive when applied to a non-sufferer. It is estimated that 0.5 % of the population are sufferers. Suppose that the test is now administered to a person about whom we have no relevant information relating to the disease (apart from the fact that he/she comes from this population). Calculate the following probabilities : (1) that the test result will he positive; (2) that, given a positive result, the person is a sufferer; (3) that, given a negative result, the person is a non-sufferer; (4) that the person will be misclassified.

(ii) You have 12 litres of apple juice in a 12 litres bucket and you want to share it with your best friend. But you have an empty 8-liter and an empty 5-liter bottle. Design the production system for it.

_____