Register No.: .... Name: ....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER M.TECH DEGREE EXAMINATION (Regular), MAY 2023
ROBOTICS AND AUTOMATION
(2021 Scheme)

Course Code: 21RA204-A

Course Name: Artificial Intelligence and Expert Systems in Automation

Max. Marks: 60   **Duration: 3 Hours**

PART A
(Answer all questions. Each question carries 3 marks)

1. What are the philosophical issues associated with AI?
2. How predicate logic is implemented in AI?
3. What do you mean by knowledge representation in an expert system?
4. What is Heuristic search? Name any two algorithms related to this search method.
5. Enumerate the difference between machine vision and computer vision.
6. What are the advantages of machine vision as a robotic sensor?
7. Explain how depth information is useful.
8. Differentiate between machine learning, artificial intelligence and deep learning.

PART B
(Answer one full question from each module, each question carries 6 marks)

MODULE I

9. a) Briefly explain the typical AI problems. (3)
   b) Explain backward chaining with an example. (3)

OR

10. a) What are the different methods of knowledge representations? (3)
    b) Differentiate between forward and backward chaining. (3)

MODULE II

11. a) Derive Bayes' theorem. (3)
    b) Explain the design considerations while designing an expert system. (3)

OR

12. a) A factory produces its entire output with three machines M1, M2, M3 and produces 50%, 30%, 20% of the output but 4%, 2% and 4% of their outputs are defective respectively. Calculate the fraction of the defective output. (4)

b) What is the importance of inference engine in expert system design. (2)

MODULE III

13. a) Describe the Breadth first search technique. (2)

b) Define A* algorithm? Explain this algorithm with a practical example. (4)

OR

14. a) How is breadth first search different from depth first search algorithm? (3)

b) Describe the hill climbing algorithm. (3)

MODULE IV

15. a) Explain alpha-beta pruning. (3)

b) What do you mean by adversarial search? (3)

OR

16. a) Draw an AND-OR graph for a simple alpha search. (3)

b) What is minimax algorithm? Explain with the help of an example. (3)

MODULE V

17. a) Describe the different levels of Computer vision. (3)

b) What are the major tasks associated with computer vision in AI? (3)

18. a) Explain how object detection is performed in computer vision? (3)

b) List out the steps associated for implementing a practical vision system. (3)

MODULE VI

19. a) Explain machine learning. (3)

b) Differentiate between CNN and RNN. (3)

OR

20. a) How Machine learning is used for software agents? (3)

b) Explain back propagation in neural networks. (3)

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