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Register No: …… Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION(R), May 2024

Robotics and Automation

(2020 SCHEME)

Course Code : 20RBT476

Course Name : AI FOR ROBOTICS

Max. Marks : 100 **Duration:3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. Differentiate between episodic and sequential task environment.
2. Describe the concept of artificial intelligence in the context of robotics.
3. Define referential transparency.
4. Define the term "logical agent" and explain its key characteristics in the context of robotics.
5. Distinguish between a consistent heuristic and an inconsistent heuristic.
6. Define the term "state space search" in the context of planning for robots.
7. Describe Maximum Expected Utility.
8. Explain the concept of applying Bayes' rule for updating beliefs based on new evidence.
9. Write the concept of motion planning and its significance in controlling robot movements.
10. Explain alternative robotic frameworks.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. Explain about informed search strategies. 14

OR

12. Illustrate the procedure of solution search for a real world problem. 14

MODULE II

13. Explain about the concept of categories and objects in knowledge representation 14

OR

14. Imagine a robot operating in a factory setting. Explain how propositional logic can be used to represent the robot's knowledge about safety protocols and potential hazards. 14

MODULE III

15. Planning graphs can be used for better heuristic estimation. Justify the statement. 14

OR

16. Describe about the complexity of classical planning problem. 14

MODULE IV

17. Describe the key considerations taken when designing a utility function for a robot operating in a social setting where user preferences and social norms might be relevant. 14

OR

18. Differentiate between posterior probability and likelihood probability, highlighting how they are used for updating beliefs based on new evidence. 14

MODULE V

19. Discuss how combining reinforcement learning with other machine learning techniques (e.g., supervised learning) can enhance a robot's ability to learn complex tasks and adapt to new situations. 14

OR

20. Compare and contrast the ethical implications of using AI in healthcare diagnostics versus autonomous weapons systems. How do these applications differ in terms of societal impact? 14

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