

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FIFTH SEMESTER B.TECH DEGREE EXAMINATION (Regular), DECEMBER 2022

(2020 SCHEME)

Course Code: 20RBT381

Course Name: AI and Machine Learning for Robotics

Max. Marks: 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. How natural language processing is performed using artificial intelligence?
2. Explain turing test with a diagram.
3. Explain hierarchical clustering with an example.
4. Define hyperplane and marginal planes in connection with SVM.
5. Explain deep feed forward networks with a diagram.
6. Explain any one application of RNN in detail.
7. What is meant by edge detection?
8. Explain the application of AI in traffic sign detection.
9. Explain robotic perception and discuss the challenges faced in robotic perception.
10. Explain machine learning in robotics industry.

PART B

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

MODULE I

11. With a block diagram explain expert system. Explain the general steps in the development of expert systems. (14)

OR

12. Explain some of the application areas of AI in detail with diagrams. (14)

MODULE II

13. With real time examples explain about supervised learning, unsupervised learning, and reinforcement learning. (14)

OR

14. How gradient descent algorithm can be employed in the parameter estimation of multiple linear regression? Explain with the steps involved in it. (14)

MODULE III

15. How AND and OR problems are solved using a single perceptron model? Explain the solution to XOR problems using NN model. (14)

OR

16. With diagrams explain how an image can be predicted using convolutional neural networks. (14)

MODULE IV

17. Explain the operation of image formation in human eye and digital camera. What are the properties of digital image sensors? (14)

OR

18. Explain region splitting and merging algorithm for segmentation with relevant equations. (14)

MODULE V

19. What are autonomous robots? Explain the classification of sensors used in a robot. (14)

OR

20. Explain in detail machine learning in robot perception. (14)
