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Pages: 2

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S8 (R, S) Exam April 2025 (2019 Scheme)

Course Code: RAT402

Course Name: AI AND MACHINE LEARNING

Max. Marks: 100

Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.

Marks

- | | | |
|----|---|-----|
| 1 | Describe the 4 different approaches/definitions in AI. | (3) |
| 2 | Explain different parts of an expert systems. | (3) |
| 3 | Summarize the applications for supervised learning and unsupervised learning. | (3) |
| 4 | List out the advantages and disadvantages of supervised and unsupervised learning techniques. | (3) |
| 5 | Draw the schematic representation of an Artificial Neuron, with the necessary notations. | (3) |
| 6 | Identify the need for sequence modelling. | (3) |
| 7 | Interpret the importance of image segmentation in machine vision. | (3) |
| 8 | Describe how does computer vision work. | (3) |
| 9 | List out some applications of robotic perception in real-world scenarios. | (3) |
| 10 | Differentiate between effectors and actuators. | (3) |

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

- | | | |
|----|--|-----|
| 11 | a) Identify the use of Turing test approach? | (7) |
| | b) Illustrate the importance of NLP in language translation. | (7) |

OR

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|----|---|------|
| 12 | a) Discuss the different foundation areas of AI. | (4) |
| | b) Comprehend the application areas of artificial intelligence in Robotics. | (10) |

Module II

- | | | |
|----|--|-----|
| 13 | a) With a neat figure, explain the concept of Stochastic Gradient Descent. Compare it with the Gradient Descent algorithm. | (7) |
| | b) Explain the concept of Reinforcement Learning with applications. | (7) |

OR

- | | | |
|----|--|-----|
| 14 | a) Explain the Decision Tree algorithm. Expand it to create the random forest algorithm. | (8) |
| | b) Illustrate with examples support vector machines for machine learning. | (6) |

Module III

- 15 a) Describe the XOR problem in classification. With a neat diagram, produce the solution of XOR problem. (14)

OR

- 16 a) With a neat figure, illustrate about the back propagation algorithm of learning. (7)
b) Demonstrate with a diagram the functions of a Recurrent Neural Network. (7)

Module IV

- 17 a) With a neat figure, describe optical flow in imaging. (8)
b) Differentiate computer vision from machine vision. (6)

OR

- 18 a) Draw the block diagram for image processing and explain its various sections. (14)

Module V

- 19 a) What is localization. Explain the Monte-Carlo localization algorithm. (7)
b) With a block diagram illustrate the stages in robotic perception. (7)

OR

- 20 a) Interpret the different application domains of Robotics. (10)
b) Identify the challenges associated with localization. (4)
