

GUJARAT TECHNOLOGICAL UNIVERSITY
ME - SEMESTER – I (OLD) EXAMINATION – SUMMER - 2025

Subject Code: 3710721

Date: 31 May 2025

Subject Name: AI Techniques

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

- Q.1** (a) Explain the following terms related to GA: (1) Fitness Function (2) Selection (3) Reproduction. **07**
(b) What is Artificial Intelligence? Briefly describe characteristics and advantages of it. **07**
- Q.2** (a) What is learning in ANN? Discuss various types of learning methods in ANN. **07**
(b) Write a note on feed forward neural network architecture with suitable diagram. **07**
- OR**
- (b) Write a note on Elman back propagation neural network. **07**
- Q.3** (a) State and explain the different types of learning methods employed for neural Networks. **07**
(b) Discuss various steps required to solve optimization problem using GA. **07**
- OR**
- Q.3** (a) What is significance of cross-over related to GA. Explain any three cross-over techniques with the help of suitable example. **07**
(b) Explain the following genetic representations with appropriate illustrations. **07**
(a) Octal (b) Binary (c) Hexadecimal
- Q.4** (a) Differentiate between fuzzy and crisp logic. Also explain Fuzzy operators like Union, Intersection and complement with corresponding examples. **07**
(b) Explain GA based Unit Commitment in power system. **07**
- OR**
- Q.4** (a) Compare various defuzzification methods based on various associated aspects. **07**
(b) Represent vector and Matrix notation of 2 neurons in input layer, 2 neurons in hidden layer and 2 neurons in the output layer. **07**
- Q.5** (a) Define the term Membership Function related to Fuzzy logic. Discuss various types of Membership Functions in brief. **07**
(b) Discuss the application of ANN for load forecasting. Specify NN structure, inputs, output, training algorithm and convergence of network with testing data. **07**
- OR**
- Q.5** (a) What is the potential utility of fuzzy logic in power system voltage control? **07**
(b) What does GA mutation mean? How can mutation be applied, Describe the different programming logics employed in the same. **07**
