# GUJARAT TECHNOLOGICAL UNIVERSITY
## ME - SEMESTER– 1 • EXAMINATION – WINTER - 2023

**Subject Code:3710721**                     **Date: 25 Jan 2024**
**Subject Name:AI Techniques**
**Time:10:30 AM TO 01:00 PM**              **Total Marks: 70**
**Instructions:**
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

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|---|---|---|---|
| Q.1 | (a) | Discuss the comparison between Artificial Neural Network and fuzzy logic with list of applications. | 07 |
| | (b) | Write in details the comparison between human brain and ANN | 07 |
| Q.2 | (a) | Represent feed forward NN with its weights matrix notation of 3 neurons in input layer, 4 neurons in hidden layer and 1 neurons in the output layer. | 07 |
| | (b) | For the single layer neural network with four inputs [0.85, 0.32, 0.21, 0.62] and their associated weights are [-0.22, 0.33, 0.81, 0.53]. Calculate output when the activation function is (1) binary sigmoidal (2) bipolar sigmoidal | 07 |

**OR**

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| | (b) | Explain the ADALINE and MADALINE structure of neural network. | 07 |
| Q.3 | (a) | What is the meaning of gradient descent? Derive the back propagation algorithm using gradient descent. | 07 |
| | (b) | What is a schema? What is the relationship between schema and chromosome? What are the effects caused by crossover and mutation over instances of schema? | 07 |

**OR**

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| Q.3 | (a) | Compare the Radial basis function network with feed forward NN. | 07 |
| | (b) | Discuss the following selection methods with reference to GA (i) Roulette wheel selection (ii)Rank selection (iii) Tournament selection | 07 |
| Q.4 | (a) | Explain the fuzzy logic based washing machine system. Define the input and output variables, membership functions, rules and defuzzification method. | 07 |
| | (b) | Describe Fuzzy IF-THEN rule along with fuzzy inference system. | 07 |

**OR**

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| Q.4 | (a) | Explain various types of membership functions used in Fuzzy Systems. What is the effect of shape of membership function and its location in the universe of disclosure on the design of fuzzy systems? | 07 |
| | (b) | Discuss the advantages of neural fuzzy hybrid system. | 07 |
| Q.5 | (a) | Discuss the application or ANN for load forecasting. | 07 |
| | (b) | Explain the voltage control method using fuzzy logic | 07 |

**OR**

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| Q.5 | (a) | Discuss the Economic load dispatch and Unit commitment problem using GA | 07 |
| | (b) | Discuss the area load frequency generation control using AI techniques. | 07 |

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