

GUJARAT TECHNOLOGICAL UNIVERSITY**ME - SEMESTER-1 (NEW) EXAMINATION – WINTER 2018****Subject Code: 3710721****Date: 04/01/2019****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 mark.

- Q.1** (a) Discuss the comparison between Artificial Neural Network, fuzzy logic and Genetic algorithm **07**
 (b) What is the learning rate of the NN? Explain mathematically the effect of the learning rate on the convergence during the training of NN. **07**
- Q.2** (a) Define the basic structure of the ANN. Explain the ADALINE and MADALINE structure of neural network with weight updated rules. **07**
 (b) What is the significant of the activation function? Explain various activation functions used in feed forward NN. **07**
- OR**
- (b) Represent vector and Matrix notation of 3 neurons in input layer, 3 neurons in hidden layer and 3 neurons in the output layer. **07**
- Q.3** (a) Derive the weight updated equation of gradient descent algorithm for back propagation NN. **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**
- Q.3** (a) Compare the Radial basis function network with feed forward NN. **07**
 (b) Discuss the following selection methods with reference to GA **07**
 (i) Roulette wheel selection (ii) Rank selection (iii) Tournament selection
- 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**
- 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 discourse on the design of fuzzy systems? **07**
 (b) Discuss the advantages of neural fuzzy hybrid system compare to the individual system. **07**
- Q.5** (a) Discuss the application of ANN for load forecasting. Specify NN structure, inputs, output, training algorithm and convergence of network with testing data. **07**
 (b) Explain the voltage control method using fuzzy logic and neural network controller. **07**
- OR**
- Q.5** (a) Discuss the Economic load dispatch and Unit commitment problem using GA **07**
 (b) Discuss the multi area load frequency generation control using AI techniques. **07**
