

GUJARAT TECHNOLOGICAL UNIVERSITY**ME – SEMESTER –I-(New) EXAMINATION – SUMMER 2019****Subject Code: 3710721****Date: 13/05/2019****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 marks.**

- Q.1** (a) What is artificial intelligence? Discuss recent development of AI and its significance in brief. **07**
- (b) Define following terms with respect to Fuzzy Logic: **07**
 (1) α -cut (2) Linguistic variable (3) Membership Function (4) Fuzzy singleton
 (5) Fuzzification (6) Cross-over (7) Mutation

- Q.2** (a) Explain basic Neural Network architecture and working with example. **07**
- (b) Explain architecture and application of Fuzzy-Neural system. Give advantages and disadvantages of the same. **07**

OR

- (b) Discuss in brief various types of learning methods in neural network. **07**

- Q.3** (a) Explain Fuzzy Inference Systems. **07**
- (b) Explain supervised and unsupervised learning of Neural Network. **07**

OR

- Q.3** (a) Enumerate various defuzzification methods. Explain any two in detail. **07**
- (b) Explain recurrent networks and Multi layer feed forward network. **07**

- Q.4** (a) Explain the following genetic representations with appropriate illustrations. **07**
 (a) Octal (b) Binary (c) Hexadecimal
- (b) What are the evolution steps of Genetic Algorithm? Draw Flowchart. Explain selection methods applied to Genetic Algorithm. **07**

OR

- Q.4** (a) Suppose a genetic algorithm uses chromosomes of the form $x = abcdefgh$ with a fixed length of eight genes. Each gene can be any digit between 0 and 9. Let the fitness of individual x be calculated as:
 $f(x) = (a + b) - (c + d) + (e + f) - (g + h)$,
 and let the initial population consist of four individuals with the following chromosomes:
 $x_1 = 6\ 5\ 4\ 1\ 3\ 5\ 3\ 2$
 $x_2 = 8\ 7\ 1\ 2\ 6\ 6\ 0\ 1$
 $x_3 = 2\ 3\ 9\ 2\ 1\ 2\ 8\ 5$
 $x_4 = 4\ 1\ 8\ 5\ 2\ 0\ 9\ 4$
 evaluate fitness of each individual and arrange them in their fitness order.
 What will be the maximum fitness value of this function? Also find out chromosome for this maximum fitness function with each gene between 0 to 9. **07**

- (b) Differentiate Reproduction and Crossover in Genetic Algorithm **07**

- Q.5** (a) Discuss maintenance schedule of electrical power transmission network using genetic algorithm. **07**
- (b) Suggest neural network based design for power system security assessment. **07**

OR

- Q.5** (a) Compare ANN with Fuzzy Logic System for power system application. **07**
(b) How artificial neural network can be useful for load forecasting of electric power system. **07**
