Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E -IIIrd SEMESTER–EXAMINATION – MAY- 2012

Subject code: 730702 **Date: 10/05/2012**

Subject Name: Application of Artificial Intelligence to Power Systems

Time: 10:30 am – 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.**

Q.1	**(a)**	What is Artificial Intelligence? Discuss properties and benefits of AI.	**07**
	(b)	Differentiate between Crisp logic and Fuzzy logic. Also explain Fuzzy operators like Union, Intersection and complement with suitable example.	**07**
Q.2	**(a)**	Define following terms: (1) Support (2) α-cut (3) Linguistic variable (4) Membership Function (5) Fuzzy singleton (6) Fuzzification (7) Cross-over	**07**
	(b)	Explain feed forward neural network architecture in detail.	**07**
		OR	
	(b)	Discuss in brief various types of learning methods in neural network.	**07**
Q.3	**(a)**	Describe Fuzzy extension principle and find fuzzy set B using this principle if Fuzzy set A is given by A= {(-2,0.2) (-1, 0.1) (0, 0.2) (1, 0.3) (2,0.1) for the function $f(x)= x^2$.	**07**
	(b)	Explain Fuzzy relationship with suitable example.	**07**
		OR	
Q.3	**(a)**	Describe Fuzzy IF-THEN rule along with fuzzy inference system.	**07**
	(b)	Explain with suitable example, the conditions under which AI techniques are beneficial over conventional techniques.	**07**
Q.4	**(a)**	Explain general structure of recurrent neural network.	**07**
	(b)	Discuss role of intelligent systems in electrical load forecasting.	**07**
		OR	
Q.4	**(a)**	Explain concept of Genetic Algorithm (GA) in brief. What is mean by inversion and mutation?	**07**
	(b)	Explain evolutionary programming. How it differs from genetic programming?	**07**
Q.5	**(a)**	Explain ANN based voltage stability assessment in brief.	**07**
	(b)	Discuss in brief various types of activation functions used in Neural Network. Explain weight calculations for output layer and hidden layer neurons.	**07**
		OR	
Q.5	**(a)**	Explain following terms related with GA: (1) Fitness function (2) Selection (3) Reproduction	**07**
	(b)	Suggest neural network based design for security assessment.	**07**

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