Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 710427N **Date: 16-01-2013**

Subject Name: Soft Computing Technique and Its Application in Engineering (Elective)

Time: 02.30 pm – 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)**	Describe the various goals of soft computing. Explain in brief importance of various fields of soft computing.	**07**
	(b)	Enlist and explain basic fussy set operations with simple examples.	**07**
Q.2	**(a)**	What is generalization of neural networks? Explain useful properties and capabilities offered by neural networks.	**07**
	(b)	Describe in brief following factors affecting the performance of artificial neural network models. 1) Number of hidden Nodes 2) Range of normalization of training data.	**07**
		OR	
	(b)	Discuss: "Initialization of interconnecting weights and type of activation function are important factors for successful training".	**07**
Q.3	**(a)**	Explain in brief the necessary steps for Back Propagation Learning algorithm. Clearly mentions all assumptions made.	**07**
	(b)	Draw and Explain ADLINE and MADLINE networks.	**07**
		OR	
Q.3	**(a)**	Explain selection of various parameters in back propagation network.	**07**
	(b)	Using Hebb rule, find the weights required to perform the following classifications: vectors (1 1 1 1) and (-1 1 -1 -1) are the members of the class (with target value 1); vectors(1 1 1 -1) and (1 -1 -1 1)are the members of the class (with target value -1). Test the response of net for any two of the training vectors. Take initial weights and bias equal to zero. Also take activation function as bipolar step function with threshold = 0.	**07**
Q.4	**(a)**	What is the significance of fuzzy inference? Describe fuzzy rule base system with proper example.	**07**
	(b)	Explain various defuzzification methods.	**07**
		OR	
Q.4	**(a)**	What is the difference between fuzzy and crisp sets? Enlist and define properties of fuzzy sets.	**07**
Q.4	**(b)**	What is adaptive control? Explain fuzzy PID control system in brief.	**07**
Q.5	**(a)**	Describe (in brief) following in context of Fuzzy systems. 1) Selection of fuzzy variables 2) Implication methods	**07**
	(b)	What is ANFIS? Explain its advantages and disadvantage.	**07**
		OR	
Q.5	**(a)**	Discuss the effects of cross over probability and mutation probabilities on GA performance.	**07**
	(b)	Discuss in brief - scope of ANN-GA-Fuzzy hybrid applications.	**07**

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