Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – III • EXAMINATION – WINTER • 2014

Subject code: 730703 **Date: 27-11-2014**

Subject Name: Intelligent Control

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)**	What is artificial intelligence? How AI techniques are useful in Control systems Engineering?	**07**
	(b)	Classify neural network models. Discuss feed forward neural network in brief.	**07**
Q.2	**(a)**	What do you mean by training of neural network? Explain supervised learning and unsupervised learning with example	**07**
	(b)	Explain the following in brief: (i) Perceptron neural network (ii) Recurrent neural network	**07**
		OR	
	(b)	Explain the conditions under which AI techniques are more suitable over conventional control techniques.	**07**
Q.3	**(a)**	Discuss ANN identification of dynamic model.	**07**
	(b)	Explain following with reference to GA methodology: (1). Initialization (2). Selection (3). Reproduction and (4). Termination	**07**
		OR	
Q.3	**(a)**	Explain the main modules/architecture of the expert systems and stages for the development of the expert systems	**07**
	(b)	Explain evolutionary programming and its merits over other AI techniques.	**07**
Q.4	**(a)**	Define (1) linguistic variable and (2) membership function. Discuss the importance of various membership function in the design of Fuzzy systems	**07**
	(b)	What is defuzzification? Why it is required in Fuzzy logic base Expert systems? Explain various methods of difuzzyfication.	**07**
		OR	
Q.4	**(a)**	Give the difference between crisp set and fuzzy set. Explain the following operations on fuzzy sets giving suitable examples (i) Union (ii) Intersection (iii) Complement	**07**
	(b)	What is data normalization in regards to input patterns of ANN? Explain the method used for data normalization of input patterns to be given as input to the ANN	**07**
Q.5	**(a)**	What is genetic representation? Explain the following genetic representations with appropriate illustrations (i) Binary (ii) Hexadecimal (iii) Octal	**07**
	(b)	With the help of flowchart explain the procedure of genetic algorithms	**07**
		OR	
Q.5	**(a)**	Explain how genetic algorithms differ from other optimization techniques and search procedures	**07**
	(b)	Explain concept of genetic algorithm (GA) in brief. What do you mean by fitness function?	**07**