

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E -IVth SEMESTER-EXAMINATION – MAY- 2012****Subject code: 743101****Date: 12/05/2012****Subject Name: Intelligent Control System****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 intelligent control? What is the difference between IC & PID? **07**
 (b) Explain the concept of fuzziness. How an intelligent control system could be designed using fuzzy control? **07**

- Q.2** (a) Describe chance versus fuzziness with appropriate examples. **07**
 (b) What do you mean by graphical programming language? How LabVIEW is more advantageous over other programming languages? **07**

OR

- (b) What are the crisp tolerance relations? How fuzzy tolerance & equivalence relations are differed from crisp tolerance relations? **07**

- Q.3** (a) What is alpha cut? Explain the usefulness of alpha cuts with examples. **07**
 (b) Explain uncertainty in information. What is uncertainty of membership functions? **07**

OR

- Q.3** (a) Explain mamdani fuzzy controller in detail. **07**
 (b) Explain below given defuzzification methods with graphical representation. **07**
1. Max Membership
 2. Center of area
 3. Mean Max Method
 4. Center of sums

- Q.4** (a) Explain below given statement with necessary examples. **07**
 “The fuzzy logic controllers (FLC) make a non-linear mapping between the input & the output using membership functions and linguistic rules (normally in the form if-then).”
 (b) Briefly describe Takagi–Sugeno Fuzzy Controller. **07**

OR

- Q.4** (a) For research on the human visual system, a visual evoke potential has to be generated by giving visual stimulus to the subject. The input is on the universe $X = [0,50,100,150,200]$ femtotesla and outputs on the universe $Y = [0,50,100,150,200]$ femtotesla. Design two fuzzy input sets of “week stimuli” & “medium stimuli” and an output fuzzy set of “severe response”. Find the fuzzy relationship matrix for both inputs to the output. **07**
 (b) Classify the neural networks by their learning procedure. Give a descriptive answer on tasks and applicability of artificial neural network. **07**

- Q.5** (a) What is an activation function? Describe the types of activation function in detail. **07**
 (b) Briefly explain perceptron neural network. Describe the learning procedure of perceptron network. **07**

OR

- Q.5** (a) Explain the backpropagation algorithm in detail. **07**
 (b) Explain the hebbian neural network. **07**
