



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/M.Tech(EE-OLD)/SEM-2/CI-2.4.2/2011**

**2011**

**SOFT COMPUTING TECHNIQUES**

*Time Allotted : 3 Hours*

*Full Marks : 70*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

Answer any *five* questions.

5 × 14 = 70

1. a) What do you understand by membership function in  
fuzzy logic ? 4

b) Define the following terms with reference to fuzzy set :  
10

i) Support

ii) Fuzzy singleton

iii) Fuzzification

iv) Normal fuzzy set

v) Stronger  $\alpha$  cut.



2. a) What do you understand by concentration and dilation of fuzzy sets ? 4

b) Let  $C$  be the algebraic summation of two fuzzy sets  $A$  and  $B$  expressed by  $C = A + B$  where

$$A = 0.2/1 + 1/2 + 0.4/3$$

$$B = 0.3/1 + 0.4/2 + 0.2/7.$$

Determine  $C$  . 4

c) What is the difference between classical relation and fuzzy relation ? 6

3. a) State and explain extension principle. 6

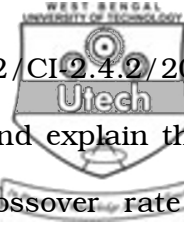
b) What is meant by defuzzification ? What are the different methods of defuzzification ? 8

4. a) Briefly discuss the different components of fuzzy logic controller with detailed block diagram.

b) What do you mean by composition of fuzzy relations ? 14

5. a) What are the different types of activation functions used in artificial neural network ? 7

b) What are the differences between supervised and unsupervised learning ? 7



6. a) Define crossover and mutations rates and explain their impact on GA convergence. Why crossover rate is usually set wet equal to 1 ? 4 + 2
- b) Describe various components of simple genetic algorithm. 8
7. Write short notes on any *two* of the following : 2 ∞ 7
- a) Boltzman machine
- b) Backpropagation training algorithm
- c) Hopfield network.
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