



Name :

Roll No. :

Invigilator's Signature :

**CS/M.Tech(EDPS)/SEM-3/MTEE-314/2009-10
2009**

**MODELING SIMULATION AND EVOLUTIONARY
TECHNIQUES**

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

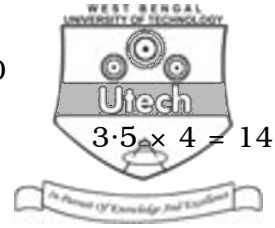
Candidates are required to give their answers in their own words as far as practicable.

Answer any *five* of the following. $5 \times 14 = 70$

1. a) Illustrate the following with diagrams :
 - i) Single Layer Feed forward Network.
 - ii) Multi Layer Feed forward Network
 - iii) Recurrent Networks. $2 + 2 + 2$
- b) Infer the result for the problem described by the following Training sets using Backpropagation neural network learning algorithm : 8

Training sets

Sl. No.	Input		Output
	I_1	I_2	
1	0.4	- 0.6	0.2
2	0.3	- 0.4	0.1
3	0.5	0.2	0.3
4	0.2	0.3	0.2
5	0.1	- 0.2	0.12



2. Explain any *four* genetic operators :

- i) Inversion
- ii) Deletion
- iii) Crossover
- iv) Mutation
- v) Segregation
- vi) Migration.

3. Illustrate any *four* through examples :

$$3.5 \times 4 = 14$$

- i) Support of a fuzzy set.
- ii) Normal and subnormal fuzzy set.
- iii) Absolute and relative complements of a fuzzy set.
- iv) Algebraic sum and algebraic product of a fuzzy set.
- v) Concentration and dilation of a fuzzy set.

4. Illustrate the following through examples :

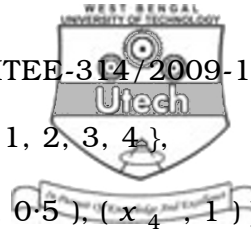
$$2.8 \times 5 = 14$$

- i) Union of two fuzzy relations.
- ii) Intersection of two fuzzy relations.
- iii) Complementation of a fuzzy relation.
- iv) Composition of fuzzy relations.
- v) Max-min composition of fuzzy relations.

5. a) Define and illustrate through example the following fuzzy connectives :

$$1.5 \times 4 = 6$$

- i) Negation
- ii) Disjunction
- iii) Conjunction
- iv) Implication.



b) Let $X = \{x_1, x_2, x_3, x_4\}$, $Y = \{1, 2, 3, 4\}$,

$$A = \{(x_1, 0.2), (x_2, 0.8), (x_3, 0.5), (x_4, 1)\}$$

$$B = \{(1, 0.3), (2, 0.4), (3, 0.7), (4, 0)\}$$

$$\text{and } C = \{(1, 0), (2, 0.4), (3, 0.8), (4, 1)\}.$$

Determine implication relations

i) IF x is A THEN y is B .

ii) IF x is A THEN y is B ELSE y is C . 4 + 4

6. Illustrate the Fuzzy rule base for the air conditioner control system. 2 + 2 + 1 + 1 + 4 + 4

7. What is defuzzification ? Mention different methods of defuzzification. Illustrate the centroid method of defuzzification through example. 2 + 4 + 8

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