Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER • 2014

Subject Code: 173101 **Date: 29-05-2014**

Subject Name: Soft Computing

Time: 02:30 pm - 05:00 pm **Total Marks: 70**

Instructions:

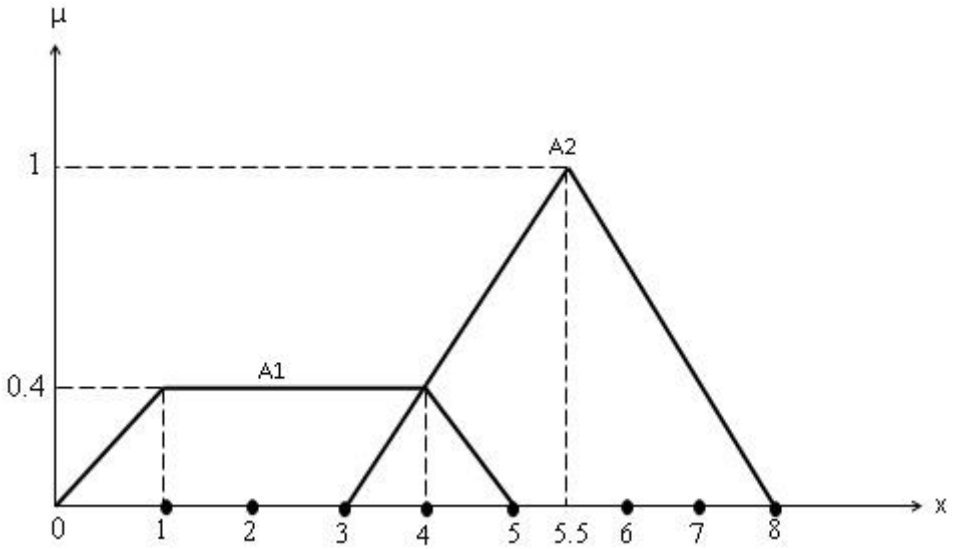
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** What do you mean by linearly separable problem? Give appropriate example for the same problem. Also state the differences between radial basis function networks and multi-layer perceptrons. **07**

(b) Enlist and discuss different fuzzy set theoretic operations with example(s). **07**

Q.2 **(a)** Discuss Backpropagation Network with necessary formulae and support your answer with neat sketches. **07**

(b) Consider A1 and A2 are two different implication processes. The results of these processes are shown in Figure – 1. Using centroid method (or centre of gravity method) and mean of maxima method, find out defuzzified (crisp) output for the aggregated output of A1(trapezoidal shape shown in figure-1) and A2(triangular shape shown in figure-1). **07**



[Figure – 1]

OR

(b) What is meant by hybrid system and discuss its various types. **07**

Q.3 **(a)** (1) Discuss the following terms of fuzzy set theory in brief: **03**

- Core
- Support
- Cross-over points

(2) Explain various encoding methods in genetic algorithm. **04**

(b) Explain any three reproduction methods in genetic algorithm. **07**

OR

Q.3 **(a)** (1) Write a brief note on: 'Kohonen's self organizing networks'. **03**

(2) Consider the fuzzy set A of logic families, the fuzzy set B of delay times, and the fuzzy set C of power dissipations. If A={A1, A2, A3}, B={B1, B2, B3} and C={C1, C2, C3}. Let P be a relation on A x B and Q be a relation on B x C. Find out the association of A with C using max-min composition. **04**

P =

	B1	B2	B3
A1	0.9	0.2	0.1
A2	0.2	1.0	0.0
A3	0.5	0.4	0.3

Q=

	C1	C2	C3
B1	0.1	0.2	0.3
B2	0.9	1.0	0.4
B3	0.7	0.4	0.6

(b) What is traveling salesperson problem? Explain cross-over operation for the solution of the same problem using genetic algorithm. **07**

Q.4 **(a)** (1) Explain mamdani fuzzy inference model in brief. **03**

(2) Discuss upper and lower approximation in rough set theory with proper illustration. **04**

(b) Write the differences between classical algorithm and genetic algorithm. Explain different types of cross-over methods in genetic algorithm with example(s). **07**

OR

Q.4 **(a)** (1) Enlist and explain various artificial neural network architectures. **04**

(2) What is learning by analogy and by discovery in machine learning? **03**

(b) (1) State the difference(s) between fuzzy set and rough set. What do you mean by reducts in rough set theory? **04**

(2) What is meant by fitness function in genetic algorithm? **03**

Q.5 **(a)** Write a detailed note on 'Adaptive Neuro-Fuzzy Inference System'. **07**

(b) Discuss 'Speech recognition' as an application of Neuro-Fuzzy modeling. Also discuss concept formation in machine learning briefly. **07**

OR

Q.5 **(a)** Discuss Color recipe prediction as an application of computational intelligence in soft computing. **07**

(b) Write detailed note on 'GA based weight optimization'. **07**

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