Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VII (OLD) - EXAMINATION – SUMMER 2018

Subject Code:173101   **Date:05/05/2018**
Subject Name: Soft Computing
Time:02:30 PM to 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)**	Discuss backpropagation algorithm in detail with proper illustration.	**07**
	(b)	(i) Explain different neural network architecture.	**04**
		(ii) Correct the following statement, if incorrect then give proper justification. "XOR problem is linearly separable problem."	**03**
Q.2	**(a)**	How Travelling Salesman Problem(TSP) can be solved using GA. Describe operation performed in different phases using suitable examples.	**07**
	(b)	Discuss various operations of fuzzy sets with example.	**07**
		OR	
	(b)	Let R and S be fuzzy relations given below find max-min composition and max prod composition.	**07**

$$R = \begin{bmatrix} 0.5 & 0.1 \\ 0.2 & 0.9 \\ 0.8 & 0.6 \end{bmatrix} \qquad S = \begin{bmatrix} 0.6 & 0.4 & 0.7 \\ 0.5 & 0.8 & 0.9 \end{bmatrix}$$

Q.3	**(a)**	(i) Compare : Supervised Vs. Unsupervised learning	**02**
		(ii) Why single layer perceptron is not capable of solving inseparable problem?	**02**
		(iii) Discuss the following terms in brief:	**03**
		1) Offspring generation 2) Fitness function	
	(b)	Explain how genetic algorithm used for weight optimization in neural network.	**07**
		OR	
Q.3	**(a)**	What do you mean by hybrid system? Discuss advantages and application of neuro fuzzy hybrid system.	**07**
	(b)	Explain adaptive neuro fuzzy inference system in detail.	**07**
Q.4	**(a)**	Discuss learning by observation and learning by analogy with respect to machine learning.	**07**
	(b)	Write the need of defuzzification in fuzzy set theory. Enlist and Explain different methods of defuzzification in brief.	**07**
		OR	
Q.4	**(a)**	Elaborate printed character recognition as an application of computational intelligence.	**07**
	(b)	(i) What do you mean by cross over reproduction?	**03**
		(ii) Discuss following terms: Perceptron, Membership function	**04**

Q.5 (a) Consider a set P = {P1, P2, P3, P4} of four varieties of paddy plants, set D = {D1, D2, D3, D4} of the various diseases affecting the plants and S = {S1, S2, S3, S4} be the common symptoms of the diseases. Let R be a relation on P x D and S be a relation on D x S. **07**

	D1	D2	D3	D4
P1	0.0	0.5	0.2	0.8
P2	0.3	0.1	0.3	0.2
P3	0.5	0.0	0.4	0.0
P4	0.8	0.9	0.5	1.0

	S1	S2	S3	S4
D1	1.0	0.9	0.3	0.5
D2	0.9	0.8	0.1	0.8
D3	0.2	1.0	0.5	1.0
D4	0.8	1.0	0.6	1.0

Obtain the association of the plants with the different symptoms of the diseases using max-min composition.

(b) What do you mean by activation function, bias and delta rule? Describe different activation functions in neural network. **07**

OR

Q.5 (a) (i) Discuss sequence prediction in machine learning. **04**

(ii) Discuss fuzzy membership interpretation using rough set theory. **03**

(b) Explain Mamdani fuzzy inference system with example. **07**

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