

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**EIGHTH SEMESTER B.TECH DEGREE EXAMINATION(S), OCTOBER 2019**

**Course Code: MR402**

**Course Name: SOFT COMPUTING TECHNIQUES**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 5 marks.*

		Marks
1	Define Soft Computing and list out its constituents	(5)
2	Illustrate with diagram the working of fuzzy inference system	(5)
3	Draw the diagram which represents various units of perceptron network?	(5)
4	Differentiate between supervised and unsupervised learning?	(5)
5	Write applications for adaptive systems?	(5)
6	Draw a flow diagram which depicts ANFIS procedure?	(5)
7	Write a short note on character recognition using neural network?	(5)
8	What is the difference between forward and inverse kinematics problem?	(5)

**PART B**

*Answer any three full questions, each carries 10 marks.*

9	a) Write a note on characteristics of Soft computing	(7)
	b) Explain the term: a) Fuzzy number b) open-right	(3)
10	a) What are the different methods used in derivative based optimization	(6)
	b) Explain the terms: a) Step Size b) direction vector c) $\Theta$	(4)
11	a) Describe genetic algorithm?	(2)
	b) Define the terms Chromosome, population, Gene, allele	(8)
12	a) How the learning vector quantization is differing from KSOM?	(10)
13	a) Discuss about set theoretic operations	(10)
14	a) Explain learning algorithm used in ADALINE with flowchart?	(5)
	b) What are the various types of cross over and mutation techniques?	(5)

**PART C**

*Answer any two full questions, each carries 15 marks.*

15	a) Consider the following rules;	(15)
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Rule 1: If  $x$  is  $A_1$  and  $y$  is  $B_1$  then  $f_1 = p_1x + q_1y + r_1$

Rule 2: If  $x$  is  $A_2$  and  $y$  is  $B_2$  then  $f_2 = p_2x + q_2y + r_2$

Based on the rule, construct a first order Sugeno model and its equivalent

- ANFIS architecture?
- 16 a) Elaborate about the Neuro fuzzy spectrum? (5)
- b) Explain in detail about the learning methods that cross fertilize ANFIS and RBFN methods? (10)
- 17 a) Elucidate about the joint variables? (5)
- b) Describe about the Kinematic chain in forward and inverse kinematic problem? (5)
- c) Explain about Denavit-Hartenberg convention in forward kinematic problem? (5)

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