

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

Course Code: MR402

Course Name: Soft Computing Techniques

Max. Marks: 100

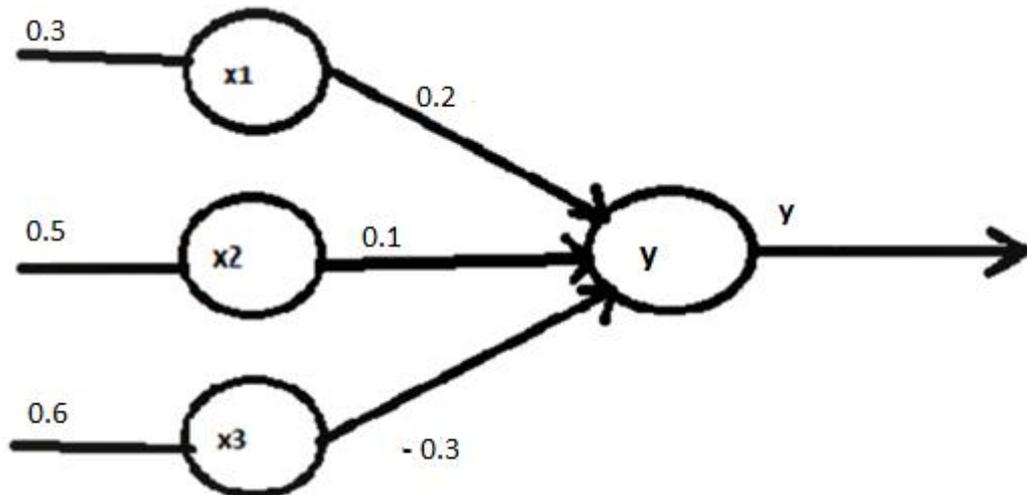
Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks.

Marks

- | | | |
|---|--|-----|
| 1 | Define the terms:
a) Convexity b) Bandwidth c) Symmetry d) Open left e) Fuzzy Singleton | (5) |
| 2 | Define gradient function. What are the stopping criteria used in gradient method | (5) |
| 3 | Explain learning algorithm used in ADALINE with flowchart? | (5) |
| 4 | For the network shown below, calculate the net input to the output neuron? | (5) |



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|---|---|-----|
| 5 | Write a note on nearest neighbouring algorithm | (5) |
| 6 | With adequate figure, explain about the input and output relation in colour recipe prediction system? | (5) |
| 7 | Explain about the four-rule ANFIS equalizer? | (5) |
| 8 | Point out the applications of adaptive systems in soft computing | (5) |

PART B

Answer any three full questions, each carries 10 marks.

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|---|--|-----|
| 9 | a) State Extension Principle. Illustrate its necessity in Fuzzy Set | (5) |
| | b) Define Fuzzy relations. Describe the different types of relations used. | (5) |

- 10 a) Explain the terms: a) Hessian matrix b) Newton Step (5)
b) Write a note on approach used in method of steepest descent (5)
- 11 a) Write a note on steps used in downhill simplex search (5)
b) What are the various types of cross over and mutation techniques? (5)
- 12 a) Determine the weights after one iteration for Hebbian learning of a single neuron network starting with initial weights $w=[1,-1]$ input as $x_1=[1,2]$, $x_2=[2,3]$, $x_3=[1,-1]$ and $c=1$. (Use bipolar activation function) (5)
b) Discuss about Kohonen self-organizing networks (5)
- 13 a) Using the genetic algorithm process, minimize the function $f(x)=x^2+5x$. Assume the necessary operators for the process on your own? (10)
- 14 a) Design a 3-3-2 back propagation network (5)
b) With a neat architecture, write the training algorithm and testing algorithm of adaline network? (5)

PART C

Answer any two full questions, each carries 15 marks.

- 15 a) Construct an ANFIS that is equivalent to a two input two rule Mamdani fuzzy model with max min composition and Centroid defuzzification. Explain the function that is used to approximate Centroid defuzzification. (15)
- 16 a) Describe about the hybrid learning algorithm? (5)
b) Elaborate the learning methods that cross fertilize ANFIS and RBFN methods? (10)
- 17 a) Illustrate the CANFIS with five colour rules for colour recipe prediction system? (15)
