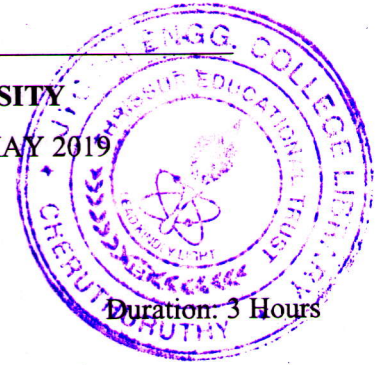Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

Course Code: CS361

Course Name: SOFT COMPUTING

Max. Marks: 100   Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.   Marks

1	Describe the importance of Back Propagation Network.	(3)
2	Write three application scope of the Neural Network.	(3)
3	Explain Perceptron Training Algorithm for Single Output Class.	(3)
4	What is Activation Function and write its importance.	(3)

PART B

Answer any two full questions, each carries 9 marks.

5	a)	Implement ANDNOT function using McCulloch-Pitts neuron model. (Use binary data representation).	(7)
	b)	Differentiate between Hard Computing and Soft Computing.	(2)
6	a)	Explain the training algorithm for Hebb Network.	(6)
	b)	Write the learning factors of Back Propagation Network.	(3)
7	a)	With the help of an example explain Supervised, Unsupervised, Reinforcement learning.	(6)
	b)	What is ADALINE . Why it is trained using least mean square rule.	(3)

PART C

Answer all questions, each carries 3 marks.

8	Represent the standard fuzzy set operations using Venn diagram.	(3)
9	Why the excluded middle law does not get satisfied in fuzzy logic.	(3)
10	Describe the features of membership function.	(3)
11	Consider the discrete fuzzy set defined on the universe $X= \{a, b, c, d, e\}$ as	(3)

$A=\left\{\frac{1}{a}+\frac{0.9}{b}+\frac{0.6}{c}+\frac{0.3}{d}+\frac{0}{e}\right\}$. Using Zadhe's notation , find the $\lambda-$ cut sets for $\lambda=0.6, 0.3, 0^+$.

PART D

Answer any two full questions, each carries 9 marks.

12	a)	Using the inference approach, obtain the membership values for the triangular shapes, **(I,R,T)** for a triangle with angles $40^\circ, 60^\circ , 80^\circ$.	(6)
	b)	What is cardinality of a fuzzy set. Whether a power set can be formed for a fuzzy set. Justify your answer.	(3)

13 a) Differentiate the following (3)

   (a) Convex and Nonconvex Fuzzy Set.

   (b) Normal and Subnormal Fuzzy Set.

   b) For a speed control of DC motor, the membership function of series resistance, (6)
   armature current and speed are given as follows

$$R_{se} = \left\{\frac{0.4}{30} + \frac{0.6}{60} + \frac{1.0}{100} + \frac{0.1}{120}\right\}$$

$$I_a = \left\{\frac{0.2}{20} + \frac{0.3}{40} + \frac{0.6}{60} + \frac{0.8}{80} + \frac{1.0}{100} + \frac{0.2}{120}\right\}$$

$$N = \left\{\frac{0.35}{500} + \frac{0.67}{1000} + \frac{0.97}{1500} + \frac{0.25}{1800}\right\}$$

   Compute relation T for relating series resistance to motor speed ie R_{se} to N. Perform
   max-min composition.

14   Explain different defuzzification methods. (9)

PART E

Answer any four full questions, each carries 10 marks.

15 a) With the help of a block diagram explain Genetic Neuro Hybrid Systems. (6)

   b) Write a note on Fuzzy Qualifiers. (4)

16 a) Explain the methods used for decomposing compound linguistic rules into simple (6)
   canonical rules.

   b) Explain the steps of Genetic Algorithm. (4)

17 a) Describe two methods used for Aggregation of Fuzzy Rules. (3)

   b) Write any three advantages of Neuro- Genetic hybrid system. (3)

   c) Explain Value Encoding and Permutation Encoding with example. (4)

18 a) Explain stopping condition for Genetic Algorithm. (5)

   b) Describe 5 types of Crossover. (5)

19 a) Distinguish between Mamdani FIS and Sugeno FIS. (6)

   b) Explain Stochastic Universal Sampling with example. (4)

20 a) Explain the following terms (10)

   (a) Cooperative Neural Fuzzy Systems

   (b) General Neuro Fuzzy Hybrid Systems

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