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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth Semester B.Tech Degree Regular and Supplementary Examination December 2023 (2019 Scheme)

Course Code: MRT 307

Course Name: SOFT COMPUTING TECHNIQUES

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks) Marks

1		What are the features of membership function?	3
2		Explain the theoretic operations over fuzzy set?	3
3		Illustrate the block diagram of FIS?	3
4		Discuss about gradient descent method?	3
5		Explain the Widrow-Hoff learning rule used for supervised learning in neural network	3
6		Define the basic terminologies used in Genetic algorithm?	3
7		What is competitive learning in unsupervised learning?	3
8		Explain about Hybrid learning algorithm?	3
9		Describe about RBFN concept used in soft computing.	3
10		Differentiate between two kinematics problems.	3

PART B

(Answer one full question from each module, each question carries 14 marks)

Module -1

11	a)	Define fuzzy set and membership function. Explain any 5 membership functions?	9
	b)	Consider two given fuzzy sets	5

$$A = \left\{\frac{1}{2} + \frac{0.3}{4} + \frac{0.5}{6} + \frac{0.2}{8}\right\}$$

$$B = \left\{\frac{0.5}{2} + \frac{0.4}{4} + \frac{0.1}{6} + \frac{1}{8}\right\}$$

Perform Union, Intersection, Difference and Complement over fuzzy set A and B.

12	a)	List out the methods of membership value assignments? Explain any two methods in detail?	7
	b)	Write a note on fuzzy if then rules	7

Module -2

13		What is Defuzzification? Explain Defuzzification methods given below : • Max-membership principle • Centroid method • Weighted average method • Mean-max membership • Center of sums • Center of largest area	14
14		Explain in detail about Mamdani and Sugeno fuzzy inference system?	14

Module -3

15		Illustrate the perceptron network with perceptron training algorithm?	14
16		Define selection in genetic algorithm? Explain the various types of selection methods?	14

Module -4

17	a)	Discuss about Hebbian learning algorithm?	7
	b)	Describe about Learning Vector Quantisation?	7
18	a)	Elaborate about kohonen self-organizing feature map?	7
	b)	Explain about Radial basis function with its architecture?	7

Module -5

19		Explain Adaptive Neuro-Fuzzy inference system with its architecture?	14
20		What is colour recipe prediction? Explain how color recipe prediction can be done using soft computing?	14

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