Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S5 (R,S) Examination November 2025 (2019 Scheme)

Course Code: MRT307

Course Name: SOFT COMPUTING TECHNIQUES

Max. Marks: 100 Duration: 3 Hours

PART A

(Answer all questions; each question carries 3 marks)

		Marks
1	Define soft computing and list out its constituents	3
2	Differentiate fuzzy set and classical set.	3
3	Point out the stopping criterion used in gradient descent method.	3
4	Write a note on Newton's method in derivative based optimization?	3
5	Define the terms: a) Bias b) Activation function c) Weight	3
6	Discuss about Crossover and Mutation technique used in Genetic Algorithm? Explain with an example.	3
7	Differentiate between supervised and unsupervised learning?	3
8	Write a note on Hebbian learning?	3
9	Describe about CANFIS architecture	3
10	Write a short note on automobile fuel efficiency prediction using soft computing.	3

PART B

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

Module -1

11 a) Consider two fuzzy sets A and B: 6

$$A = \{\frac{0.2}{1} + \frac{0.6}{2} + \frac{0.5}{3} + \frac{0.8}{4} + \frac{0.4}{5} + \frac{1}{6}\}$$

$$B = \{\frac{0.3}{1} + \frac{0.8}{2} + \frac{0.6}{3} + \frac{0.9}{4} + \frac{0.2}{5} + \frac{1}{6}\}$$

Find the following:

a) AUB b) $A \cap B$ c) $\bar{A}$ d) $\bar{A} \cup \bar{B}$ e) $A \cap \bar{B}$

	b)	Define: a) Triangular Membership Function b) Generalized Bell Membership Function c) Gaussian Membership Function d) Trapezoidal membership function	8
12	a)	Elaborate about different fuzzy reasoning methods.	10
	b)	Explain the term a) Core b) Support c) Fuzzy number d) Membership function	4

Module -2

13	a)	Explain the sugeno fuzzy model & its types with example.	7
	b)	Describe about any 3 defuzzification methods	7
14		Discuss about derivative based optimization techniques	14

Module -3

15	a)	Write a note on Simulated annealing concept	7
	b)	Explain and draw the flowchart of ADALINE learning algorithm	7
16		Illustrate the concept of genetic algorithm in detail.	14

Module -4

17	a)	Describe about kohonen Self organizing network	7
	b)	Explain in detail about Competitive Learning networks	7
18		Illustrate and explain the various unsupervised learning networks	14

Module -5

19		Discuss the implementation of colour recipe prediction using soft computing method.	14
20		Describe CANFIS and ANFIS system working models with examples?	14

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