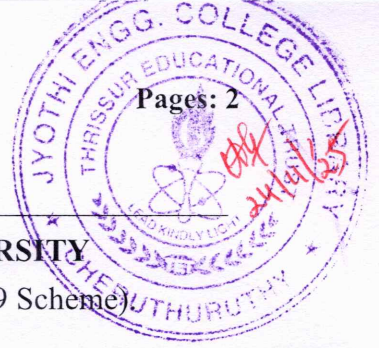


Reg No.: _____

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

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

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

Find the following:

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

- b) Define: 8
- a) Triangular Membership Function
 - b) Generalized Bell Membership Function
 - c) Gaussian Membership Function
 - d) Trapezoidal membership function
- 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
