Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - VI EXAMINATION - SUMMER 2025

Subject Code: 3160619 **Date: 26-05-2025**

Subject Name: Soft Computing Techniques

Time: 10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	Define Soft Computing. Enlist Various Soft Computing.	**03**
	(b)	Explain concept of Neural networks and the various types of learning.	**04**
	(c)	Differentiate between Hard Computing and Soft Computing with examples.	**07**
Q.2	**(a)**	What is Fuzzy logic.	**03**
	(b)	Explain the significance of Fuzzy Logic and Fuzzy Sets in detail.	**04**
	(c)	What is membership function? Draw the various membership functions of fuzzy sets with a suitable mathematical formula.	**07**
		OR	
	(c)	Define with examples (1) Fuzzy Sets, (2) Grade ship function, (3) Fuzzy Rules (If else rules).	**07**
Q.3	**(a)**	What is meant by Genetic Algorithm?	**03**
	(b)	Draw the framework of GA.	**04**
	(c)	Discuss applications of ANN to solve engineering and technical problems.	**07**
		OR	
	(a)	Explain Genetic Algorithm with examples.	**03**
	(b)	What are the applications of GA in civil engineering?	**04**
	(c)	What are the advantages and drawbacks of ANN, provide comparative analysis.	**07**
Q.4	**(a)**	Write a short note on Mamdani or Sugeno FIS for the formation of inference rules.	**03**
	(b)	List different types of activation functions used in ANN's.	**04**
	(c)	What are the different defuzzification techniques using in Fuzzy Rationale?	**07**
		OR	
	(a)	What is meant by Crossover and Mutation.	**03**
	(b)	What is meant by Selection and Encoding. Explain with help of examples in reference with Genetic Algorithm.	**04**

	(c)	What is the basic framework of fuzzy logic. Draw the ANN architectures.	**07**
Q.5	**(a)**	What is Hybrid Computing Technique.	**03**
	(b)	How does hybrid computing can be used in technical analysis.	**04**
	(c)	Describe Fuzzy Neural (Neuro-Fuzzy) System. Explain with the help of example.	**07**

OR

	(a)	Explain genetic-neural system (Neuro-Genetic) in detail.	**03**
	(b)	How genetic neural system is helpful in engineering solutions	**04**
	(c)	Explain various applications of Hybrid and soft computing techniques.	**07**

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