Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI (NEW) EXAMINATION – WINTER 2024

Subject Code:3160619 Date:28-11-2024

Subject Name:Soft Computing Techniques

Time:02:30 PM TO 05:00 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)**	Explain the terms: (a) Fuzziness, (b) Power set, (c) Union of two sets.	**03**
	(b)	Write the applications of soft computing techniques.	**04**
	(c)	Differentiate between hard computing and soft computing. Also discuss the characteristics of soft computing.	**07**
Q.2	**(a)**	Write the disadvantages of GA.	**03**
	(b)	Write the components of a fuzzy logic system and explain them.	**04**
	(c)	Define defuzzification and explain the different defuzzification methods.	**07**
		OR	
	(c)	Explain different cross over operations performed in GA	**07**
Q.3	**(a)**	Give the difference between conditional fuzzy proposition and unconditional fuzzy proposition.	**03**
	(b)	Explain the various ways by which membership values can be assigned to fuzzy variables.	**04**
	(c)	Explain fuzzy Cartesian and composition with a suitable example.	**07**
		OR	
Q.3	**(a)**	Define: (a) Swap mutation, (b) Inversion mutation and (c) Scramble mutation.	**03**
	(b)	What is Roulette wheel selection in GA? Explain in detail.	**04**
	(c)	Explain input layer, hidden layer & output layer computations in Backpropagation Network.	**07**
Q.4	**(a)**	Briefly explain Associative Memory.	**03**
	(b)	Discuss the fitness function in GA.	**04**
	(c)	Describe the basic steps of Genetic Algorithm used for solving optimization techniques and compare the features of Genetic Algorithm with other optimization techniques..	**07**
		OR	
Q.4	**(a)**	Write the advantages and applications of ANN.	**03**
	(b)	Explain sigmoid and tanh activation functions of ANN.	**04**
	(c)	Explain the basic architecture of McCulloch – Pitts neuron model.	**07**
Q.5	**(a)**	List few applications of Neuro fuzzy systems.	**03**
	(b)	Implement a perceptron to solve simple AND problem with two inputs.	**04**
	(c)	What do you mean by neuro fuzzy controller? Explain in detail.	**07**
		OR	
Q.5	**(a)**	List few applications of hybrid fuzzy Genetic algorithm systems.	**03**
	(b)	Explain briefly the features and importance of neuro-genetic system.	**04**
	(c)	With suitable block diagram, explain the principle involved in a water level control sensor using neuro-fuzzy technique.	**07**

****