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**Presidency University**

**Bengaluru**

 **School of Engineering & School of Computer Science Engineering**

**Make-up Examinations July 2024**

**Date**: 05 JULY 2024

**Time**: 01:30pm – 04.30pm

**Max Marks**: 100

**Weightage**: 50%

**Even Semester**: B. Tech. 2023 - 24

**Course Code**: CSE3007

**Course Name**: Introduction to Fuzzy Logic

**Department:** Computer Science and Engineering

 **Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*
3. *Scientific Calculators, mobile phones or any resources (internet) are STRICTLY PROHIBITED.*

 **PART A** (CO1, Comprehension)

 **Answer any six questions. 6x5= 30 Marks**

* 1. **Define Reflexivity and symmetry of a binary fuzzy relation on a single set?**
	2. **What is fuzzy operator tuning?**
	3. **Describe the characteristics of ANN? What is Perceptron? Describe Multilayer Perceptron?**
	4. **Define Height and Core of a Fuzzy set with suitable examples?**
	5. **Explain a fuzzification method.**
	6. **Recall Fuzzy quantifier and their types?**
	7. **Distinguish between Discrete and Continuous Fuzzy set?**
	8. **Explain the properties of alpha-cut in detail?**

**PART B** (CO2, Comprehension)

**Answer any five questions. 5x6=30 Marks**

* 1. **Describe the different properties of fuzzy sets.**
	2. **Define Dilation,** **Concentration and Contrast intensification on fuzzy sets.**
	3. **Explain with example Linguistic variables and Hedges**
	4. **Let a,b,c,d and e be five students who scored 55,35,60, 85 and 75 out of 100 respectively in Science. For the universe discourse U={a,b,c,d,e} defined on Fuzzy set S with following membership function. Compute the membership value of each element of Fuzzy set S using the below formula and draw the graph.**
	5. **Give the equation to find algebraic sum and algebraic difference of two fuzzy sets. And also apply the same formula on the given A(x)={(x1,0.1),(x2,0.2),(x3,0.3),(x4,0.4)} and B(x)={(x1,0.5),(x2,0.7),(x3,0.8),(x4,0.9)}.**
	6. **Demonstrate equal and complement of Fuzzy sets with an example.**
	7. **Write a short notes on aggregation of fuzzy rules and explain about determination of aggregation strategy.**
	8. **Write a notes on decision making under fuzzy states and fuzzy actions?**

 **PART C** (CO3, Problem Solving)

 **Answer any 3 Questions. (4Qx 10M= 40M)**

* 1. **Using your own institution, develop fuzzy membership functions on the real linefor the fuzzy numbers 3, using the following function shapes**

**(a) Symmetric triangle**

**(b) Trapeziod**

**(c) Gaussian function.**

* 1. **What is gradient descent? How it is effective in error optimization? Explain with diagram and impact of learning rate on it?**
	2. **Explain in detail the different types of Fuzzy relations and Fuzzy set operations?**
	3. **Max min composition and Max product composition Let A and B be two fuzzy relations expressed in the matrix form, Find C, the composition of two fuzzy relations. Also find the max-product composition for the same?**