



**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

MAKEUP EXAMINATION – JAN 2023

Course Code: CSE 3007

Course Name: Introduction to Fuzzy Logic

Program : B.Tech

Date: 31-JAN-2023

Time: 09:30 AM – 12:30 PM

Max Marks: 100

Weightage:50%

Instructions:

- (i) Read the all questions carefully and answer accordingly.
(ii) Scientific and Non-programmable calculators are permitted.

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries FIVE marks. (6Qx 5M= 30M)

- How would you define a fuzzy set it closed or open. Relate with an example.
[C.O.NO 2] [KNOWLEDGE]
- List the advantages of fuzzy logic over crisp logic with an example.
[C.O.NO 1] [KNOWLEDGE]
- Define Generalized Modus Pollens and Generalized Modus Tollens
[C.O.NO 3] [KNOWLEDGE]
- Define the various defuzzification techniques.
[C.O.NO 3] [KNOWLEDGE]
- Define the concept of Concentration and dilation in generation of Membership functions.
[C.O.NO 1] [KNOWLEDGE]
- State core, support and normality in membership function.
[C.O.NO 1] [KNOWLEDGE]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries FIFTEEN marks. (2Qx15M=30M)

- In the student's evaluation system based on their GPA and GRE scores, there are three categories for each score as HIGH (H), Medium (M) and Low (L). The decision should be Good (G), Fair (F), and Poor (P). The fuzzy variable range is given in the following table.

	Fuzzy variable range		
	L/P	M/F	H/G
GPA	5-8	6-9	7-10
GRE	600-1200	1000-1500	1300-1800
Decision	50-65	60-85	75-100

Use triangular membership function. Experts associate the decision to the GPA and GRE scores as given below.

GPA	L	M	L	H	L	M	M	H	H
GRE	L	L	M	L	H	M	H	M	H
Decision	P			F			G		

Identify a student with GPA and GRE scores of 8 and 1400 respectively. Use any centroid method for defuzzification process. **[C.O.NO 4] [COMPREHENSION]**

8. Consider two fuzzy sets one representing a scooter and other van

Scooter = $\{(a, 0.6), (b, 0.3), (c, 0.8), (d, 0.9), (e, 0.1)\}$

Van = $\{(a, 1), (b, 0.2), (c, 0.5), (d, 0.3), (e, 0.2)\}$

Infer the following:

[C.O.NO 2] [COMPREHENSION]

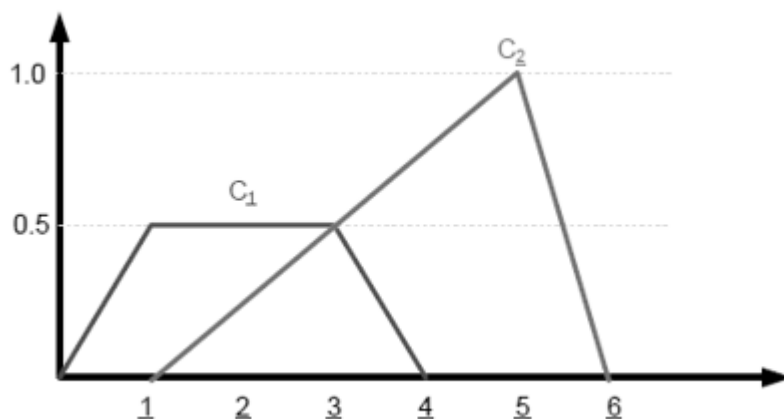
- $Scooter \cup Van$
- $Scooter \cap \overline{Scooter}$
- $\overline{Scooter \cup Scooter}$
- $\overline{Scooter} \cap \overline{Van}$
- $Scooter_{0.8}$

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries TWENTY marks.

(2Qx20M=40M)

9. Consider the output fuzzy sets as shown in the following plot:



Compute the crisp value using CoG, CoS and CoA methods. **[C.O.NO 3] [APPLICATION]**

10. Presidency University has decided to automate the attendance marking system of each class using RFID tags. The input given to system is Roll No and entry time of a student into the class. Using your own intuition, demonstrate Fuzzy Logic Controller to decide whether a student is present in the class or absent based on the entry time of the class.

[C.O.NO 4] [APPLICATION]