JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- FEB-2025

COURSE CODE(CREDITS): 21B1WMA831 (3) MAX. MARKS: 15

COURSE NAME: Soft Computing & Optimization Algorithms

COURSE INSTRUCTORS: Dr. B. K. Pathak MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory.*
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

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Q.No.	Question	CO	Marks
Q1	Consider a fuzzy set A defined on the universal set $X=\{1,2,3,4,5,6\}$ with the following membership function: $A=\{(1,0),(2,0.6),(3,1),(4,1),(5,0.4),(6,0)\}$ (a) Determine the **core** of the fuzzy set A. (b) Find the **support** of A. (c) Identify the **boundary** of A.	**CO-1**	**3**
Q2	Imagine that two restaurants, restaurant A and restaurant B, are evaluated based on customer satisfaction for five key aspects: **1-Food Quality, 2-Service Speed, 3-Cleanliness, 4-Ambience and 5-Pricing** Each aspect is rated between 0 and 1, where 0 represents very poor satisfaction and 1 represents maximum satisfaction. • Restaurant A's customer satisfaction levels across the five aspects are represented as fuzzy set A: $A=\{(1,0.2),(2,0.5),(3,0.8),(4,1.0),(5,0.6)\}$ • Restaurant B's customer satisfaction levels for the same aspects are given by fuzzy set B: $B=\{(1,0.7),(2,0.4),(3,0.9),(4,0.5),(5,0.3)\}$ Compute the following: (a) The best possible experience if we pick the highest satisfaction from both restaurants. (b) The most conservative experience, considering only aspects where both restaurants perform well. (c) The dissatisfaction levels with restaurant A. (d)The aspects where restaurant A is superior to restaurant B	**CO-1**	**4**

Q3	Let a fuzzy set A be defined on the interval X=[0,10] with the following membership function: $$\mu_A(x) = \frac{x}{10} \quad ; \quad 0 < x < 10$$ (a) Compute the **cardinality** of the fuzzy set A. (b) Determine the **relative cardinality** of A with respect to the universal set X=[0,10].	**CO-2**	**4**
Q4	Plot and write the **trapezoidal membership function** for a fuzzy set A with the following breakpoints: a=2, b=4, c=6, d=8. Also, find $\mu_A(x)$ for: **(a)** $x_1 = 3$ **(b)** $x_2 = 7$	**CO-2**	**4**