

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- FEB-2023

COURSE CODE(CREDITS): 21B1WMA831 (3)

MAX. MARKS: 15

COURSE NAME: Soft Computing & Optimization Algorithms

COURSE INSTRUCTORS: Dr. B. K. Pathak

MAX. TIME: 1 Hour

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*Note: All questions are compulsory. Marks are indicated against each question in square brackets.*

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1. Draw the basic diagram for the concept of computing and write their important characteristics. [CO-1][3 Marks]

2. Find the cardinality of the fuzzy set  $A$  whose membership function is given as:

[CO-2] [3 Marks]

$$\mu_A(x) = \begin{cases} 0 & ; 0 \leq x \leq 2 \\ (x-2)/2 & ; 2 < x < 4 \\ 1 & ; 4 \leq x \leq 6 \\ (8-x)/2 & ; 6 < x < 8 \\ 0 & ; x \geq 8 \end{cases}$$

Also plot the membership function of fuzzy set  $A$ .

3. The amount of “total suspended solids” (TSS) in a river vary with the seasons, as do the flows. For example, in the summer when the flows are lowest, the TSS can be the highest. For the two particular rivers shown here, calculate the union, intersection, and difference of the membership functions: [CO-2] [3 Marks]

$$A = \left\{ \frac{0.15}{\text{winter}} + \frac{0.33}{\text{spring}} + \frac{0.52}{\text{summer}} + \frac{0.25}{\text{fall}} \right\}.$$

$$B = \left\{ \frac{0.1}{\text{winter}} + \frac{0.55}{\text{spring}} + \frac{0.9}{\text{summer}} + \frac{0.2}{\text{fall}} \right\}.$$

4. Let  $R$  be a relation on the set  $A = \{ 1, 2, 3 \}$  is defined as  $\{ (1,1), (2,2), (1,3), (2,3) \}$ . Is this relation transitive or not? [CO-2] [3 Marks]
5. Write the basic tools of soft computing techniques and give their example, where these tools can be used. [CO-1] [3 Marks]