224 CSD
21

FACULTY OF ENGINEERING & TECHNOLOGY
UNIVERSITY OF LUCKNOW
First Mid Term Examination
B. Tech (CSE-AI), Semester–VI, 2023-24

Student's Name & Roll No.....

Subject Code: AI-6031 | **Subject: Soft Computing**
Time: 1 Hrs. | **Max. Marks: 20**
Instruction: Attempt all sections. | **Course: B. Tech**

SECTION A

1. Attempt all parts **(1X5 = 5)**

a) What is the fuzzy logic? Describe any one application of it.

b) Enlist and explain properties of fuzzy sets.

c) What is Fuzzy Logic System? Why is it needed?

d) Consider the fuzzy relation

$$R=\begin{bmatrix} 1 & 0.8 & 0 & 0.1 & 0.2 \\ 0.8 & 1 & 0.4 & 0 & 0.9 \\ 0 & 0.4 & 1 & 0 & 0 \\ 0. & 1.0 & 0 & 1 & 0.5 \\ 0.2 & 0.9 & 0 & 0.5 & 1 \end{bmatrix}$$

Perform λ-cut operations for the values of $\lambda = 0.9$

e) Explain the features of membership functions?

SECTION B

Answer any THREE questions. (5X3 = 15)

2. Consider two fuzzy sets

$$A = \{\frac{0.2}{0} + \frac{0.3}{1} + \frac{1}{2} + \frac{0.1}{3} + \frac{0.5}{4}\}$$

$$B = \{\frac{0.1}{0} + \frac{0.25}{1} + \frac{0.9}{2} + \frac{0.7}{3} + \frac{0.3}{4} + \frac{0.2}{5}\}$$

Find the following:

(a) Algebraic sum

(b) Bounded sum

(c)Bounded Difference

3.Given two universes X={x1,x2,x3,x4,x5} and Y={y1,y2,y3,y4,y5},the fuzzy sets A defined on X and fuzzy set B defined on Y are given below.

(a) Find the relation $R = A \times B$

$$A = \{\frac{0.4}{X1} + \frac{0.7}{X2} + \frac{1}{X3} + \frac{0.8}{X4} + \frac{0.6}{X5}\}$$

$$B = \{\frac{0.2}{y1} + \frac{0.6}{y2} + \frac{1}{y3} + \frac{0.9}{y4} + \frac{0.7}{y5}\}$$

Consider another fuzzy set C defined on the universe V = {v1, v2, v3}

$$C = \{\frac{0.4}{v1} + \frac{1}{v2} + \frac{0.8}{v3}\}$$

(b) Find $P = B \times C$.

(c) Using max-min composition finds RoP

.4. Explain any two de-fuzzification methods?

5) List and explain the various operations that can be performed in fuzzy relations.