BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BE **SEMESTER: VII**
BRANCH: CSE **SESSION : MO/2019**

SUBJECT : CS5105 SOFT COMPUTING

TIME: 1.5 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1 (a) What is fuzziness? Explain with example. [2]
(b) Define fuzzy set. Elaborate the importance of membership values. [3]

Q2 (a) Let A and B be fuzzy sets defined on a universal set X. Prove that [2]
$|A| + |B| = |A \cup B| + |A \cap B|$
(b) Let A and B be two fuzzy sets defined as [3]
$A = .7/x_1 + .5/x_2 + .7/x_3 + .9/x_4 + 1/x_5$, and
$B = .8/x_1 + .9/x_2 + 1/x_3 + .9/x_4 + ..2/x_5$
Find (a) A-B (b) $A \cup B$ (c) $.5^+(A \cap B)$

Q3 Let A and B be two fuzzy numbers defined as [2+3]

$$A(x) = \begin{cases} 0 & \text{for } x \le -1 \text{ and } x > 3 \\ (x+1)/2 & \text{for } -1 < x \le 1 \\ (3-x)/2 & \text{for } 1 < x \le 3 \end{cases}$$

$$B(x) = \begin{cases} 0 & \text{for } x \le 1 \text{ and } x > 5 \\ (x-1)/2 & \text{for } 1 < x \le 3 \\ (5-x)/2 & \text{for } 3 < x \le 5 \end{cases}$$

Find (a) (A - B)(x) (b) (A * B)(x)

Q4 (a) What are different fuzzy quantifiers? Explain with examples. [2]
(b) What are different fuzzy propositions? Elaborate them. [3]

Q5 Suppose X = {30, 40, 50, 60, 70, 80, 90, 100} represent set of temperature, and [5]
Y = { 10, 20, 30 , 40, 50, 60 }represent set of rotation per minute
If H (High) , VH (Very High), S (Slow) , QS (Quite Slow) indicate the associated fuzzy sets as follows
H = { (70, 1) (80, 1) (90, 0.3)}
VH = { (90, 0.9) (100, 1)}
QS = {(10, 1) (20, 0.8)}
S = { (30, 0.8) (40, 1) (50, 0.6)}
Apply the Fuzzy Modus Ponens Rule to deduce "Rotation is quite slow" , given
(i) If the temperature is high then the rotation is slow.
(ii) The temperature is very high.

Q6 Explain the following fuzzy models with examples [5]
(a) Mamdani
(b) Sugeno

:::: 19/09/2019M ::::::