

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

CLASS: BE
BRANCH: IT

SEMESTER: V
SESSION : MO/2019

SUBJECT : IT5025 PRINCIPLES OF 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.
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- Q1 (a) What is fuzziness? Explain with example. [2]
(b) Explain why we need fuzzy set theory. [3]
- Q2 (a) Explain why the law of contradiction and law of excluded middle are violated in fuzzy set theory under the standard fuzzy sets operations. What is the significance of this? [2]
(b) Let A and B be two fuzzy sets defined as [3]
 $A = .8/x_1 + .5/x_2 + 1/x_3 + .9/x_4 + 1/x_5$, and
 $B = .9/x_1 + .4/x_2 + .2/x_3 + 1/x_4 + .7/x_5$
Find (a) B-A (b) S(A, B) (c) $\bar{A} \cap B$
- Q3 (a) Suppose the form of the equation is [5]
 $A + X = B$, and
Let A and B in the equation be the following fuzzy numbers:
 $A = .2 / [0,1) + .6 / [1,2) + .8 / [2,3) + .9 / [3,4) + 1 / 4 + .5 / (4,5) + .1 / (5,6]$
 $B = .1 / [0,1) + .2 / [1,2) + .6 / [2,3) + .7 / [3,4) + .8 / [4,5) + .9 / [5,6) + 1 / 6 + .5 / (6,7] + .4 / (7,8] + .2 / (8,9] + .1 / (9,10]$
Find the value of 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 (a) Explain the following fuzzy models with examples [2+3]
(i) Mamdani
(ii) Sugeno