

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

CLASS: BE
BRANCH: CSE

SEMESTER: VII/ADD
SESSION : MO/2018

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.
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- Q1 (a) Why we need fuzzy set theory? Elaborate. [2]
(b) Explain why the law of contradiction and law of excluded middle are violated in fuzzy set theory under the standard fuzzy set operations. What is the significance of this? [3]
- Q2 (a) What is convexity? Explain with example when fuzzy set is convex? [2]
(b) Explain the following [3]
1. Level set
2. Degree of subsethood
3. Hamming distance
- Q3 (a) Let A and B be two fuzzy set defined as [5]
 $A = .2/x_1 + .4/x_2 + .5/x_3 + .8/x_4 + 1/x_5$
 $B = .5/x_1 + .8/x_2 + .9/x_3 + 1/x_4 + 1/x_5$
Find (a) $A \cap B$, (b) $A - B$, (c) $A \cup B$ (d) $S(A, B)$ (e) ${}^5(|A|)$
- Q4 (a) Let A and B be two fuzzy numbers defined as [5]
$$A(x) = \begin{cases} 0 & \text{for } x \leq -1 \text{ and } x > 3 \\ (x+1)/2 & \text{for } -1 < x \leq 1 \\ (3-x)/2 & \text{for } 1 < x \leq 3 \end{cases}$$
$$B(x) = \begin{cases} 0 & \text{for } x \leq 1 \text{ and } x > 5 \\ (x-1)/2 & \text{for } 1 < x \leq 3 \\ (5-x)/2 & \text{for } 3 < x \leq 5 \end{cases}$$

Find (A) $(A + B)(x)$, (B) $(A \cdot B)(x)$
- Q5 What are different types of fuzzy propositions? Explain them with examples. [5]
- Q6 (a) What is defuzzification? Explain. [2]
(b) What is Mamdani inference system model? Explain. [3]