M.Sc. 4th Semester Examination-2020

Applied Mathematics with Oceanology and Computer programming
[Fuzzy Sets and Their Applications]
Paper: MTM-402, Unit-1, Full Marks: 25, Time: 1 hours

1. Answer any two questions: 2×2=4

   a. For two fuzzy sets A and B prove that $\overline{A \cap B} = \bar{A} \cup \bar{B}$.
   b. Prove that the law of contradiction does not hold for fuzzy sets.
   c. Define difference of two fuzzy sets and illustrate with an example.
   d. Let $A = (a_1, a_2, a_3)$ be a triangular fuzzy number and $k \in \mathbb{R}$, then find the membership function of kA, where $k > 0$.

2. Answer any two questions: 4×2=8

   a. Let $A = (a_1, a_2, a_3)$ and $B = (b_1, b_2, b_3)$ be two triangular fuzzy numbers with $a_1 > 0, b_1 > 0$ then prove that AB is not a triangular fuzzy number.
   b. For any three fuzzy sets A, B, C, prove that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.
   c. Discuss any approach of multi-objective optimization with crisp objectives and fuzzy resources.
   d. Give an analogy between fuzzy set theory and probability theory.

3. Answer any one questions: 8×1=8

   a. Discuss Werner's approach of solving fuzzy L.P.P.
   b. Three metals namely iron, copper and zinc are required to produce two alloys A and B. To produce one meter rod of A, 1 kg iron, 1 kg copper and 0.5 kg zinc and to produce 1 meter rod of B, 1 kg copper, 1 kg zinc are needed. Total available quantities of metals ranges as follows:
      Iron: 3 kg to 9 kg.; Copper 4 kg to 8 kg.; Zinc 3 kg. to 5 kg
      The profit of selling one unit of A and B are respectively Rs. 2 and Rs. 1. Determine the optimal production quantities to maximize the profit using Verdegay's method.

Internal: 05

Signature of Paper Setter: Manas Kumar maih