

M. Phil. DEGREE EXAMINATION APRIL 2014
MATHEMATICS
PAPER III – FUZZY SET THEORY & APPLICATIONS

TIME : 3 HOURS

MAX. MARKS : 100

ANSWER ANY FIVE QUESTIONS:

(5 × 20 = 100)

1. a) Explain the concept of a fuzzy set and types of fuzzy sets.
b) Define convex fuzzy set and derive a necessary and sufficient condition for a fuzzy set to be convex.
c) Write the features that are responsible for the Paradigm shift from the classical set theory.
2. Discuss in detail :
 - i) Zadeh Extension principle on fuzzy sets
 - ii) Binary relation on a single set
3. Construct
 - i) fuzzy real line
 - ii) arithmetic operations on fuzzy numbers
4. Prove that fuzzy t-norm and t-conorm are dual to each other with respect to the fuzzy complement. Cite an example.
5. a) Find the solutions to the fuzzy equations
 - i) $A + X = B$
 - ii) $A \cdot X = B$b) Explain binary fuzzy relation.
6. Using standard notations, discuss the fuzzy relation equations based on \circ and \circ compositions.
7. Write a note on any two of
 - i) fuzzy ordering relations
 - ii) fuzzy equivalence relation
 - iii) fuzzy Morphisms
8. Discuss an application of fuzzy set theory to engineering or Industry or Medicine.

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