

PG (NEW) CBCS
M.Sc. Semester-IV Examination, 2020
MATHEMATICS
PAPER: MTM 402

Full Marks: 40

Time: 2 Hours

Write the answer for each unit in separate sheet

MTM 402.1

FUZZY MATHEMATICS WITH APPLICATIONS

Any one question of the following:

20 X 1=20

1. a. Define different arithmetic operations on Interval numbers.
 b. Why $[a, b] - [a, b] \neq [0, 0]$ in interval arithmetic? Justify.
2. a. Using subtraction of fuzzy number show that $7-3=4$.
 b. Define support and height of a fuzzy set.
 c. State resolution principle for fuzzy set.
3. a. Using addition rule for fuzzy numbers, prove that $[3, 5] + [4, 8] = [7, 13]$.
 b. Define convex fuzzy set.
 c. What do you mean by α -cut of a fuzzy set.
4. a. Explain different types of representation of fuzzy set with example.
 b. Write three real life fuzzy sets and their α -cuts, where $\alpha=0.7$.
5. a. Show that addition of two triangular fuzzy numbers is a triangular fuzzy number.
 b. Explain, why multiplication of two triangular fuzzy numbers is not a triangular fuzzy number.
6. a. Prove that the law of contraction and law of excluded middle do not hold for fuzzy sets.
 b. Is every fuzzy set is fuzzy number? Explain with examples.
 c. Define Non- symmetric fuzzy linear programming problem.

(2)

MTM 402.2
SOFT COMPUTING

Any one question of the following:

20 X 1=20

1. Short note on the following terms: Hybrid computing, Biological Neural Network, Fuzzy logic, supervise learning.
2. a. Write down the differences between Biological Neural Network and Artificial Neural Network.
b. Write down Penalty function method.
c. Draw working cycle of Genetic algorithm.
3. a. Write down the drawbacks of traditional optimization technique.
b. Short note on Multi-layer feed forward network.
c. What is mutation?
4. a. Describe the topology of ANN.
b. Write different learning rules with their mathematical expressions which are used to update the parameters in ANN.
5. a. Perform the selection procedure of the following Binary Coded GA:
$$\text{Maximize } f(x) = \sqrt{x}, 0 \leq x \leq 25.$$

Given that population size, N=5; Initial population, 11001, 01111, 01011, 10001, 11001; random numbers for selection, 0.67, 0.11, 0.83, 0.31, 0.54.

b. Describe the limitations of Binary Coded GA with appropriate examples.
6. a. Write down the main features of Soft computing,
b. Short note on Crossover.
c. Draw working cycle of Genetic Algorithm.
