



FD-766

M.A./M.Sc. 4th Semester
Examination, May-June 2022

MATHEMATICS

Paper - III (C)

Fuzzy Set Theory and Its Applications-II

Time : Three Hours]

[*Maximum Marks* : 80

Note : Answer any **two** parts from each question. All questions carry equal marks.

Unit-I

1. (a) Give an overview of classical logic with examples of some tautologies used as inference rules.
(b) Define linguistic hedges. Taking some linguistic hedges, determine reasonable modifiers for them.
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(2)

(c) Explain the following properties with example :

(i) Unconditional and qualified propositions

(ii) Conditional and unqualified propositions

Unit-II

2. (a) Give an overview of Fuzzy expert system.
- (b) Explain multiconditional approximate reasoning.
- (c) Explain the role of Fuzzy relation equations.

Unit-III

3. (a) Explain Fuzzy rule base with suitable example.
- (b) There are two principal ways in which relevant inference rules can be determined. Explain.
- (c) Explain various methods of fuzzification.

Unit-IV

4. (a) What is the purpose of defuzzification in Fuzzy controller? Explain with suitable example.
- (b) Explain the mean of maxima method both for discrete and continuous case.

(3)

- (c) Explain the centre of maxima method with suitable example.

Unit-V

5. (a) Explain individual decision making in Fuzzy setting.
(b) Explain Fuzzy ranking method.
(c) Solve the following Fuzzy linear programming problem :

Maximize

$$Z = 0.5x_1 + 0.2x_2$$

subject to the constraints :

$$x_1 + x_2 \leq B_1;$$

$$2x_1 + x_2 \leq B_2;$$

$$x_1, x_2 \geq 0,$$

$$\text{where } B_1(x) = \begin{cases} 1, & \text{for } x \leq 300 \\ \frac{400-x}{100}, & \text{for } 300 < x \leq 400 \\ 0, & \text{for } x > 400 \end{cases}$$

$$\text{and } B_2(x) = \begin{cases} 1, & \text{for } x \leq 400 \\ \frac{500-x}{100}, & \text{for } 400 < x \leq 500 \\ 0, & \text{for } x > 500 \end{cases}$$