

Total Pages : 12

H-5348

**M.A./M.Sc. (Semester-IV) Examination,
July 2022**

MATHEMATICS

(Fuzzy Sets and Its Application-II)

Time Allowed : Three Hours

Maximum Marks : 70

Minimum Passing Marks : 25

Note : Attempt questions from all the four sections as directed. Distribution of marks is given in each section.

SECTION-A

(Objective Type Questions)

Note : Attempt **all** questions of this section. Each question carries **1** marks. [1x10=10]

H-5348/1000

(1)

[P.T.O.]

1. (A) Fill in the blanks :
- (i) The fundamental difference between classical propositions and fuzzy propositions is in the of their truth values.
 - (ii) The equation which can be solved by modus ponens, is given by
 - (iii) FLC system and system have one thing in common both want to model human experience.
 - (iv) COS is a method of
 - (v) The fuzzy linear programming problem can be converted in linear programming problem.
- (B) Multiple Choice questions :
- (vi) The unary operations that represent the linguistic hedge is called :
 - (a) quantifier
 - (b) modifier

- (c) strong modifier
- (d) none of these
- (vii) For the fuzzy implication $\Im$ which of the following is/are true :
- (a) $\Im(a, b) = a \vee (a \wedge b)$
- (b) $\Im(a, b) = (\bar{a} \wedge \bar{b}) \vee b$
- (c) $\Im(a, b) = \sup[x \in [0, 1] : i(a, x) \leq b]$
- (d) All of these
- (viii) A collection of rules referring to a particular system is called :
- (a) fuzzy system
- (b) fuzzy rule base
- (c) fuzzy expert system
- (d) none of these

(ix) The method of defuzzification given by

$$d_{cm}(\mu) = \frac{\inf M + \sup M}{2} \text{ is given by :}$$

- (a) Center of area method
 - (b) Center of maxima method
 - (c) Weighted average method
 - (d) None of these
- (x) In a fuzzy linear programming problem, the set of vectors which satisfy all the constraints is called :
- (a) a fuzzy set
 - (b) a convex set
 - (c) a feasible set
 - (d) a finite set

SECTION-B

(Very Short Answer Type Questions)

H-5348/1000

(4)

Note : Attempt **any five** questions. Each question carries **02** marks. (Word limit **25-30** words) [5x2=10]

2. Define the following terms :

- (i) Classical logic
- (ii) Hedges
- (iii) Fuzzy expert system
- (iv) The role of fuzzy relation equation
- (v) Fuzzy controllers
- (vi) The centre of maxima
- (vii) Fuzzy linear programming

SECTION-C

(Short Answer Type Questions)

Note : Attempt **any five** questions. Each question carries **04** marks. (Word limit **250** words) [5x4=20]

3. (i) Explain : Inference from conditional fuzzy propositions.

- (ii) Explain : Approximate reasoning and fuzzy language with one such example.
- (iii) Explain : Assumptions in fuzzy control system design with structure of fuzzy production rules.
- (iv) Explain : any two examples of Defuzzification.
- (v) Explain : Individual decision with use of weighted coefficients.
- (vi) Discuss about fuzzy rule based system.
- (vii) Discuss about fuzzification with example.

SECTION-D

(Essay Type Questions)

Note : Attempt **any three** questions. Each question carries **10** marks.(more that **500** words) [3x10=30]

- 4. (i) Write short note of compositional rule of inference.
- (ii) Discuss about S-implications with examples.

(iii) Explain various defuzzification method.

(iv) Solve the following fuzzy LPP :

$$\text{Max. } Z(x) = \begin{cases} -x_1 - 3x_2 \\ 1.5x_1 + 2.5x_2 \end{cases}$$

such that $-x_1 + 2x_2 \leq 18,$

$$4x_1 + 3x_2 \leq 40,$$

$$3x_1 + x_2 \leq 25$$

$$x_1, x_2 \geq 0$$

-----X-----