**PD-483**

**(514) M.A./M.Sc. MATHEMATICS (FOURTH SEMESTER)**

**Examination JUNE 2021**

**Paper-IV**

**Name/Title of Paper-FUZZY SETS AND THEIR APPLICATION-II**

[Maximum Marks: 80

**Time**: 3:00 Hrs.] [Minimum Pass Marks: ---

---

**Note: Answer from Both the Section as Directed. The Figures in the right-hand margin indicate marks.**

---

**Section(A)**

Q.1 Answer the following questions:- 2X5

a) What do you mean by probability assignment?
b) Explain Multivalued logics.
c) What do you mean by linguistic hedges?
d) Define Meta Knowledge base?
e) What do you understand by s-implications?

Q.2 Answer the following questions 2X5

a. Prove that & is ∅ valid inference from the premises P→ $\exists q, qvr, \exists s \rightarrow P$ *and* $\exists r$
b. What do you mean by kernel of an expert system?
c. Define Lukasiewicz implications?
d. Write general form of fuzzy linear programming problem.
e. What do you mean by fuzzification?

**Section(A)**

Q.3. Answer the following 12X5

a. Write the properties of belief measure.
b. A belief measure bel on finite power set P(X) is a probability measure if and only if the associated basic probability assignment functions $\mu$ *is given by* $\mu(\{x\}) = bel(\{x\}) and\ \mu(A) = 0$ *for all Subset S of X that are not singletons.*

Or

a. For every $A \in P(X)$, *any necessity measur* $'nec'$ *on* $P(X)$ *and the associated possibility measure* $'pos'$, Prove that
   i. nec (A)>0 implies pos (A)=1
   ii. pos (A)<1 implies nec (A)=0

b. Explain the terms body of evidence & total ignorance.

Q.4 What do you mean by Fuzzy Quantifiers Discuess different types of Fuzzy Quantifiers in detail. Or, type

Q.5 Discuss the axioms of Fuzzy implications. Prove that a function

https://www.abvvonline.com

. J: $[0,1]^2, \rightarrow [0,1]$Satisfying alll the axioms of fuzzy implications for fuzzy complement C if and only if there exists a strictly imcreasing continuous function f:$[0,1]\rightarrow [0,\infty]$ *Such that*

F(0,0)=0

J(a,b)=$f^{(-1)}$[f(1)-f(a)+f(b)], $\forall a, b \in [0,1]$and $C(a) = f^{-1}\ (f(1) - f(a))$

OR

a. Write Short note on method of interpolation.
b. Consider the 'if-then' rules
   i. If X is $A_1$, then y is $B_1$,
   ii. If x is $A_2$, then y is $\mathbf{B_2}$
   Where Aj and Bj are Fuzzy sets such that

$$A_1 = \frac{1}{x_1} + \frac{.9}{x_2} + \frac{.1}{x_3},\ B_1 = \frac{1}{y_1} + \frac{.2}{y_2},$$

$$A_2 = \frac{.9}{x_1} + \frac{1}{x_2} + \frac{.2}{x_3}, \qquad B_2 = \frac{.2}{y_1} + \frac{.9}{y_2}$$

Given the fact : X is A', Where A'

$$A' = \frac{.8}{x_1} + \frac{.9}{x_2} + \frac{.1}{x_3},$$

Using Method of interpolation, Calculate the conclusion $B'$.

Q.6.

a) Discuss the Fuzzy Expert System
b) Write Short note on Centre of maxima method.
   OR
a) Discuss the Fuzzy Controller With Example.
b) What do you mean by defuzzification method. Explain centroid method in detail.

Q.7

a) Write Short note on Multicriteria decision making
b) Consider an automation with $X = \{x_1, x_2\}$ $z = \{z_1, z_2, z_3\}$and state − transitions function expressed by the matrix

| | $x_1$ | $x_2$ |
|---|---|---|
| $z_1$ | $z_1$ | $z_2$ |
| $z_2$ | $z_3$ | $z_1$ |
| $z_3$ | $z_2$ | $z_3$ |

Whose entries are next internal states for any given present internal and output states if N=2 and Fuzzy goal at t=2 is $c^2 = \frac{.3}{z_1} + \frac{.1}{z_2} + \frac{.8}{z_3}$,

The Fuzzy constraints at input at times t=o and t=1 are

$$A^0 = \frac{.7}{x_1} + \frac{1}{x_2}$$

https://www.abvvonline.com

$$A^1 = \frac{1}{x_1} + \frac{.6}{x_2}$$

Solve this multistage decision problem

OR

Solve the Following Fuzzy Linear programming Problem

Max $z=5x_1 + 4x_2$

S.t. $(4,2,1)\, x_1 + (5,3,1)\, x_2 \leq (24,5,8)$

$(4,1,2)\, x_1 + (1,.5,1) x_2 \leq (12,6,3)\, x_1, x_2 \geq 0$

**https://www.abvvonline.com**
**Whatsapp @ 9300930012**
**Send your old paper & get 10/-**
अपने पुराने पेपर्स भेजे और 10 रुपये पायें,
**Paytm or Google Pay से**