PART C — (5 × 8 = 40 marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 600 words.

16. (a) Explain the different types of fuzzy sets.

Or

(b) Explain the basic concepts of fuzzy sets.

17. (a) State and prove second decomposition theorem.

Or

(b) Explain the extension principle in detail.

18. (a) State and prove second characterization theorem of fuzzy complements.

Or

(b) Explain the combinations of operations.

19. (a) Explain the fuzzy equation $A \,.\, X = B$.

Or

(b) Explain the arithmetic operations on fuzzy numbers.

20. (a) Explain the multistage decision making.

Or

(b) Explain the fuzzy linear programming.

———————



**Reg. No. :** .....

**Code No. : 10448 E** **Sub. Code : CEMA 62**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2024.

Sixth Semester

Mathematics

Major Elective – FUZZY MATHEMATICS

(For those who joined in July 2021-2022)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. $A \cup (A \cap B) =$ ————————
   (a) $\phi$ (b) $A$
   (c) $X$ (d) $B$

2. The core of a fuzzy set is ————————
   (a) ${}^{O+}A$ (b) ${}^{O}A$
   (c) ${}^{1+}A$ (d) ${}^{1}A$

3. Which of the following is a wrong statement?
   (a) ${}^{\alpha+}A \subseteq {}^{\alpha}A$ (b) ${}^{\alpha}A \subseteq {}^{\alpha+}A$
   (c) ${}^{1}A \subseteq {}^{O}A$ (d) None of these

*Nesamony Memorial Christian College, Marthandam*

4. Let $A, B$ be any two fuzzy sets, $\alpha, \beta \in [0,1]$, then ${}^{\alpha}(A \cup B) =$

(a) ${}^{\alpha}A \cup {}^{\alpha}B$ (b) ${}^{\alpha}A \cap {}^{\alpha}B$

(c) ${}^{\alpha}(A \cap B)$ (d) None of these

5. If $C$ is any fuzzy complement, then the value of $C(1)$ is ————————

(a) 0 (b) 1

(c) $-1$ (d) c (0)

6. $i(a, a)$ is always ————————

(a) $= 0$ (b) $= a$.

(c) $< a$ (d) $> a$

7. The value of $[2, 5] + [1, 3]$ is ————————

(a) $[5, 6]$ (b) $[3, 8]$

(c) $[8, 3]$ (d) $[6, 5]$

8. $MAX\,[A, MIN\,(A, B)] =$ ————————

(a) $A$ (b) $B$

(c) $MIN\,(A, B)$ (d) $MAX\,(A, B)$

9. If $A \leq B$, then $MAX\,(A, B) =$ ————————

(a) $A$ (b) $B$

(c) $MIN\,(A, B)$ (d) $A + B$

10. Fuzzy dynamic programming was formulated in the year

(a) 1969 (b) 1970

(c) 1989 (d) 1954



PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Write the fundamental properties of crisp set operations.

Or

(b) Write short note on $\alpha$- cut and strong $\alpha$ - cut.

12. (a) Prove that ${}^{\alpha}(A \cap B) = {}^{\alpha}A \cap {}^{\alpha}B$.

Or

(b) Explain the representation of fuzzy sets.

13. (a) If $C$ is a continuous fuzzy complement, then prove that $C$ has a unique equilibrium.

Or

(b) Explain the fuzzy unions ($t-$ conorms).

14. (a) Explain the Linguistic variables.

Or

(b) Explain the lattice of fuzzy numbers.

15. (a) Explain the individual decision making.

Or

(b) Explain the fuzzy ranking methods.



*Nesamony Memorial Christian College, Marthandam*