

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Test 3 EXAMINATION- June 2023

PhD 2<sup>nd</sup> Semester (Department of Mathematics)

COURSE CODE: 17P1WMA112

MAX. MARKS: 35

COURSE NAME: Intuitionistic Fuzzy Set Theory and Similarity Measures

COURSE CREDITS: 3

MAX. TIME: 2 Hrs

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Use of scientific calculator is allowed.*

1. Let  $X = \{a, b, c, d, e\}$ . Let the Intuitionistic fuzzy sets A and B have the form  $\{ \langle x_i, \mu(x_i), \nu(x_i) \rangle \}$ :

$$A = \{ \langle a, 0.5, 0.3 \rangle, \langle b, 0.1, 0.7 \rangle, \langle c, 1.0, 0.0 \rangle, \langle a, 0.0, 0.0 \rangle, \langle a, 0.0, 1.0 \rangle \}$$

$$B = \{ \langle a, 0.7, 0.1 \rangle, \langle b, 0.3, 0.2 \rangle, \langle c, 0.5, 0.5 \rangle, \langle a, 0.2, 0.2 \rangle, \langle a, 1.0, 1.0 \rangle \}$$

Find  $A \cup B, A \cap B, \bar{A}, A + B, A \cdot B$ .

2. Explain the geometrical representation of the Fuzzy sets, Intuitionistic fuzzy sets, Pythagorean and Picture fuzzy sets in 2D as well as 3D.
3. Discuss various binary operations on IFSs with examples for each.
4. What are various similarity measures and discuss their relation to the various distance measures. Explain in detail with examples.
5. Explain different norms over IFS with examples.
6. Discuss various norms and metrics over the intuitionistic fuzzy sets with two term approach. Explain with suitable examples.
7. Explain three distance measures between the intuitionistic fuzzy sets in regard of 3-term approach with the help of one example for each.

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