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Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET UNIVERSITY)



Ph.D. (Second Semester-Summer/Winter) Examinations, April – 2026
23PPECS2017/ 23WPPECS2015– Soft Computing
(CSE)

Time: 3 hrs

Maximum: 70 Marks

The figures in the right hand margin indicate marks.

Answer ANY FIVE Questions.**(14 x 5 = 70 Marks) Marks**

- 1.a. Differentiate between soft computing and hard computing 8
 b. What are the different real life applications of soft computing? 6
 2.a Two fuzzy sets are given as: 7

$$A = \{0.4/2, 0.6/3, 0.8/4, 1/5, 0.8/6, 0.6/7, 0.4/8\}$$

$$B = \{0.4/2, 0.8/4, 1/5, 0.6/7\}$$

Find the following operation on the given 2 fuzzy sets.

- (i) Union (ii) Intersection (iii) Difference

- b. Two fuzzy relations are given as 7

$$R1 = \begin{bmatrix} 0.3 & 0.4 & 0.7 & 0.3 \\ 0.0 & 1.0 & 0.2 & 0.1 \end{bmatrix} \quad R2 = \begin{bmatrix} 1.0 & 0.5 & 1.0 \\ 0.0 & 0.5 & 0.4 \\ 0.7 & 0.9 & 0.6 \\ 0.0 & 0.0 & 0.0 \end{bmatrix}$$

Find: Max-min Composition.

- 3.a. What do you mean by defuzzification? Discuss different method of defuzzification. 7
 b. Two fuzzy relation R1 and R2 are given in the following table: find Max-product composition 7

$$R1 =$$

0.3	0.0	0.6
0.1	0.9	0.3

$$R2 =$$

1.0	0.0	1.0
0.2	0.5	0.4
0.7	0.9	0.6

4. Write Back Propagation neural network working with example. 14
 5.a. What is multi layer feed forward learning? 7
 b. How the computations are performed at the different layer of Multi layer neural network? 7
 6.a. What is machine learning ? Discuss different types of it with example 7
 b. Write the use of RBF neural network for problem solving. 7
 7.a. What are the different types of mutation operation used in GA.? 8
 b. What do you mean by objective function? Consider the problem maximizing the function $f(x) = x^2$ using the genetic algorithms, where 'x' vary between 0 and 31. 6
 8.a. How is the k-nearest neighbor algorithm different from k-means clustering? 7
 b. What is the difference between Deep Learning and Machine Learning? Explain with example 7

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