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GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR

(GIET UNIVERSITY)

Ph.D. (Second Semester-Summer) Examinations, May – 2025

23SPPECA2011 – 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. Explain different techniques used in soft computing with real life example 10

b. Write the advantages of soft computing. 4

2a. Discuss different types of activation function used in ANN. 8

b. Compare ANN with BNN. 6

3.a. Describe the architecture of a typical neural network, including the roles of input, hidden, and output layers. 7

b. Discuss the significance of activation functions and how they influence the network's performance 7

4.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

$$R1 = \begin{bmatrix} 0.3 & 0.4 & 0.7 & 0.3 \\ 0.0 & 1.0 & 0.2 & 0.1 \end{bmatrix}$$

$$R2 = \begin{bmatrix} 1.0 & 0.5 & 1.0 \\ 0.0 & 0.5 & 0.4 \\ 0.7 & 0.9 & 0.6 \\ 0.0 & 0.0 & 0.0 \end{bmatrix}$$

Find out Max-min Composition.

5.a What do you mean by defuzzification? Discuss different method of defuzzification. 14

6.a. Define cross over in GA.Consider the following two parents selected for crossover. 7

Parents 1: [1 1 0 1 1 0 0 1 0 0 1 1 0 1 1 0]

Parents 2: [1 1 0 1 1 1 1 0 0 0 0 1 1 1 1 0]

Explain how to implement one point crossover, two point crossovers, and Uniform crossover

b. Explain Roulette-wheel selection methods for selecting chromosomes. 7

7.a Define a Perceptron network. 4

b Implement AND and OR operation using perceptron neural network 10

8.a. State the importance of Genetic algorithm with example 7

b. Explain swarm optimization technique used to optimize the solution. 7

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