BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO 2025)

CLASS: BTECH **SEMESTER : V/ADD**
BRANCH: CSE **SESSION : MO/25**

SUBJECT: CS347 SOFT COMPUTING

TIME: 03 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	(i) Consider a fuzzy set A defined on the interval X = [0, 10] of integers by the membership function μA(x) = x / (x+3). What is the α cut corresponding to α = 0.5? [3] (ii) What is the value of Yager's complement function for the parameters: a = 0.5 and w = 2. [2]	[5]	CO1	2
Q.1(b	If a fuzzy set A has the membership function μA(x = 0 for x < 0, linearly increase to 1 to x = 10, and decreases back to 0 at x = 20. What type of fuzzy set is this? Explain the logical reasoning behind your answer.	[5]	CO1	3
Q.2(a)	Using centroid defuzzification, find crisp value for: μ(x): 0.4 at x=2, 1.0 at x=4, 0.6 at x=6 and 0.8 at x=8	[5]	CO2	1
Q.2(b)	Compare and contrast the Mamdani Fuzzy Models, Sugeno Fuzzy Models, and Tsukamoto Fuzzy Models.	[5]	CO2	3
Q.3(a)	Explain the basic structure of Genetic Algorithm. And also explain the different selection methods.	[5]	CO3	2
Q.3(b)	Suppose a genetic algorithm uses chromosomes of the form x = abcdefgh with a fixed length of eight genes. Each gene can be any digit between 0 and 9. Let the fitness of individual x be calculated as: f (x) = (a + b) − (c + d) + (e + f) − (g + h). Evaluate the fitness of each individual, showing all your workings, and arrange them in order with the fittest first and the least fit last.	[5]	CO3	3
Q.4(a)	Explain the Hebb, Perceptron and Delta learning rule with weight change formulae.	[5]	CO4	2
Q.4(b)	Consider the following assumptions and calculate new weights: A. Inputs : x1=1 , x2= 1 , B. Output(t) : -1, C. Initial weights: w1=w2=b= 0.2, D. learning rate (α) = 0.2 Calculate the new weights using Perceptron learning rule.		CO4	3
Q.5(a)	Define the following terms of Convolution neural Network: (i) Kernel (ii) stride (iii) Padding (iv) pooling (v) ReLU	[5]	CO4	1
Q.5(b)	How Radial Basis Neural network works? Solve the XOR non-linear problem using Radial Basis Function Network.	[5]	CO4	3

::::::21/11/2025::::::M