

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION MO 2024)

CLASS: BCA
BRANCH: CSE

SEMESTER : V
SESSION : MO/24

SUBJECT: CA315 SOFT COMPUTING

TIME: 03 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 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

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Q.1(a)	Define the Cardinality, Core, Height, Support and Inclusion property of fuzzy set with mathematical notation.	[5]		CO1	2
Q.1(b)	$R = \begin{matrix} & x & y \\ a & 0.2 & 0.7 \\ b & 0.8 & 0.4 \\ c & 0.3 & 0.5 \end{matrix} \quad S = \begin{matrix} & a & b & c \\ x & 0.2 & 0.1 & 0.6 \\ y & 0.3 & 0.7 & 0.6 \end{matrix}$ <p>If \circ denotes the max-min composition then what are the values of $R \circ S$.</p>	[5]		CO1	3
Q.2(a)	Compare and contrast Mamdani FIS with Sugeno FIS.	[5]		CO2	2
Q.2(b)	Consider the triangular number $A = (-3, 2, 4)$ and $B = (-1, 0, 6)$, calculate the addition and subtraction of these fuzzy number.	[5]		CO2	3
Q.3(a)	Explain the basic structure of Genetic Algorithm. And also explain the different crossover operators.	[5]		CO3	2
Q.3(b)	Solve the Maximization function $f(x) = x^2 + 3x + 2$ subject to constraint that $1 < x < 20$ using Genetic Algorithm. Show only one iteration of solution, highlighting each step.	[5]		CO3	3
Q.4(a)	Compare and contrast Biological Neural Networks with Artificial neural networks.	[5]		CO4	2
Q.4(b)	Consider the following assumptions and calculate new weights: A. Inputs : $x_1=1$, $x_2= 1$, B. Output(t) : -1, C. Initial weights: $w_1=w_2=b= 0.2$, D. learning rate (α) = 0.2 E. Weight updation formula : $w_i(\text{new}) = w_i(\text{old}) + \alpha (t - y_{in}) x_i$ Calculate the new weights.	[5]		CO4	3
Q.5(a)	How perceptron and delta learning rule works?	[5]		CO4	2
Q.5(b)	Explain the Back Propagation Network with diagram.	[5]		CO4	3

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