BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: B.E. **SEMESTER: V**
BRANCH: CSE/IT **SESSION: MO/2022**

SUBJECT: CS321 SOFT COMPUTING

TIME: 2 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 25.
2. Candidates attempt for all 25 marks.
3. Before attempting the question paper, be sure that you have got the correct question paper.
4. The missing data, if any, may be assumed suitably.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

				CO	BL
Q1	(a)	How soft computing is differed from conventional computing? What are the major building blocks of soft Computing?	[2]	CO1	L1
Q1	(b)	The fuzzy sets A and B are defined as universe, x = [0,1,2,3] with the following membership fractions: $\mu_A(x) = \frac{2}{x+3}$ and $\mu_B(x) = \frac{4}{x+5}$ Define the intervals along the x-axis corresponding to the α-cut sets for each fuzzy set A and B for α = 0.2 and α = 0.6?	[3]	CO1	L1
Q2	(a)	Using your own intuition develop fuzzy membership functions on the real line for the fuzzy number 4, using the following function shapes: symmetric triangle, Trapezoid and Gaussian function.	[2]	CO1	L2
Q2	(b)	Suppose we have a universe of integers Y={1,2,3,4,5}, we define the following linguistic terms as a mapping into Y: "small" = [1/1+0.7/2+0.6/3+0.4/4+0.2/5} "large" = {0.2/1+0.4/2+0.6/3+0.9/4+1/5} Find (i) "very small" (ii) "~ very small and ~very very large" (iii) "intensely small"	[3]	CO1	L1
Q3	(a)	For speed control of DC motor, the membership functions of series resistance, armature current and speed are given as follows: $R_{se} = \{\frac{0.4}{30} + \frac{0.6}{60} + \frac{1.0}{100} + \frac{0.1}{120}\}$ $I_a = \{\frac{0.2}{20} + \frac{0.3}{40} + \frac{0.6}{60} + \frac{0.8}{80} + \frac{1.0}{100} + \frac{0.2}{120}\}$ $N = \{\frac{0.35}{500} + \frac{0.67}{1000} + \frac{0.97}{1500} + \frac{0.25}{1800}\}$ Compute relation T for relating series resistance to motor speed ie R_{se} to N. Perform max-min composition only.	[2]	CO1	L4
Q3	(b)	Show that the fuzzy rule "if x is A or y is B then then z is C" is the equivalent to the union of two fuzzy rules "if x is A then z is C" and 'if y is B then z is C" under max-min composition.	[3]	CO1	L3
Q4	(a)	Explain the compositional rule of Inference.	[2]	CO2	L4
Q4	(b)	Discuss the Fuzzy expert system with suitable diagram.	[3]	CO2	L5
Q5	(a)	What is Fuzzification and defuzzification. Why defuzzification required?	[2]	CO2	L4
Q5	(b)	Write the FIS for Controlling the water level and temperature in the boiler using Mamdani model. Assume your own linguistic variables.	[3]	CO2	L6

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