RANI RASHMONI GREEN UNIVERSITY
Post Graduate Department of Computer Science
M.Sc. Semester-III Mid-semester Examination 2025 Subject: Computer Science
Paper: MSCCS201 (Artificial Intelligence and Soft Computing)

Time: 1 Hour **Full Marks: 20**

The figures in the margin indicate full marks
Candidate are required to give their answer in their own words as far as practicable

Group A

Answer any 2 questions. 2x5

1. Given the following sets A = {a_1, a_2, a_3}, B = {b_1, b_2}, C = {c_1, c_2, c_3} 5
   Fuzzy relation R is defined from A to B based on the following membership function:
   $$\mu_R\ (a_i, b_i) = 1 - \frac{|i-j|}{3}$$
   Fuzzy relation S is defined from B to C based on the following membership function:
   $$\mu_S\ (b_j, c_k) = \frac{(j+k)\ mod\ 3}{2}$$
   Using the max-min composition compute the fuzzy relation R ∘ S.

2.
   a. A fuzzy control system outputs a fuzzy set defined on the universe of discourse x ∈ [0,10]. The fuzzy output set is given by the following membership function:

$$\mu(x) = \begin{cases} \frac{x}{5}, & 0 \le x < 5 \\ \frac{10-x}{5}, & 5 \le x < 10 \\ 0, & Otherwise \end{cases}$$

   This is a triangular fuzzy member with peak at $x = 5$ and height $\mu = 1$ forming a symmetric triangle from 0 to 10. compute the defuzzified crisp value of the output. 2

   b. Let fuzzy set A be defined over the universe X = {1,2} with the membership function:
   μ_A ={(1,0.3), (2,0.9)}
   Let fuzzy set B be defined over the universe Y={a,b} with the membership function:
   μ_B ={(a,0.6), (b,1.0)}
   Assume the fuzzy universe Y is fully compatible, i.e.,
   μ_Y ={(a,1.0), (b,1.0)}
   Using the fuzzy implication rule: R=(A×B) ∪ (A′ ×Y)
   Construct the fuzzy relation R representing the implication "If x is A, then y is B." 3

3. What is a fuzzy set? State any two differences between fuzzy logic and crisp logic. Give two simple real-life examples where fuzzy sets are used. 1 + 2 + 2

P.T.O

Group B

Answer any 2 questions. 2x5

4. Explain forward chaining with a suitable example. 5
5. Convert the following sentences into First order predicate logic.
   i) All purple mushrooms are poisonous. 1
   ii) Some boys like cricket. 1
   iii) All Gorillas are black. 1
   iv) Some cats are intelligent. 1
   v) Everyone likes Ram. 1
6. Explain alpha-beta pruning with an example. 5
7. What is resolution? Explain with an example. 2+3

----------x----------