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Odd Mid Semester Examination for Academic Session 2024-25

COURSE NAME: B.Tech SEMESTER:3rd

BRANCH NAME: ETC
SUBJECTNAME: Optimization & Soft Computing

FULLMARKS:**30** TIME:**90 Minutes**

Answer **All** Questions.
The figures in the right hand margin indicate Marks. *Symbols carry usual meaning.*

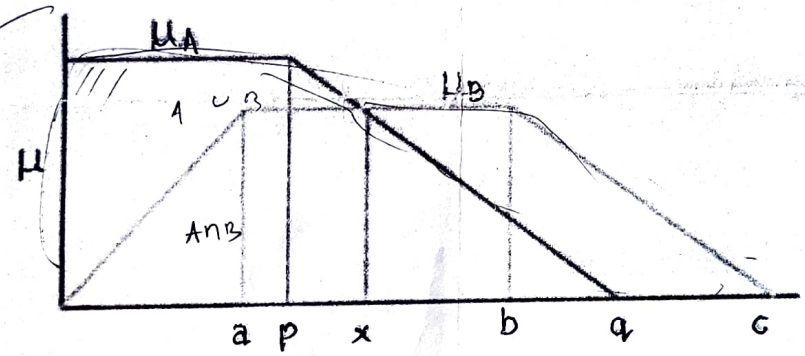
Q1. Answer all Questions. **[2 × 3]**

a) What do you mean by soft computing? How it is different from Hard computing ?. -CO1
b) Express the member ship function representing linguistic hedges using the concept of concentration and dilation ? -CO2
c) Draw a framework of dynamic neural network. -CO3

Q2. **[8]**

a) Explain the trapezoidal membership function with the help of mathematical expression and relevant graph. -CO1

b)



For the given fuzzy sets; $A=\{(x1, 0.5), (x2, 0.6), (x3, 0.2)\}$
$B=\{(x1, 0.4), (x2, 0.3), (x3, 0.5)\}$;
Find the graphical representation of a) AUB b) $A \cap B$

OR

a) Describe all the properties of Fuzzy sets. -CO1
b) Consider the following two fuzzy sets A and B defined over a universe of discourse [0,3] of real numbers with their membership functions

$\mu_A(x) = \frac{x+5}{x+8}$ and $\mu_B(x) = 2^{-x}$

Determine the membership functions of the following:

a) A^C, B^C
b) AU B
c) $A \cap B$
d) $(AU\ B)^C$

Q3. [8]

a) Two fuzzy relations are given by

$$R = \begin{array}{c} \\ X1 \\ X2 \end{array}\begin{array}{c} \begin{array}{cc} Y1 & Y2 \end{array} \\ \begin{pmatrix} 0.6 & 0.2 \\ 0.3 & 0.8 \end{pmatrix} \end{array} \qquad S = \begin{array}{c} \\ Y1 \\ Y2 \end{array}\begin{array}{c} \begin{array}{ccc} Z1 & Z2 & Z3 \end{array} \\ \begin{pmatrix} 1 & 0.5 & 0.3 \\ 0.8 & 0.4 & 0.7 \end{pmatrix} \end{array}$$

Obtain the fuzzy relation T as composition between the fuzzy relations using max-min rule of composition.

OR

(a) Clearly draw a symbolic diagram of a perceptron and show the different parameters in it and the computations involved in terms of the parameters. -CO2

(b) Consider a fuzzy set A defined on the interval x= [0,10] of integers by the membership function, $\mu A(x) = x / x+2$. Find α cut corresponding to α = 0.5.

Q4. [8]

a) Draw the block diagram and its configuration for a three layer multilayer FF NN of type l –m–n. -CO3

b) Explain the method of steepest descent using suitable diagram.

OR

a) Describe all the fundamental classes of ANN architectures -CO3

b) Why different type of neural network architectures are required. Explain with suitable examples