Mid Term Examination, 2019-20

Course: B. Tech. (CSE-DA) Year: IV Semester: VII

Soft Computing (CSE 6004)

Time: 1.5 Hrs. **Total Marks: 20**

Notes:

1. All parts of a question should be answered at one place.
2. Answer should be brief and to-the-point and be supplemented with neat sketches.
3. Any missing or wrong data may be assumed suitably giving proper justification.
4. Figures on the right-hand side margin indicate full marks.

Section A

Note: Attempt All Questions **(1x5=5)**

I. Discuss α-cut of fuzzy set with suitable example.
II. What is meant by Support of a fuzzy set?
III. Illustrate step by step process of a Fuzzy System?
IV. Differentiate between crisp set and fuzzy set.
V. Write De Morgan's and involution law for fuzzy set.

Section B

Note: Attempt any Three Questions **(2x3=6)**

I. Consider two fuzzy sets

$$A = \frac{1}{2.0} + \frac{0.65}{4.0} + \frac{0.5}{6.0} + \frac{0.35}{8.0} + \frac{0}{10.0}$$

$$B = \frac{0}{2.0} + \frac{0.35}{4.0} + \frac{0.5}{6.0} + \frac{0.65}{8.0} + \frac{1}{10.0}$$

Find $A \cup B$ and B^c?

II. Discuss the following with suitable example:

a) Linguistic variable

b) Hedges

c) Concentration and Dilation

III. If P and Q two statements are given as:
P: Mary is efficient T(P)=0.8
Q: Ram is efficient T(P)=0.65. Find the value for the Statement **"Either Mary or Ram is efficient".**

IV. Draw the diagram for FLC (Fuzzy Logic Controller) and discuss the job of its each component.

Section C

Note: Attempt any Three Questions **(3x3=9)**

I. Consider the following real variables from everyday life:

a) Speed measured in meters per second.

b) Performance of students working on a project.

c) A traffic light measured in what colour is on.

In each case, suggest a fuzzy variable corresponding to these real variables. For which of these variables, the use of a fuzzy variable is not really necessary? Why explain in detail?

II. For two fuzzy sets $\underset{\sim}{A}=[\frac{0.2}{LS}+\frac{0.5}{MS}+\frac{0.7}{HS}]$ $\underset{\sim}{B}=[\frac{0.1}{PE}+\frac{0.55}{ZE}+\frac{0.85}{NE}]$

(a) Find $R = A \times B$

(b) Introducing a fuzzy set $\underset{\sim}{C}$ given by $\underset{\sim}{C}=[\frac{0.25}{LS}+\frac{0.5}{MS}+\frac{0.75}{HS}]$

Find $S = B \times C$

(c) Find RoS and CoS using max- min composition.

III. Let X={p, q, r, s}, Y={a, b, c, d} and fuzzy sets are:
A={(p,0),(q,0.8),(r,0.6),(s,1)}, B={(a,0.2),(b,1),(c,0.8),(d,0)}
C={(a,0),(b,0.4),(c,1),(d,0.8)},
Determine the implication relations:

(i) IF x is A THEN y is B

(ii) IF x is A THEN y is B ELSE y is C.