

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

**CLASS: BE
BRANCH: CSE**

**SEMESTER : VII/ADD
SESSION : MO/18**

SUBJECT: CS5105-SOFT COMPUTING

TIME: 03:00 HRS.

FULL MARKS: 60

INSTRUCTIONS:

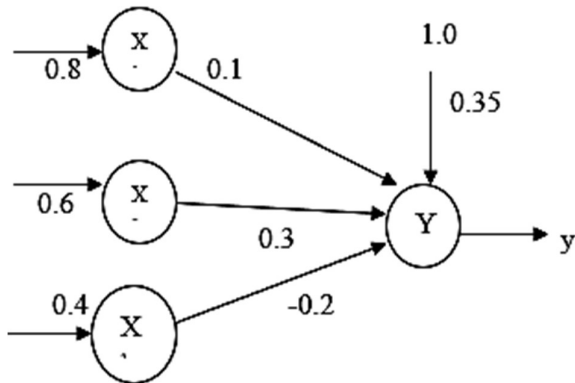
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
 2. Candidates may attempt any 5 questions maximum of 60 marks.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Why we need fuzzy set theory? Elaborate. [2]
(b) Let A and B be fuzzy sets defined on a universal set X. Prove that. [4]
 $|A| + |B| = |A \cup B| + |A \cap B|$, where \cap and \cup are the standard fuzzy intersection and union, respectively.
(c) Let A and B be two fuzzy set defined as [6]
 $A = .2/x_1 + .4/x_2 + .5/x_3 + .8/x_4 + 1/x_5$
 $B = .5/x_1 + .8/x_2 + .9/x_3 + 1/x_4 + 1/x_5$
Find (a) $A \cap B$, (b) $B - A$, (c) $A \cup B$ (d) $S(A, B)$ (e) ${}^5(A)$, (f) $d(A, B)$
- Q.2(a) What is type 2 fuzzy set? Explain with example. [2]
(b) Explain the following [4]
1. Extension principle with example
2. Fuzzy Quantifiers
(c) Let A and B be two fuzzy numbers defined as [6]
$$A(x) = \begin{cases} 0 & \text{for } x \leq -1 \text{ and } x > 3 \\ (x+1)/2 & \text{for } -1 < x \leq 1 \\ (3-x)/2 & \text{for } 1 < x \leq 3 \end{cases}$$
$$B(x) = \begin{cases} 0 & \text{for } x \leq 1 \text{ and } x > 5 \\ (x-1)/2 & \text{for } 1 < x \leq 3 \\ (5-x)/2 & \text{for } 3 < x \leq 5 \end{cases}$$

Find (A) $(A - B)(x)$, (B) $(A / B)(x)$
- Q.3(a) What is defuzzification? Explain. [2]
(b) What is the difference between crisp and fuzzy propositions? [4]
(c) What is centroid method of defuzzification? Explain. [6]
- Q.4(a) What is Genetic Algorithm? How it is different from traditional optimization methods. [2]
(b) Illustrate with example the working principle of Genetic Algorithm. [4]
(c) Explain the following [6]
1. Roulette-Wheel Selection
2. Tournament Selection
- Q.5(a) What is Mutation and Mutation rate? [2]
(b) What is Cross over? Explain the different types of cross over. [4]
(c) What is Genetic Algorithm cycle? Elaborate the reasons for stopping condition of Genetic Algorithm flow. [6]
- Q.6(a) Explain the terminological relationships between biological and artificial neurons. [2]
(b) What are basic models of Artificial Neural Network? Illustrate any two of them? [4]
(c) What is learning? What are different types of learning? Explain them with examples. [6]

- Q.7(a) What is the importance of threshold in perceptron network?
 (b) With a flowchart, explain the training process of perceptron network.
 (c)

[2]
 [4]
 [6]



Obtain the output of the neuron Y for the network shown in above figure using (i) binary sigmoidal and (ii) bipolar activation function.

*****28.11.18*****M