Motilal Nehru National Institute of Technology Allahabad
Department of Computer Science and Engineering
Mid-Sem Examination 2017-18
M.C.A 3rd semester, Course Name: Soft Computing(CA3303)

Time: 1.5 hours MM:20 marks

Note: i) All questions are compulsory
ii) For numericals, precision should be upto 3 decimal places.

Q1:)Write the answers of the following: [1+1+1 marks]
a) Explain Fuzzy systems with example.
b) How fuzzy logic is different from probability ?
c) Write out the properties of fuzzy set and crisp sets. Also list their diffference.

Q2:) Write the answers of the following: [1+ 2 + 2 marks]
a) Classify this question paper alongwith answer as soft/hard computing with proper reasoning and cases you considered.
b) Explain how an unsupervised neural network can be used for character recognition.
c) Explain fuzzy inference process with an example.

Q3:) Explain why law of contradiction and law of exclusive middle are violated in fuzzy set theory. [2 marks]

Q4:) The task is to recognize English Alphabetical character(F, E, X, Y, I, T) in an image-processing system. For given two fuzzy sets A and B to represent the identification of characters I and F as

A = {(F, 0.4), (E, 0.3), (X, 0.1), (Y, 0.1), (I, 0.9), (T, 0.8)}
B = {(F, 0.99), (E, 0.8), (X, 0.1), (Y, 0.2), (I, 0.5), (T, 0.5)}

a) Find the following i) AUB; ii) (A-B) iii) (AUA^c) [3 marks]
b) Verify De Morgan's Law: $(AUB)^c = (A^c \cap B^c)$ [2 marks]

Q5:) For given neural network in given Fig 1, initial input, weight and bias values are given in Fig 2. Also Learning rate = 0.9

Using back propogation algorithm:

a) Find the outputs at 4, 5 and 6 node. [3 marks]
b) Calculate the error on these nodes. [2 marks]

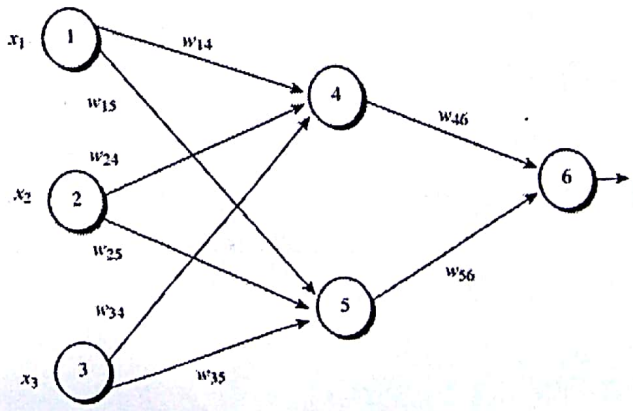

Fig: 1

Initial input, weight, and bias values.

x_1	x_2	x_3	w_{14}	w_{15}	w_{24}	w_{25}	w_{34}	w_{35}	w_{46}	w_{56}	θ_4	θ_5	θ_6
1	0	1	0.2	−0.3	0.4	0.1	−0.5	0.2	−0.3	−0.2	−0.4	0.2	0.1

Fig 2: