[Total No. of Printed Pages:2] **CODE NO:- Z-367**

FACULTY OF ENGINEERING & TECHNOLOGY

B.E (CSE) Year Examination - June – 2015

Soft Computing

(Revised)

[Time: Three *Hours*] **[Max. Marks: 80]**

"Please check whether you have got the right question paper."

N.B *i)* Question No.1 and Q.No.6 are compulsory.
ii) Attempt any two questions from the remaining questions from each section.
iii) Assume data if necessary & state it clearly.

SECTION-A

Q.1 Attempt any two of the following. 10

a) Explain the following artificial neural network terminology
i) Processing unit ii) Interconnection

b) What are the benefits of ANN? Explain any two applications of ANN.

c) Explain the features of Hopfield network.

Q.2 a) Implement ANDNOT function using Mc. Callochpitts neuron. 08

b) What are basic functional units of ANN for pattern recognition task? Explain. 07

Q.3 a) Explain back propagation learning algorithm? Why it is called as generalized delta rule. 08

b) Show by geometrical arguments that with 3-layers of non-linear units any hard classification problem can be solved. 07

Q.4 a) Train a heteroassociative memory network using hebb rule to store input row vector $S = (s_1, s_2, s_3, s_4)$ To the output row vector= (t_2, t_2). The vector pairs are given in table. 08

Input target	S_1	S_2	S_3	S_4	T_1	T_2
1	1	0	1	0	1	0
2	1	0	0	1	1	0

b) Explain the architecture of feedback neural network with its applications. 07

Q.5 Write short notes on (Any three) 15

a) Bidirectional Associative memory
b) Soft computing Vs hard computing
c) Limitations of Back propagation learning algorithm
d) Pattern Recognition tasks performed by ANN
e) Auto Association and Hetero association.

SECTION -B

Q.6 Attempt the following. (any two) 10

a) Explain the different methods of membership value assignment.

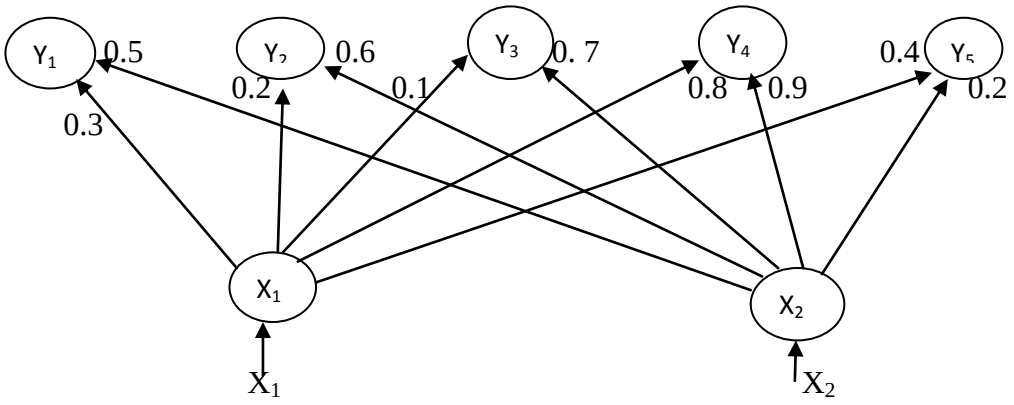
b) Explain pattern austering network.

c) List the four different operations on classical sets. Do fuzzy set follow the same properties as crisp set.

Q.7 a) Explain with architecture the training algorithm used in Kohonen self organizing feature map. 07

b) For a given Kononen self-organizing feature map with weights shown in fig. use the square of the Euclidean distance to find the cluster unit Yj closed to the input vector (0.6, 0.6). Using learning rate of 0.1, find the new weights for unit Yj. 08

$$W = \begin{bmatrix} 0.3 & 0.2 & 0.1 & 0.8 & 0.4 \\ 0.5 & 0.6 & 0.7 & 0.9 & 0.2 \end{bmatrix}$$



Q.8 a) For the two given fuzzy sets. 08

$$\underset{\sim}{A} = \left\{\frac{0.1}{0} + \frac{0.2}{1} + \frac{0.4}{2} + \frac{0.6}{3} + \frac{1}{4}\right\}$$

$$\underset{\sim}{B} = \left\{\frac{1}{0} + \frac{0.5}{1} + \frac{0.7}{2} + \frac{0.3}{3} + \frac{0}{4}\right\}$$

Find the following

a) $\underset{\sim}{A} \cup \underset{\sim}{B}$ b) $\underset{\sim}{A} \cap \underset{\sim}{B}$ c) $\overline{\underset{\sim}{A}}$ d) $\underset{\sim}{A} \cap \overline{\underset{\sim}{B}}$ e) $\underset{\sim}{A} / \underset{\sim}{B}$

b) For two fuzzy sets 07

$$\underset{\sim}{A} = \left\{\frac{0.2}{LS} + \frac{0.5}{MS} + \frac{0.7}{HS}\right\}$$

$$\underset{\sim}{B} = \left\{\frac{0.1}{PE} + \frac{0.55}{ZE} + \frac{0.85}{NE}\right\}$$

a) find $\underset{\sim}{R} = \underset{\sim}{A} \times \underset{\sim}{B}$

$$\underset{\sim}{C} = \left\{\frac{0.25}{LS} + \frac{0.5}{MS} + \frac{0.75}{HS}\right\}$$

b) Find $\underset{\sim}{S} = \underset{\sim}{B} \times \underset{\sim}{C}$

Q.9 a) Explain different operations in fuzzy relation data model with example. 08

b) What is genetic algorithm? Explain the working principles of genetic algorithm. 07

Q.10 Write short notes on (Any three) 15

a) Fuzzy SQL
b) Fuzzy object oriented databases
c) Fuzzification and Defuzzification
d) Learning vector quantization
e) Crisp set Vs fuzzy set.