

**SUBJECT CODE NO:- P-286**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**B.E. (CSE) Examination May/June 2017**  
**Soft Computing**  
**(Revised)**

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

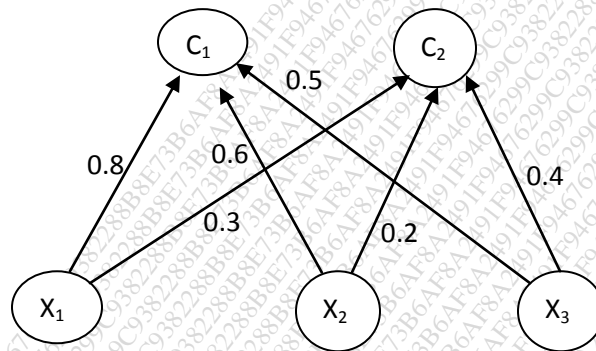
- N.B
- 1) Question No 1 and 6 are compulsory
  - 2) Attempt any two question from the remaining question from each section
  - 3) Assume data if necessary & state it clearly

Section A

- Q.1 Attempt any two of the following 10
- a) How ANN is used for pattern recognition tasks? Explain
  - b) Explain various types of soft computing techniques? Give its application
  - c) Explain Errors correction & gradient descent rule
- Q.2 a) Explain feed forward neural network architecture & Give pattern recognition tasks solved by FFNN 08
- b) Explain three basic models of ANN with its applications 07
- Q.3 a) How perceptron learning law is used for pattern classification? Explain in detail with example. 07
- b) Show by geometrical arguments that with 3-layers of non-linear units any hard classification problems can be solved 08
- Q.4 a) What is Hopfield network? Explain algorithm to store and recall a set of bipolar patterns in Hopfield network 07
- b) Train a hetero-associative memory network using hebb rule to store input row vector 08  
 $S = (S_1, S_2, S_3, S_4)$  to the outpou row vector  $t = (t_1, t_2)$  The vector pairs are given in table
- | 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     |
- Q.5 Write short notes ( any three) 15
- a) Bidirectional Associative memory
  - b) Limitation of single layer perceptron
  - c) Topologies of ANN
  - d) ANN Terminologies
    - 1) Interconnection
    - 2) Update
  - e) ANN Vs BNN

Section B

- Q.6 Answer the following ( any two) 10  
 a) Explain pattern clustering network  
 b) Describe properties of fuzzy set  
 c) Distinguish between numerical variable and linguistic variable
- Q.7 a) With architecture explain the training algorithm used in kohonen self-organizing feature map 07  
 b) Consider kohonen net with two clusters units & three input units. The weight vector for the cluster units are ( 0.8, 0.6, 0.5, ) and ( 0.3, 0.2 0.4 ) find the winning cluster unit for the input vector ( 0.4, 0.2, 0.1 ) use learning rate of 0.2, find new weights for the winning unit 08



- Q.8 a) Consider two fuzzy sets 07

$$A = \left\{ \frac{1}{1.0} + \frac{0.75}{1.5} + \frac{0.3}{2.0} + \frac{0.15}{2.5} + \frac{0}{3} \right\}$$

$$B = \left\{ \frac{1}{1.0} + \frac{0.6}{1.5} + \frac{0.2}{2.0} + \frac{0.1}{2.5} + \frac{0}{3} \right\}$$

Find A) AUB      B) A∩B      c)  $\bar{B}$       d)  $\overline{A \cup B}$

- b) consider the following fuzzy sets 08

$$A = \left\{ \frac{0.4}{30} + \frac{0.6}{60} + \frac{1.0}{100} + \frac{0.1}{120} \right\}$$

$$B = \left\{ \frac{0.2}{20} + \frac{0.3}{40} + \frac{0.6}{60} + \frac{0.8}{80} + \frac{1.0}{100} + \frac{0.2}{120} \right\}$$

$$C = \left\{ \frac{0.3}{500} + \frac{0.6}{1000} + \frac{0.9}{1500} + \frac{0.2}{1800} \right\}$$

Compute the relation  $\tilde{R} = \tilde{A} \times \tilde{B}$  and  $s = \tilde{B} \times \tilde{C}$

Also find Fuzzy relation  $\tilde{T} = \tilde{R} \circ \tilde{S}$  Using max-min composition

Q.9 a) Explain the following operations in fuzzy relational algebra with example

- 1) Join
- 2) Union
- 3) Projection
- 4) Selection

b) Explain any one application of fuzzy control

Q.10 Write short notes (Any three)

- a) Membership function in fuzzy logic
- b) Genetic algorithm
- c) Application of competitive neural network
- d) Learning vector quantization
- e) Self-organizing map

08

07

15