



## Soft Computing (1090)

P. Pages : 3

Time : Three Hours

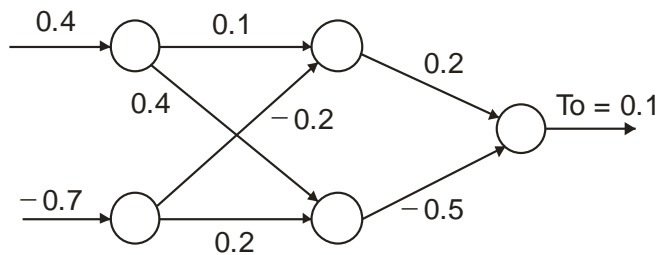
Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any five** questions.
5. All questions carry equal marks.
6. Figures to the right indicate full marks.
7. Use of programmable calculator is allowed.
8. Assume suitable data if necessary.

1. a) Draw and explain ADALINE and MADALINE networks also compare them. 8  
b) Find the new activities values for following input vector by applying ART1 algorithm, assume the dimensions of F1 (comparison layer) and F2 (Recognition layer) as M=5 and N=6 respectively, where M is number of neurons in comparison layer and N is the number of neurons in recognition layer 12  
Input vector  $[I] = \begin{bmatrix} 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$   
Assume the parameters A=1, B=1.5, C=5, D=0.9,  $\rho = 0.9$
2. a) Discuss the classification of Neural Network System with respect to learning methods and architecture types. 10  
b) State and explain fixed increment perceptron learning algorithm for a classification problem with n input features  $(X_1, X_2, \dots, X_n)$  and two output states (0/1). 10

3. a) Illustrate the back propagation in following 2-2-1 multilayer feed forward network. 12



- b) State and explain ART1 algorithm. 8
4. a) Discuss the application of neural network in classification of soil. 8
- b) Following table shows 12 patterns in the two dimensional space, do the clustering of these patterns by using vector quantization. Assume threshold distance 2.0 and 3.5. 12

Point	X	Y
1	2	3
2	3	3
3	2	6
4	3	6
5	6	3
6	7	3
7	6	4
8	7	4
9	2	4
10	3	4
11	2	7
12	3	7

5. a) State and explain stability and plasticity dilemma. 8
- b) Discuss in detail classical ART network. 12
6. a) Consider two Fuzzy set 12
- $$\tilde{A} = \{(x_1, 0.5), (x_2, 0.7), (x_3, 0)\}$$
- and
- $$\tilde{B} = \{(x_1, 0.8), (x_2, 0.2), (x_3, 1)\}$$
- perform union, Intersection, complement, product, Equality, product of fuzzy set with crisp number, power, difference operations on above  $\tilde{A}$  and  $\tilde{B}$  fuzzy set.

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|----|---|----|
| b) | Draw and explain fuzzy inference system.                                      | 8  |
| 7. | a) Discuss various fuzzy models.  | 12 |
|    | b) Draw and explain application of fuzzy logic in air conditioner controller. | 8  |
| 8. | a) State and explain various selection methods in genetic algorithm.          | 10 |
|    | b) Discuss in detail drawback of genetic algorithm.                           | 10 |

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