Time: 3 Hours Total Marks:80

N.B.: 1. Question 1 is compulsory
2. Solve any **THREE** questions out of remaining six questions
3. Figures to the right indicated full marks
4. Assume suitable data whenever required and justify the same.

Q.1	Attempt any FOUR questions:	**20**
1.	Implement AND function using Mc-Culloch Pitts neuron	
2.	Compare RBF and MLP network.	
3.	Model the fuzzy set using suitable membership function, "Number close to 6".	
4.	Explain in brief linear and non linear separability concept	
5.	Explain the K-means algorithm	
6.	Explain LVQ with architecture	
Q.2.a.	Explain Radial Basis function neural network for the solution of XOR function	**10**
b.	Find the weights required to perform the following classification using Perceptron network. The vectors (1, 1, 1,1) and (-1, 1, -1, -1) are belonging to the class and have the target value 1 and vectors (1,1,1,-1) and (1,-1,-1,1) are not belonging to the class and have the target value -1. Assume learning rate as 1 and initial weights as 0.	**10**
Q.3.a.	With a neat architecture, explain the training algorithm of Kohonen self organizing maps.	**10**
b.	Discuss the back propagation training algorithm and list the learning factors in BPNN	**10**
Q.4. a.	Design fuzzy logic controller for water purification plant. Assume the grade of water and temperature of water as the inputs and the required amount of purifier as the output. Use three descriptors for input and output variables. Derive set of rules for control the action and de fuzzification. The design should be supported by figures. Clearly indicate that if water temperature is low and grade of water is low, then the amount of purifier required is large.	**12**
b.	Explain adaline network in detail	**08**

Q.5. a. Train a hetero associative memory network to store the input vectors s=(s1,s2,s3,s4) to the output vectors t=(t1,t2). The vector pairs are given in the table below. Also test the performance of the network using its training input as testing input: **10**

Inputs and Targets	s1	s2	s3	s4	t1	t2
1st	1	0	0	0	0	1
2nd	1	1	0	0	0	1
3rd	0	0	0	1	1	0
4th	0	0	1	1	1	0

b. Let the two fuzzy relations: **10**

P=

	b1	b2	b3
a1	0.4	0.5	0
a2	0.2	0.8	0.2

Q=

	c1	c2
b1	0.2	0.7
b2	0.3	0.8
b3	1	0

Find 1. Max Product Composition of P and Q.
2.Max-min Composition of P and Q

Q.6. Write short note on:(Any TWO)

a. Bidirectional Associative Memory **10**

b. Adaptive Resonance Theory **10**

c. Activation Functions **10**

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