

GUJARAT TECHNOLOGICAL UNIVERSITY**M.E Sem-I Regular Examination January / February 2011****Subject code: 710423N****Subject Name: Neuro Computing and Applications****Date: 03 /02 /2011****Time: 02.30 pm – 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Enlist various activation functions used in single and multilayer neural networks. Explain any two of them in brief. **07**
- (b) Describe in brief following factors affecting the performance of artificial neural network models. **07**
- i) Number of hidden Nodes
 - ii) Range of normalization of training data.

- Q.2** (a) Explain in brief the necessary steps for Back Propagation Learning algorithm. Clearly mentions all assumptions made. **07**
- (b) What is generalization of neural networks? Enlist and explain useful properties and capabilities offered by neural networks. **07**

OR

- (b) Discuss: "Initialization of interconnecting weights and type of activation function are important factors for successful training". **07**

- Q.3** (a) Why learning is required? Explain Hebbian and Perceptron training rules for neural training. **07**
- (b) What is the importance of Delta learning rule? Justify with proper derivation an explanation "Delta learning is called error correction learning". **07**

OR

- Q.3** (a) Draw basic architecture for Hebb networks. Write algorithm for Hebb Learning. **07**
- (b) Explain concept of linear separability. Apply Hebb net to the training patterns that define XOR function with bipolar input and targets. Critically evaluate result. **07**

- Q.4** (a) Explain algorithm used for training the perception net clearly mentioning all assumption made. **07**
- (b) Consider an auto associative net with the bipolar step function as the activation function and weights set by Hebb rule with main diagonal elements set to zero. **07**
- a) Find the weight matrix to store vector $v = (1 \ 1 \ 1 \ 1 \ -1 \ -1)$
 - b) Test the response of the network with the same input.

OR

- Q.4** (a) Enlist different neural architectures of Associative Memory models. Explain two layer models with necessary details. **07**

- (b) Consider three orthogonal vectors $\begin{bmatrix} 1 & -1 & 1 & -1 \end{bmatrix}$ $\begin{bmatrix} -1 & 1 & 1 & -1 \end{bmatrix}$ $\begin{bmatrix} 1 & 1 & -1 & -1 \end{bmatrix}$. Find the weight matrix to store all three orthogonal vectors and test the response of the network for any one of the input. **07**

Q.5 (a) Explain competitive learning neural network with necessary diagram. Explain different criteria being used for competition. **07**

- (b) What is stability –plasticity dilemma ? List related questions that one need to address to resolve the dilemma. **07**

OR

Q.5 (a) Explain basic Adaptive Resonant Theory (ART) architecture. **07**

- (b) Consider six number of points in two dimensional Euclidian space (x,y) as shown below. **07**

Point	Input pattern coordinates	
	X	Y
1	2	3
2	1	3
3	2	6
4	3	6
5	6	3
6	7	4

Determine clusters using VQ. Assume threshold distance 2.5 .
