Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013

Subject code: 710423 **Date: 06-01-2014**

Subject Name: Neuro Computing and Applications

Time: 10.30 am – 01.00 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)** "Neural network exhibits a graceful degradation in performance rather than catastrophic failure"- In this statement which benefit of neural network is evident? Discuss it fully comparing with conventional computing. **07**

(b) Explain **Sigmoid** as an activation function used in single and multilayer neural networks. Explain how it differs than other function giving clear comparison. **07**

Q.2 **(a)** Starting with input node (forward step), derive weight updating equations for neuron j when a) neuron j is an output node for back propagation learning algorithm. Clearly mentions all assumptions made. **07**

(b) Explain simple perceptron learning algorithm with clearly mentioning all assumed parameters. **07**

OR

(b) Describe in brief following factors affecting the performance of back propagation neural network models. **07**

i) Learning co-efficient

ii) Selection of number of hidden neurons/layers

Q.3 **(a)** What is Associative Memory? Explain two layer models for associate memory with necessary details. **07**

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

Point	X- coordinate	Y-coordinate
1	2	4
2	6	3
3	3	6
4	4	6
5	6	5
6	7	4

Determine:

number of clusters and cluster centers using VQ.

Assume threshold distance 3

OR

Q.3 **(a)** Draw basic architecture for Hebb networks. Write algorithm for Hebb Learning. **07**

(b) Explain concept of linear reparability. Apply Hebb net to the training patterns that define NAND function with bipolar input and targets. Critically evaluate result. **07**

Q.4	**(a)**	What is stability –plasticity dilemma? Explain how the same can be resolved by Basic ART architecture.	**07**
	(b)	Discuss application of neural networks in any pattern recognition problem in brief.	**07**
		OR	
Q.4	**(a)**	Explain in brief; different basic architectures of neural network.	**07**
Q.4	**(b)**	**List** applications of neural networks in following domains: (mention at least two in each domain) a) Optimization b) Forecasting and risk management c) Control system. - Out of all above listed application, for any one application, clearly mention only class/type of neural network and corresponding parameters to be used.	**07**
Q.5	**(a)**	Discuss solution of EXOR problem in context of following: a) Macculo-pits model b) Perceptron c) Back propagation network d) RBF network	**07**
	(b)	Explain NARX model for recurrent network architectures in brief.	**07**
		OR	
Q.5	**(a)**	Explain State-space model architecture for dynamic recurrent NN in brief.	**07**
	(b)	Explain Radial Basis Function networks with necessary details.	**07**

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