Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–II EXAMINATION – SUMMER 2015

Subject Code: 2722710 **Date: 01/06/2015**

Subject Name: Neuro Computing and Applications (Elective)

Time: 02:30 PM to 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)** Explain concept of error correcting learning by clearly mentioning all assumed parameters, signal flow graph (highlighting activity of a single neuron) and mathematical equations. **07**

(b) Enlist benefits offered by neural network. Also for the following statement identify the benefit of neural network that is evident and comparing it with conventional computing. ñNeural network exhibits a graceful degradation in performance rather than catastrophic failure.ò **07**

Q.2 **(a)** Enlist different heuristics for making back propagation neural network perform better. Explain in brief any two of them. **07**

(b) Discuss in brief solution of EXOR problem in context of following: **07**

a) Macculo-pits model
b) Perceptron
c) Back propagation network
d) RBF network

OR

(b) Explain in brief the necessary steps for Back Propagation Learning algorithm. Clearly mentions all assumptions made. **07**

Q.3 **(a)** What is stability plasticity dilemma? Explain basic ART network architecture. **07**

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

Shown below. Inp**ut pattern coordinates are:**

Point	X	Y	**Point**	X	Y
1	1	2	**4**	6	5
2	7	7	**5**	4	4
3	9	8	**6**	2	2

Assume threshold distance a) 4 b) 2.
Determine clusters using VQ in each case.
Comment on the results in view of threshold distance and clusters formed.

OR

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

(b) Use Hebbôs outer product rule, to find out a weight matrix to store three orthogonal vectors given as (1 -1 1 -1), (-1 **07**

1 1 -1) and (1 1 -1 -1).
a) Find the weight matrix.
b) Test the response of net with each of the input vector.

Q.4	**(a)**	Discuss application of neural networks in image processing/pattern recognition problem, in brief.	**07**
	(b)	Explain NARX model for recurrent network architectures in brief.	**07**

OR

Q.4	**(a)**	Explain State-Space model for recurrent network architectures in brief.	**07**
Q.4	**(b)**	Discuss application of neural networks in domain of robotics, in brief.	**07**

Q.5	**(a)**	**List** applications of neural networks in following domains: (mention at least two in each domain) a) Optimization b) Control system. - Out of all above listed applications, for any one application, clearly mention only class/type of neural network and corresponding parameters to be used.	**07**
	(b)	Explain KOHONEN model architecture for Self Organization Map (SOFM).	**07**

OR

Q.5	**(a)**	Discuss application of neural networks in any finance/weather forecasting application in brief.	**07**
	(b)	Explain with necessary details Radial Basis Function networks. Enlist three major differences between RBF and multi layer Perceptron.	**07**

****