

IV B.Tech I Semester(R05) Supplementary Examinations, May/June 2010**ARTIFICIAL NEURAL NETWORKS****(Common to Electronics & Instrumentation Engineering and Bio-Medical Engineering)****Time: 3 hours****Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Give the brief operation of biological neural network.
(b) Explain how biological neural network is superior over a conventional computer system. [8+8]
2. (a) Explain the concept of Hebbian learning principle and its mathematical modeling.
(b) Given are a set of input training vectors and initial weight vector. The learning constant is assumed to be 0.1. The desired responses for X_1 , X_2 and X_3 are $d_1=-1$, $d_2=-1$ and $d_3=1$ respectively for a bipolar binary case. $X_1 = [1, 2, 0, 1]^T$, $X_2 = [0, 1.5, -0.5, -1.0]^T$ and $X_3 = [-1, 1, 0.5, -1]^T$. $W^0 = [1, -1, 0, 0.5]^T$. With Widrow-Hoff learning rule evaluate weight vector after completion of one cycle of training. [8+8]
3. (a) Define the problem of handwritten digit recognition. With suitable diagram, explain architecture of multilayer feed forward network for handwritten character recognition.
(b) Summarize the training algorithm of multi category single layer Perceptron networks. [8+8]
4. (a) Explain Kohonen self organizing maps with example.
(b) Explain the following terms: with respect to Neural networks.
 - i. Stability
 - ii. Plasticity
 - iii. Learning
 - iv. Architecture. [8+8]
5. (a) Explain Learning Vector Quantizer (LVQ).
(b) Compare Kohonen SOM and LVQ. [8+8]
6. (a) What are the assumptions to be satisfied for a network to form a Hopfield network?
(b) Construct an energy function for the same size with N neurons. Show that the energy function decreases every time as the neuron output changes. [8+8]
7. Draw the architecture of ART algorithm and explain. Comment on the vigilance parameter. [10+6]
8. (a) Explain the steps in the solution of a general optimization problem by a neural network.
(b) How an optimization problem formulated for solution using a neural network model. [8+8]
