CS-801

B. E. (Eighth Semester) EXAMINATION, June, 2009

(Computer Science & Engg. Branch)

NEURAL NETWORK (CS-801)

Time : Three Hours Maximum Marks : 100 Minimum Pass Marks : 35

Note : Attempt any *five* questions. All questions carry equal marks.

1 (a) Describe the taxonomy of neural network architecture. 5

(b) What is the significance of Widrow's learning rule ? 5

(c) Distinguish between linearly separable and linearly-inseparable problems giving examples. Why a single layer of perceptron cannot be used to solve linear separable problem ? 10

2. (a) Differentiate the following : 10

(i) AD ALINE *vs* MADALINE

(ii) AI *vs* ANN

(iii) Supervised *vs* Unsupervised learning

(iv) Feedback Network *vs* Feedforward Network

(b) Given a two input neuron with the following weight matrix and input vector : W = [3 2] and P = $[- 5 7]^T$, we would like to have an output of 0-5. Do you suppose that there is a combination of bias and transfer function that might allow this ? 10

3. (a) Is there a bias that will do the job if the linear transfer function is used ? If yes, what is it ? 10

(b) Is there a bias that will do the job if a log sigmoid transfer function is used ? What is it ? 10

4. (a) Derive the back propagation training algorithm for the neuron in the hidden layer using logistic functions and the neurons in the output layer using linear function. 10

(b) Prove that a multilayer linear feedforward neural network is computationally equivalent to a single layer neural network. 10

5. (a) Explain the architecture of counterpropagation network. How it works in normal and training mode ? 10

(b) Describe Boltzmann training algorithm with the help of example. 10

6- (a) Explain the significance of hidden layer. How is it useful in pattern recognition and control problems ? 8

(b) What is ART ? Apply an ART algorithm to the following data : 12

{(111111) (111000) (000111) (000000) (110000) (1010001)}

7. (a) Discuss the Hopefield network on the following points : 12

(i) Generalized structure

(ii) Stability

(iii) Associative memory

(iv) Applications

(b) Discuss the characteristics, limitations and applications of Associative memory. 8

8. (a) Write down the operating principle of vector matrix multipliers.

8 (b) With reference to cognitron explain the following : 12

(i) Lateral inhibition

(ii) Receptive region

(iii) Simulation results of cognitron

9. Write short notes on any *three* of the following : 20

(i) Net talk

(ii) Activation function

(iii) Neocognition

(iv) Cauthy training

(v) Optical Neural Network