M.E.(Elec.), 2nd Semester Examination, 2012

Neural Networks and Systems (EE–1024)

Time: 3 hours Full Marks: 100

(i) *Answer any three questions from Group -A and any two from Group -B*

(ii) *Marks are indicated in the margin*

GROUP – A

1.(a) Draw and explain the general model of an artificial neural network.

(b) Explain why nonlinear activation function is needed in multilayer network. (7+7)

2.(a) Show with suitable example that the single layer perceptron can not simulate linearly inseparable function.

(b) Explain how the multilayer perceptron model can overcome this problem. (7+7)

3.(a) Draw, label and explain feedforwad counterpropagation network. Describe Kohonen layer in normal operation of this network.

(b) Compare between interpolative and accretive mode of training of Kohonen layer in counterpropagation network. ((6+4)+4)

4.(a) With a neat sketch, explain the operation of single-layer Hopfield network with binary systems. State the conditions for stable operation.

(b) Discuss the general application areas of artificial neural network. ((8+2)+4)

GROUP – B

5.(a) What is competitive learning? How are the connection weights modified in competitive learning neural network during training? Describe two schemes for updating weights.

(b) What is 'Self Organizing Map (SOM)'? Explain, how lateral competition among output layer neurons results in self organization. (7+7)

6.(a) Explain the role of 'neighbourhood function' in Kohonen's SOM algorithm. Discuss the suitability of using 'Mexican Hat' type function as neighbourhood function in Kohonen's SOM.

(b) What is pattern classification? Develop a flow chart to show how the English alphabets can be classified into 26 distinct classes using Kohonen's SOM. (7+7)

7.(a) What is 'objective function' and 'constraint' in an optimization problem? Describe how ANN can be used to solve a nonlinear optimization problem like 'Travelling Salesman Problem (TSP)'.

(b) What is 'Financial Forecasting'? Draw a flow chart showing the steps to be followed to develop an ANN based forecasting model. (7+7)