Exam.Code:0919
Sub. Code: 6375

1078
B.E. (Computer Science and Engineering)
Seventh Semester
Elective – III
CS-705B: Neural Networks

Max. Marks: 50

Time allowed: 3 Hours

NOTE: *Attempt* <u>*five*</u> *questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt the following:-

   a) Draw a simple artificial neuron and discuss the calculation of net input.
   b) State the process of learning in supervised manner from a mathematical point of view?
   c) State the outer products rule used for training pattern association networks.
   d) State techniques for proper choice of learning rate.
   e) Compare Multi-layer perceptron and Radial basis function.   (5x2)

UNIT – I

II. a) Design neural networks with only one M-P neuron that implements the three basic logic operations:
       i)   NOT (xl)
       ii)   OR (xl, x2)
             where xl and x2 belongs to {0, 1}.

                                                                         (7,3)
    b) State various heuristics of Hebbian learning nets.

III. a) Implement a NOR function using perceptron network for bipolar inputs and targets.
                                                                         (6,4)
     b) Discuss Linear least squares filters.

IV. a) Discuss back-propagation algorithm. Draw the architecture of back propagation algorithm. State the importance of back-propagation algorithm

                                                                         (7,3)
    b) Why is gradient descent method adopted to minimize error?

UNIT – II

V. a) Construct an auto-associative network to store vector [1 1 -1 +1]. Use iterative auto-associative network to test the vector with three missing elements.

(2)

b) State the applications of Kohonen self-organizing maps. (6,4)

VI. a) What is meant by unsupervised learning? Draw the architecture of Mexican hat and stare its activation function.

b) Write a short note on Hebbian based Principal Component Analysis. (5,5)

VII. A company has collected a large amount of data in the form of pairs of input and output vectors, and wants you to build a system that will predict the outputs for new inputs. Design an appropriate Radial Basis Function (RBF) network for them. Explain what will be computed at each network layer. State and elaborate learning mechanism with all other details. (10)

x-x-x