Code No: NR410405 **NR**

IV B.Tech I Semester Supplementary Examinations, November 2005
NEURAL NETWORKS
(Common to Electronics & Communication Engineering, Computer Science & Engineering, Information Technology, Computer Science & Systems Engineering and Electronics & Telematics)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Give a flow graph model of an artificial neural network and explain its working.
   (b) Distinguish between unipolar and bipolar activation functions used in artificial neural networks giving at least two examples of each. [6+10]

2. (a) Describe perceptron and explain about its working principle in detail. [2+6]
   (b) Explain the limitations of perceptron? [8]

3. (a) In a feed forward network, the error is the target value minus the actual value produced by the network. Suppose the target value is a range (interval) rather than a point, derive a simple scheme to calculate the error. [8]
   (b) Discuss briefly about the limitations of backpropagation and also discuss how to use the backpropagation network as a noise filter in signal processing. [8]

4. Consider a simple Hopfield network made up of two neurons. The synaptic weight matrix of the network is

   $$W=\begin{bmatrix} 0 & -1 \\ -1 & 0 \end{bmatrix}$$

   The bias applied to each neuron is zero. The four possible states of the network are

   $x_1 = [+1, +1]^T$ $x_2 = [-1, +1]^T$

   $x_3 = [-1, -1]^T$ $x_4 = [+1, -1]^T$

   Demonstrate that states x_2 and x_4 are stable, whereas states x_1 and x_3 exhibit a limit cycle. Do this demonstration using the following tools:

   (a) The alignment (stability) condition. [4+4]
   (b) The energy function. [4+4]

5. (a) Explain the architecture and training of Kohonen's self-organizing network. [3+5]
   (b) Explain the Kohomem's learning algorithm. [8]

6. Write note on the following.

(a) Bidirectional Associate memories [8]

(b) Grossberg layer. [8]

7. (a) ART network exploits in full one of the inherent advantages of neural computing technique, namely parallel processing Explain. [8]

   (b) Describe the architecture and operation of ART2 network. [3+5]

8. Discuss in detail the pattern recognition tasks that can be solved by feed forward neural networks. [16]

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