Code No: R05320505 **Set No. 1**

III B.Tech II Semester Regular Examinations, Apr/May 2008
NEURAL NETWORKS
(Computer Science & Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain the simple model of machine learning. With an example. [16]

2. Consider the following ortho normal sets of key patterns, applied to a correlation matrix memory
   $x_1 = [1,0,0,0]^T$
   $x_2 = [0,1,0,0]^T$
   $x_3 = [0,0,1,0]^T$
   and respective stored patterns are
   $y_1 = [5,1,0]^T$
   $y_2 = [-2,1,6]^T$
   $y_3 = [-2,4,3]^T$
   (a) Calculate the memory matrix
   (b) The stimulus applied to the memory is a noisy version of the key pattern x,as shown by
   $x = [0.8, -0.15, 0.15, -0.20]^T$
   Calculate memory response y. [8+8]

3. (a) Explain in detail about adaptive filter problem.
   (b) Explain in detail about unconstrained orgaizational techinques [8+8]

4. Explain signal flow graphical summary of back propagation learning showing forward pass and backward pass. [16]

5. (a) What is over fitting? Explain the effects of over fitting on generalization.
   (b) Explain variants of cross validation tool. [8+8]

6. Write short notes on computer simulations to explain the behavior of self organization map algorithm. [16]

7. Discuss about the stability property of the dynamical system taking an example. [16]

8. (a) What is the Hopfield network? Explain.
   (b) Describe how Hopfield network can be used to have analog to digital conversion. [4+12]

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Code No: R05320505 **Set No. 2**

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NEURAL NETWORKS
(Computer Science & Engineering)

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

Answer any FIVE Questions
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1. Explain the following:
   (a) Single layer feed forward networks
   (b) Stable forward weight. [8+8]

2. Write briefly about the following:
   (a) Correlation matrix memory
   (b) Linear adaptive filter. [8+8]

3. Explain the following briefly
   (a) Steepest descent method
   (b) Newton's method for optimization. [8+8]

4. Consider the following optimized multilayer perceptron

parameter	**value**
optimum number of hidden neurons	2
optimum learning-rate parameter	0.1
optimum momentum constant	0.5

   Using above data explain optimal network design. [16]

5. Statistical criterion for model selection, such as Rissanen's minimum description length (MDL) criterion and an information-theoretic criterion (AIC) due to Akaike, share a common form of composition:
   (model-complexity criterion) = (log-likelihood function) + (model-complexity penalty)
   Discuss how the weight-decay and weight-elimination methods used for network pruning fit into this formalism. [16]

6. (a) Write about Willshaw-Vonder malsburg's model of self organized feature map
   (b) Write short notes on parameter specifications for the computer simulations of self organization map algorithm. [8+8]

7. (a) Discuss about stability and convergence in the context of an autonomous non-linear dynamical system with equilibrium state.
   (b) Draw and explain block diagram of related model. [8+8]

8. (a) Explain the working of a Hopfield network with a neat sketch of its architecture

(b) Taking a three-node net, determine the weight matrix to store the following states V_1 V_2V_3 = 000, 011, 110 and 101 using Hebb's rule. [8+8]

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Code No: R05320505 **Set No. 3**

III B.Tech II Semester Regular Examinations, Apr/May 2008
NEURAL NETWORKS
(Computer Science & Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Explain the following benefits of neural network
   (a) Neurobiological analogy
   (b) Uniformity of analysis and design
   (c) Fault tolerance
   (d) VLSI implementability. [4+4+4+4]
2. (a) Write in detail about error-detection learning.
   (b) Write in detail about memory brief learning. [8+8]
3. Write about linearly separable patterns and non-linearly separable patterns in single layer perceptron with an examples [8+8]
4. Give the solution for credit -assignment problem using back propagation. [16]
5. What is back propagation? Derive its learning algorithm with a schematic two-layer feed forward neural network. [16]
6. (a) Explain Willshaw-Vonder malsburg's of self organized feature map and compare with Kohenen model.
   (b) Explain how we can use learning vector quantizer for the final fine tuning of a feature map. [8+8]
7. Explain the design procedure of Neuro-Controller for a dynamical system with a case study. [16]
8. (a) A Hopfield network made up of 5 neurons, which is required to store the following three fundamental memories
   $\xi_1 = \{+1, +1, +1, +1, +1\}^T$
   $\xi_2 = \{+1, -1, -1, +1, -1\}^T$
   $\xi_3 = \{-1, +1, -1, +1, +1\}^T$
   Evaluate the 5-by-5 synaptic weight matrix of the network
   (b) Contrast and compare a recurrent network configuration with a feed forward network. [8+8]

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Code No: R05320505 **Set No. 4**

III B.Tech II Semester Regular Examinations, Apr/May 2008
NEURAL NETWORKS
(Computer Science & Engineering)

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Write the various benefits of neural networks. Explain them in detail. [16]
2. (a) Explain in detail about competitive learning.
   (b) Explain in detail about Bolltzmann learning. [8+8]
3. (a) Explain method of steepest descent for unconstrained optimization.
   (b) Explain Newton's method for unconstrained optimization. [16]
4. Explain in detail about the following methods which are useful in improving back propagation algorithm.
   (a) Tangent values
   (b) Normalizing the inputs. [8+8]
5. (a) What are the steps involved in the back propagation algorithm. Explain
   (b) What are the pattern recognition tasks that can perform by back propagation network.Explain Briefly
   (c) What are the limitations of back propagation algorithm? [8+4+4]
6. Determine the Self organization map generated by points selected at random from an annular ring formed by two concentric circles, consider the following two cases.
   (a) The units in the Self organization map are arranged in a 2-dimensional plane.
   (b) The units in the self organization map are arranged in 1-dimensional layer. [8+8]
7. Restate Lyapunov's theorems for the state vector x(0) as the equilibrium state of a dynamical system. [16]
8. (a) What is the Hopfield network? Explain.
   (b) Describe how Hopfield network can be used to have analog to digital conversion. [4+12]

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