Code No: **R164205B** **R16** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, June - 2022

ARTIFICIAL NEURAL NETWORKS

(Common to Computer Science and Engineering and Information Technology)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B

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PART–A *(14 Marks)*

1. a) Explain the role of activation function in artificial neuron. [2]
   b) Discuss about competitive learning algorithm. [3]
   c) What kind of operations can be implemented with perceptron? [2]
   d) What are feed forward artificial neural networks? [2]
   e) What is universal approximation theorem? [2]
   f) Write a short note on inner product kernels. [3]

PART–B *(4x14 = 56 Marks)*

2. a) Compare and contrast Biological neuron with artificial neuron. [7]
   b) Describe various functional aspects of artificial neuron model with respect to activation functions [7]

3. a) How state space model of artificial neural networks can be used for optimization of various applications? Explain. [7]
   b) Illustrate the working principles of supervised learning with an example [7]

4. a) Explain about linear adaptive filtering [7]
   b) Discuss the Signal Flow graph representations with respect to Perceptron algorithm [7]

5. a) Describe the training steps for back propagations networks [7]
   b) Explain the importance of hidden and output layers in Multi-layer feed forward networks [7]

6. a) Write a short note on Radial Basis Function networks [7]
   b) Explain about interpolation [7]

7. a) Give the classification of hyperplanes. How SVM overcomes the drawbacks of other classification approaches? [7]
   b) Illustrate the idea of an optimal hyperplane for linearly separable patterns [7]

Code No: **R164205B** **R16** **Set No. 2**

IV B.Tech II Semester Regular/Supplementary Examinations, June - 2022

ARTIFICIAL NEURAL NETWORKS

(Common to Computer Science and Engineering and Information Technology)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B

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PART–A *(14 Marks)*

1. a) What are the applications of artificial neural networks? [2]
   b) Explain the working principles of unsupervised learning [2]
   c) Give the role of mean square error in delta learning rule [2]
   d) Discuss the use of Back Propagation networks [3]
   e) What are the approximation properties of Radial Basis Function networks? [2]
   f) Write a short note on linear seperability [3]

PART–B *(4x14 = 56 Marks)*

2. a) Explain the architecture of artificial neural network [7]
   b) Write a short note on recurrent neural networks [7]

3. a) How to find multiplication by inverse in vector algebra? Explain with example. [7]
   b) Explain the concept of optimization with suitable example. Give its application in the design of learning systems. [7]

4. a) Explain the Convergence Considerations with respect to Perceptron algorithm? [7]
   b) Elaborate on the two-class pattern classification problem [7]

5. a) Explain the training algorithm in back propagation networks [7]
   b) Write a short note on forward propagation of function signals [7]

6. a) Write about the RBF networks design with respect to Radial Basis Function network [7]
   b) How interpolation problem is solved with Radial Basis Function networks? Illustrate. [7]

7. a) Explain inner product kernels for various types of Support Vector Machines [7]
   b) Design the Support Vector Machine for Classification Problems [7]

Code No: **R164205B** **R16** **Set No. 3**

IV B.Tech II Semester Regular/Supplementary Examinations, June - 2022

ARTIFICIAL NEURAL NETWORKS

(Common to Computer Science and Engineering and Information Technology)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B

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PART–A *(14 Marks)*

1. a) Why activation function is used in Artificial neuron? [3]
   b) What is state space model of artificial neural networks? [2]
   c) Define perceptron. [2]
   d) Write a short note on Multi-layer feed forward networks [2]
   e) What is interpolation problem? [3]
   f) How to build a Support Vector Machine for pattern recognition problem? [2]

PART–B *(4x14 = 56 Marks)*

2. a) Give the role of activation function in Artificial neural networks. Explain different activation functions**.** [7]
   b) How single layer perceptron is different from multi-layer perceptron? Explain the concept of multi-layer neuron model. [7]

3. a) Describe about systems of linear equations and substitutions. Give its applications [7]
   b) Explain various operations that can be performed on vectors [7]

4. a) What is the need of convergence of perceptron? Explain the perceptron convergence theorem. [7]
   b) Write a short note on linear adaptive filtering [7]

5. a) Describe the design issues of back propagation learning [7]
   b) Explain various steps involved in solving function approximation with back propagation networks [7]

6. Write about the RBF networks training with respect to Radial Basis Function(RBF) networks with a suitable example [14]

7. a) Explain the architecture of Support Vector Machine [7]
   b) How to find maximal hyper planes to solve two class classification problem with Support Vector Machine, when data is Linearly Inseparable? [7]

Code No: **R164205B** **R16** **Set No.4**

IV B.Tech II Semester Regular/Supplementary Examinations, June - 2022

ARTIFICIAL NEURAL NETWORKS

(Common to Computer Science and Engineering and Information Technology)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B

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PART–A *(14 Marks)*

1. a) Write a short note on activation function [2]
   b) What is unsupervised learning? [3]
   c) What is Jacobian matrix? [2]
   d) Give the structure of multi layer feed forward network. [3]
   e) What is radial basis function network ? [2]
   f) Write a short note on Support Vector Machine [2]

PART–B *(4x14 = 56 Marks)*

2. a) Explain the working principles of neurons with "R" number of inputs [7]
   b) Explain the role of synapse in biological neuron with a neat diagram. [7]

3. a) Give the role of optimization in the design of neural networks? Illustrate. [7]
   b) Differentiate memory based learning with competitive learining. [7]

4. a) Explain the working principle of perceptron with a pair of non-linearly separable patterns [7]
   b) Describe the Virtues and limitations with respect to Perceptron algorithm [7]

5. a) Describe about various notations used in back propagation algorithm? [7]
   b) The back propagation law is also known as generalized delta rule. Is it true? Justify. [7]

6. a) Describe the training algorithm used for RBFN with fixed centers [7]
   b) Briefly explain about regularization networks [7]

7. a) Explain how Support Vector Machine separates non-separable patterns [7]
   b) Explain various constraints involved in quadratic optimization for finding the optimal hyperplanes [7]