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]