

Enrollment Number: _____

Roll Number: _____

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Examination: Odd Semester Examination 2024

Paper Name: Neural Network and Deep Learning

Paper Code: BTCSEAI - 704

Time: 3 Hours

Maximum Marks: 75

Note: Follow proper numbering for answering the questions.

SECTION – A

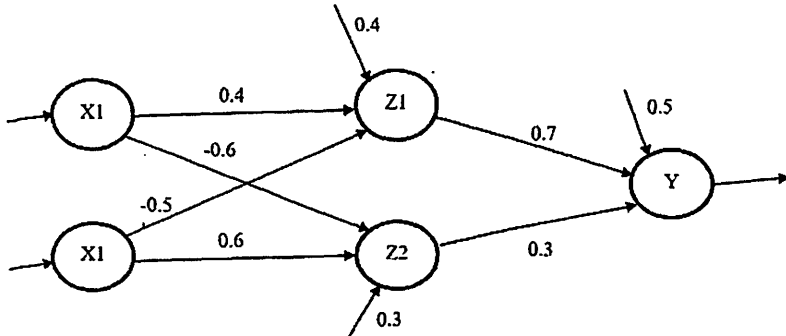
*Attempt all questions.**7 x 5 = 35 Marks*

SL. NO	Questions	Marks	CO	BL
1.	Define Artificial Neural Network and compare it with Biological Neuron.	5	CO1	L4
2.	Write the various types of activation functions used in neural networks.	5	CO1	L1
3.	“The driving force behind optimization in machine learning is the response from a function internal to the algorithm, called the cost function” Justify the statement and give reasons in support of your answer.	5	CO2	L5
4.	Use Adaline network to train OR function with bipolar inputs and targets. Perform one epoch of training.	5	CO3	L3
5.	What is Deep Learning? What is the necessity for moving towards deep learning?	5	CO4	L1
6.	Discuss the property of translational invariance in convolutional neural network and thus explain how image augmentation is beneficial for image classification.	5	CO4	L5
7.	Integrating vision capabilities into the sensing system of a self-driving car could help the car distinguish lanes from sidewalks, as well as from other obstacles the car should notice. Which type of neural network algorithm would you prefer for such a sensing system of self-driving car? Also explain its working.	5	CO5	L6

SECTION – B

*Attempt any four out of six questions.**4 x 10 = 40 Marks*

SL. NO	Questions	Marks	CO	BL
1.	Discuss the advantages of using Neural Networks and thus write some applications of Neural Networks.	10	CO1	L2
2.	Illustrate your views with the help of a suitable real-life example on	10	CO2	L6

	the statement “Error correction learning is based on optimization whereas Hebbian and Competitive learning are both inspired by neurobiological considerations” and thus differentiate Error Correction learning, Hebbian learning and Competitive learning.			
3.	Find the weights required to perform the following classification using perceptron network after 2 epochs. The vectors (1, 1, 1, 1) and (-1, 1, -1, -1) are belonging to the class (so have target value 1), vectors (1, 1, 1, -1) and (1, -1, -1, 1) are not belonging to the class (so have target value -1). Assume learning rate as 1 and initial weights as 0. Use threshold activation function with $\theta = 0.2$.	10	CO3	L3
4.	Use backpropagation network, find the updated weights for the network as shown in the following figure. The network is presented with input pattern [1, 1] and target output [1]. Use learning rate of $\alpha = 0.4$ and binary sigmoidal activation function. 	10	CO3	L3
5.	What is Recurrent Neural Network? Explain the various types of RNN architectures.	10	CO4	L2
6.	Discuss NLP Pipeline and thus explain how RNN is highly recommended for language processing.	10	CO5	L5

BL – Bloom’s Taxonomy Levels (1 – Remembering, 2 – Understanding, 3 – Applying, 4 – Analyzing, 5 – Evaluating, 6 – Creating)
