JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech-VII Semester (CSE/IT)

COURSE CODE (CREDITS): 19B1WCI738 MAX. MARKS: 25

COURSE NAME: INTRODUCTION TO DEEP LEARNING

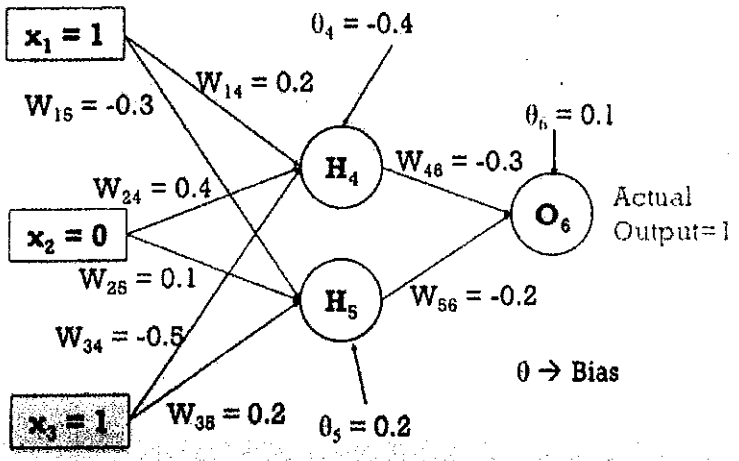
COURSE INSTRUCTORS: VANI SHARMA MAX. TIME: 1 Hour 30 Min

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculator is allowed.

Q.No	Question	CO	Marks
Q1	a) Show that with a single neuron XOR function cannot be solved. b) Design a Multi-Layer Perceptron (MLP) neural network for solving XOR function of three inputs X1, X2 and X3 having one hidden layer of four perceptron's and one output layer. Properly show and discuss weights, bias, perceptron's activation functions, etc.	[3]	[6]
Q2	What will happen if we initialize all the weights of a neural network to: i. Zero ii. Small random values iii. Large random values Briefly discuss the effects on the neural network in each case.	[3]	[3]
Q3	a) What is the drawback of Tanh activation function in comparison to ReLU activation function? b) Why are neural networks considered Turing complete?	[3]	[4]
Q4	Give mathematical equations of Adam optimizer. Explain parameters in it, and explain why bias correction is required?	[3]	[3]
Q5	a) Suppose an input image has been converted into a matrix of size 256 x 256 and a kernel/filter of size 3X3 with a stride of 1 and padding of 0 is convolved over this image. What will be the size of the convoluted matrix? b) Suppose a layer has an input volume of size 32×32×3 and uses 10 convolutional kernels of size 5×5x3, with a stride of 1 and padding of 2. Calculate the number of parameters in this layer.	[3]	[2]

Q6	Consider the following ANN model with backpropagation algorithm. Weights and biases are given in the figure. The network uses the sigmoid as an activation function. Use the given information to compute the output of each neuron during the forward pass and then calculate the error term for each neuron using the backpropagation algorithm and update the parameters for one iteration.  	[3]	[7]