CSPE72 - DEEP LEARNING TECHNIQUES

Date: 20.08.2025 **Time: 4.00 pm to 5.00 pm** **Max.Marks: 20**

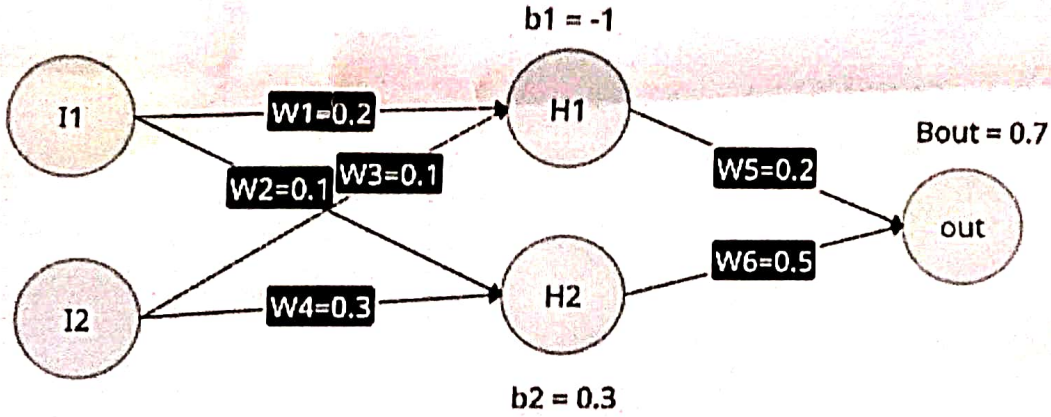
Answer all questions

1. Explain Empirical risk minimization. (2)

2. Show why a single-layer perceptron cannot solve the XOR logic problem, no matter how the weights and bias are chosen. (3)

3. Consider an activation volume of size 13 x 13 x 64 and a filter size 3 x 3 x 64. Discuss whether it is possible to perform convolutions with strides 2, 3, and 5. Justify your answer for each case. (4)

4. Update the parameters in the given MLP using back propagation with a learning rate of 0.5 and an activation function as sigmoid. Initial weights and biases are given in the diagram below. The input = [0.6, 0.9], and the target output =1. (4)



5. Discuss the bias-variance trade-off in neural networks. (1)

6. Which activation functions are prone to causing vanishing gradients in neural networks, and why does this happen? (2)

7. What is ill-conditioning in neural network training, and how does it affect the training process? (2)

8. How does ICA handle non-Gaussian signals compared to PCA, and why is this important for signal separation? (2)

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