JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech-IV Semester (ECE/ECS)

COURSE CODE (CREDITS): 25B1WEC432 (3) MAX. MARKS: 15

COURSE NAME: INTRODUCTION TO NEURAL NETWORKS

COURSE INSTRUCTOR: Dr. Nishant Jain MAX. TIME: 1 Hour

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

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

<table>
<tr><th>Q.No</th><th>Question</th><th>CO</th><th>Marks</th></tr>
<tr><td>Q1</td><td>Explain the different types of machine learning techniques, such as supervised, unsupervised, and reinforcement learning. Discuss their specific applications and use cases in real-world scenarios?</td><td>CO1</td><td>3</td></tr>
<tr><td>Q2</td><td>Given the initial weights for inputs X, X2, and the bias as:
[0.1, 0.3, 0.5],
along with a learning rate of 0.2 and a threshold of 0.5, determine the final weights of a single perceptron capable of classifying the inputs of an AND logic gate. Also draw the trained perceptron model with all the required labelings.
<table>
<tr><td>X1</td><td>X2</td><td>Target</td></tr>
<tr><td>0</td><td>0</td><td>0</td></tr>
<tr><td>0</td><td>1</td><td>0</td></tr>
<tr><td>1</td><td>0</td><td>0</td></tr>
<tr><td>1</td><td>1</td><td>1</td></tr>
</table></td><td>CO1</td><td>4</td></tr>
<tr><td>Q3</td><td>What are activation functions, and why are they essential in neural networks? Describe three different activation functions and discuss their particular applications within various types of neural networks.</td><td>CO1</td><td>4</td></tr>
<tr><td>Q4</td><td>For a softmax function applied to the vector [2, 1, 0], compute the output probabilities.</td><td>CO1</td><td>2</td></tr>
<tr><td>Q5</td><td>Describe the role of loss functions in neural networks for classification tasks. Additionally, list the specific loss functions employed for binary classification, multiclass classification, and multilabel classification problems.</td><td>CO1</td><td>2</td></tr>
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195