REG.NO.: 0434

VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF COMPUTER SCIENCE AND ENGINEERING
CONTINUOUS ASSESSMENT TEST - I
WINTER SEMESTER 2025-2026

SLOT: A1+TA1

Programme Name & Branch	**: B. Tech**
Course Code and Course Name	**: BCSE332L and Deep Learning**
Faculty Name(s)	**: Dr. Vijayanand C**
Class Number(s)	**: VL2025260502243**
Date of Examination	**: 27/01/2006**
Exam Duration	**: 90 minutes**

Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)
- Course Outcomes:
  1. Understand the methods and terminologies involved in deep neural network, differentiate the learning methods used in Deep-nets.
  2. Identify and apply suitable deep learning approaches for given application

Q. No	Question	Module	M	CO	BL
1.	Describe the role of activation functions in neural networks. Compare Sigmoid, Tanh, and ReLU with respect to their mathematical form, and suitability for deep neural networks.	1	10	1	2
2.	Consider a network with two inputs, A and B, with values 0.1 and 0.7, respectively. The neural network has a hidden layer with neurons h1 and h2. The weights for A to h1 are 0.1, A to h2 are 0.3, B to h1 are 0.5, B to h2 are 0.2, h1 to output is 0.2, and h2 to output is 0.1. Assume that the neurons have a Sigmoid activation function. Assume that the target is 1.0 and the learning rate is 1.0 with mean-squared error to calculate the error. Draw the neural network model diagram for the above details. Perform single forward and backward propagation with gradient descent on the network.	1	10	2	3
3.	a) A company is building a neural network model to classify customer review sentiments as positive or negative. The team uses a deep learning framework and trains the model on a dataset of labelled reviews. For this given scenario, identify and describe at least two parameters and two hyperparameters in the sentiment analysis and discuss how they influence the accuracy and efficiency of the model.	1	5	1	3
	b) A startup is developing a deep learning model to detect pneumonia from chest X-ray images. They have collected X-ray images, split into training, validation, and test sets. Illustrate the concept of underfitting and overfitting, considering two different neural network models with required parameters.	2	5		
4.	In deep neural network training, Momentum is often used to improve the gradient descent technique. With equations and diagrams, explain how momentum is calculated using exponentially weighted averages and justify how this approach promotes faster and more stable convergence compared to standard gradient descent.	2	10	2	3

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5.	You are building a deep learning model to detect a very rare type of retinal disease from fundus photographs. Because the disease is so rare, your dataset only contains a few "positive" images, while you have a large number of "negative" images (healthy eyes). To address the data scarcity, you decide to use Data Augmentation. Which specific augmentation techniques would you apply to these eye images, and more importantly, which techniques would you strictly avoid to ensure the diagnostic features remain valid? Explain the reasoning behind your answer.	2	10	1	4

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