# PRESIDENCY UNIVERSITY

## BENGALURU

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### End - Term Examinations – MAY 2025

**Date:** 28-05-2025                                           **Time:** 01:00 pm – 04:00 pm

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| School: SOIS | Program: BCA (AIML) | |
|---|---|---|
| Course Code: CSA3071 | Course Name: Deep Learning | |
| Semester: IV | Max Marks: 100 | Weightage: 50% |

| CO - Levels | CO1 | CO2 | CO3 | CO4 | CO5 |
|---|---|---|---|---|---|
| Marks | 26 | 24 | 26 | 24 | |

**Instructions:**

*(i)      Read all questions carefully and answer accordingly.*
*(ii)      Do not write anything on the question paper other than roll number.*

## Part A

**Answer ALL the Questions. Each question carries 2marks.**                    **10Q x 2M=20M**

| 1. | Define Perceptron. | 2 Marks | L1 | CO1 |
|---|---|---|---|---|
| 2. | Mention any 4 applications of Machine Learning. | 2 Marks | L1 | CO1 |
| 3. | Calculate the output of the **sigmoid function** for the following input values:<br>1.      x=0<br>**2.**      x =-1 | 2 Marks | L3 | CO1 |
| 4. | Define Overfitting with suitable example. | 2 Marks | L1 | CO2 |
| 5. | Outline the significance of dropout in deep learning. | 2 Marks | L1 | CO2 |
| 6. | Describe the significance of GRU compare to LSTM. | 2 Marks | L2 | CO3 |
| 7. | Name the layers of CNN. | 2 Marks | L1 | CO3 |
| 8. | Compute Avg pooling from the following table data:<br><br>34  48<br>36  128 | 2 Marks | L2 | CO3 |

| 9. | State features of Autoencoder. | 2 Marks | L1 | CO4 |
|---|---|---|---|---|
| 10. | Recall any four applications of Restricted Boltzmann machine. | 2 Marks | L1 | CO4 |

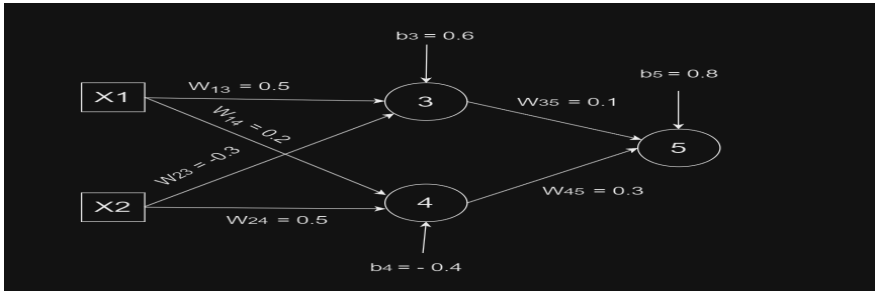## Part B

**Answer the Questions.**  **Total Marks 80M**

| 11. | a. | Prove the following using differentiation.<br><br>1. sigmoid(x)=sigmoid(x)(1-sigmoid(x))<br>2. tanh(x)=1-tanh²(x) | 10 Marks | L3 | CO1 |
|---|---|---|---|---|---|
| | b. | Develop a python code for applying different loss functions on any data set. | 10 Marks | L3 | CO1 |
| | | Or | | | |
| 12. | a. | Consider a Multilayer Perceptron which consists of three layers such as input, hidden & output layer. Input layer consists of 2 nodes, hidden layer consists of 2 neurons and 1 neuron in output layer. Further it has weights between input layer to hidden layer, such as w13, w14, w23, w24, Weights between hidden to output are w35, w45. Determine the total error for the given MLP. Assume Learning rate =0.5.<br><br> | 10 Marks | L3 | CO1 |
| | b. | Develop a python code to design a MLP for implementing classification and fine-tuning for the given house price data. | 10 Marks | L3 | CO1 |

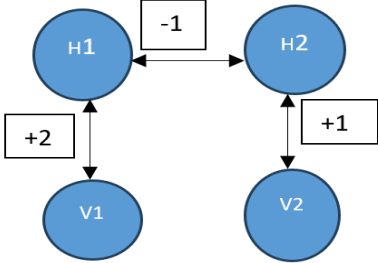| 13. | a. | Elucidate Lasso Regularization and Ridge Regularization. | 10 Marks | L2 | CO2 |
|---|---|---|---|---|---|
| | b. | Write a python code to implement Lasso Regularization. | 10 Marks | L3 | CO2 |
| | | Or | | | |
| 14. | a. | Discuss various types of hyperparameters in deep learning. | 10 Marks | L2 | CO2 |
| | b. | Develop a python for implementing 4 weight initialization. | 10 Marks | L3 | CO2 |

| 15. | a. | How **GRU** is working? Demonstrate with neat sketch. | 10 Marks | L2 | CO3 |
|---|---|---|---|---|---|
| | b. | Write a Python code for sentiment analysis using GRU for IMDB dataset. | 10 Marks | L3 | CO3 |
| | | Or | | | |

| 16. | a. | Demonstrate the architecture of LSTM and their equations. | **10 Marks** | **L** | **CO3** |
|-----|-----|-----|-----|-----|-----|
|     | b. | Implement a python code for LSTM using MNIST data set. | **10 Marks** | **L** | **CO3** |

| 17. | a. | Elucidate any 4 types of Autoencoders. | **10 Marks** | **L2** | **CO4** |
|-----|-----|-----|-----|-----|-----|
|     | b. | Develop a python code for implementing convolution autoencoder. | **10 Marks** | **L** | **CO4** |
| **Or** | | | | | |
| 18. | a. | Explain architecture of Boltzmann machine. | **10 Marks** | **L2** | **CO4** |
|     | b. | Consider a model which consists of two layers hidden and visible layer. Visible layer and hidden layer consists of two nodes each. The below given model takes input as binary combination of numbers. Deduce the value of P(v) using Boltzmann machine.  | **10 Marks** | **L3** | **CO4** |