Roll No.											

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 12-12-2025 **Time:** 01:00pm– 04:00pm

School: SOCSE	**Program:** B.Tech	
Course Code : CAI2502	**Course Name**: Deep Learning	
Semester: V	**Max Marks**:100	**Weightage**: 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**
Marks	**28**	**24**	**24**	**24**	

Instructions:

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

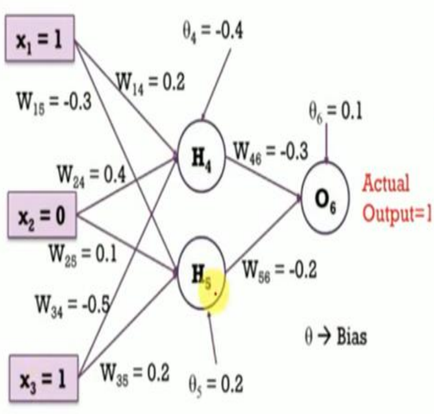
Part A

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

1.	List any 2 Deep Learning architectures.	**2 Marks**	**L2**	**CO1**
2.	List out the differences between Machine Learning and Deep Learning.	**2 Marks**	**L2**	**CO1**
3.	What is gradient? Explain 3 types of gradient descent	**2 Marks**	**L2**	**CO1**
4.	Design simple neural network	**2 Marks**	**L2**	**CO1**
5.	Write the syntax to compile the model with ‘optimizer’,’ loss’ and ‘metrics’ hyperparameters set to values of your choice.	**2 Marks**	**L3**	**CO2**
6.	Draw the architecture of LSTM and GRU	**2 Marks**	**L3**	**CO2**
7.	Explain Boltzmann Machine, draw its architecture	**2 Marks**	**L3**	**CO3**
8.	What is the use of Generative Adversarial Networks (GANs)	**2 Marks**	**L3**	**CO3**
9.	What are the components of deep reinforcement learning?	**2 Marks**	**L3**	**CO4**
10.	List the applications of PNN	**2 Marks**	**L3**	**CO4**

Part B

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

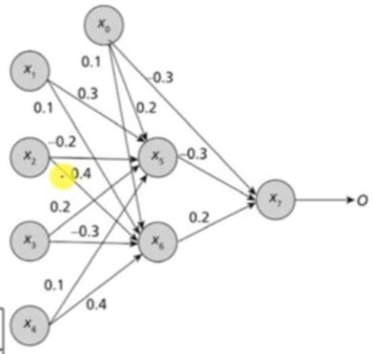
<table>
<tr><td>11.</td><td>a.</td><td>Explain in detail: 1. Sigmoid Activation Function 2. Leaky ReLU/Parametric ReLu. Discuss their advantages and disadvantages.</td><td>10 Marks</td><td>L2</td><td>CO1</td></tr>
<tr><td colspan="6">Or</td></tr>
<tr><td>12.</td><td>a.</td><td>

Assume that the neurons have a sigmoid activation function, perform a forward pass and a backward pass on the network. Assume that the actual output of y is 1 and learning rate is 0.9. Perform another forward pass.</td><td>10 Marks</td><td>L2</td><td>CO1</td></tr>
</table>

<table>
<tr><td>13.</td><td>a.</td><td>Different weight initialization schemes are used according to the activation function on each layer of a Deep neural network. Distinguish between Zero Initialization and He Initialization techniques.</td><td>10 Marks</td><td>L2</td><td>CO1</td></tr>
<tr><td colspan="6">Or</td></tr>
<tr><td>14.</td><td>a.</td><td>

- The given MLP consists of an Input layer, one Hidden layer and an Output layer.
- The input layer has 4 neurons, the hidden layer has 2 neurons and the output layer has a single neuron.
- Train the MLP by updating the weights and biases in the network.
- Learning Rate = 0.8

<table><tr><td>x_1</td><td>x_2</td><td>x_3</td><td>x_4</td><td>$O_{Desired}$</td></tr><tr><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td></tr></table>



</td><td>10 Marks</td><td>L2</td><td>CO1</td></tr>
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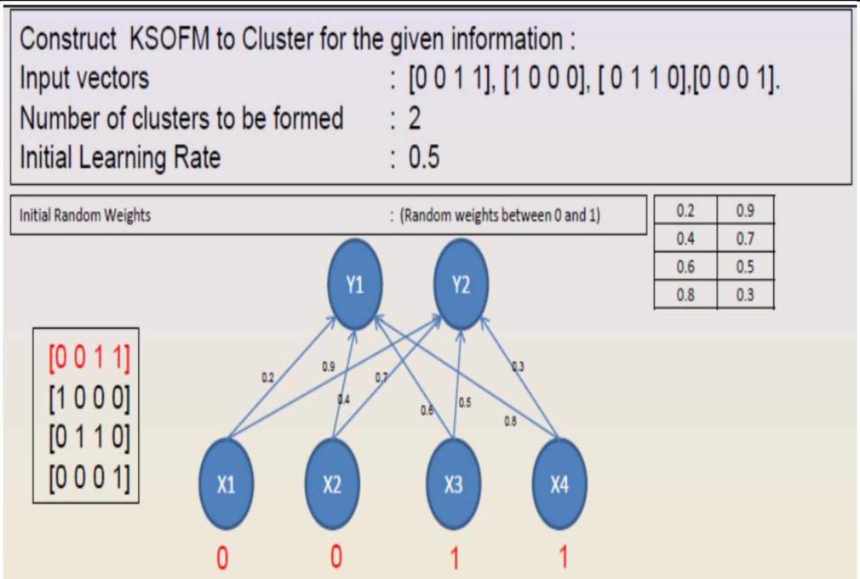
<table>
<tr><td>15.</td><td>a.</td><td>Develop a Convolutional Neural Network (CNN) model using TensorFlow/Keras to classify images from the MNIST dataset (handwritten digits 0-9). Perform data preprocessing, build and train a CNN, evaluate its performance, and analyse test results using visualization.</td><td>10 Marks</td><td>L2</td><td>CO2</td></tr>
<tr><td colspan="6">Or</td></tr>
<tr><td>16.</td><td>a.</td><td>Explain with the help of diagrams, typical CNN architecture.</td><td>10 Marks</td><td>L2</td><td>CO2</td></tr>
</table>

17.	**a.**	Explain desirable characteristics of RNN for sequence modeling	**10 Marks**	**L2**	**CO2**
		Or			
18.	**a.**	With neat diagram explain gates of LSTM and GRU	**10 Marks**	**L2**	**CO2**

19.	**a.**	Explain different types of Generative Adversarial Networks (GANs)	**10 Marks**	**L2**	**CO3**
		Or			
20.	**a.**	What are the hyper parameters used for auto encoders? Explain different types of auto encoders	**10 Marks**	**L2**	**CO3**

21.	**a.**		**10 Marks**	**L3**	**CO3**
		Or			
22.	**a.**	Draw GAN architecture, explain generator and discriminator in detail	**10 Marks**	**L2**	**CO3**

23.	**a.**	Explain the architecture of Hopfield Neural Network (HNN)	**10 Marks**	**L2**	**CO4**
		Or			
24.	**a.**	Draw the structure of Probabilistic Neural Network (PNN) in detail. Explain each layer.	**10 Marks**	**L2**	**CO4**

25.	**a.**	What is Deep Reinforcement Learning? Explain the Basic Framework of Reinforcement Learning.	**10 Marks**	**L2**	**CO4**
		Or			
26.	**a.**	What are the applications of deep learning explain a tleast 5 in detail.	**10 Marks**	**L2**	**CO4**