PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 15-12-2025   **Time:** 1.00pm to 04.00pm

School: SOCSE	Program: B.Tech	
Course Code: IST2503	Course Name: Deep Learning Techniques	
Semester: V	Max Marks: 100	Weightage: 50%

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

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

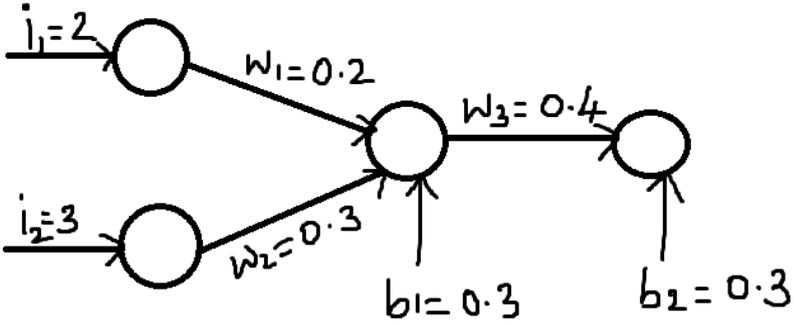**Answer ALL the Questions. Each question carries 2marks.**   **10Q x 2M=20M**

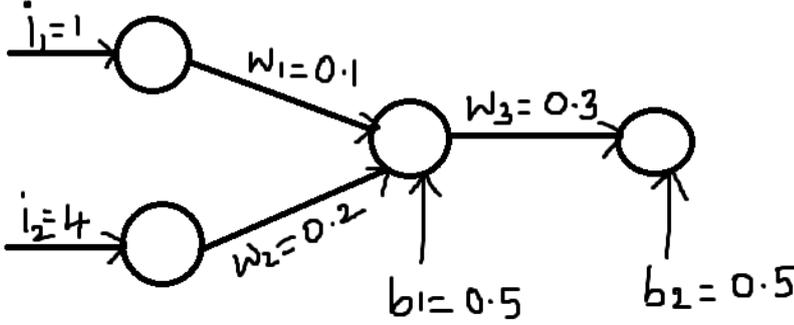| 1.	Define Deep Learning? List out the applications of Deep Learning.	2 Marks	L1	CO1
2.	What is an Activation Function? List any 2 activation functions	2 Marks	L1	CO1
3.	Outline a NN with 2 Input neurons and 2 hidden layers each with 3 Neurons and 1 output layer with 2 neurons	2 Marks	L1	CO1
4.	Define Regularization and list its strategies.	2 Marks	L1	CO2
5.	Define overfitting and underfitting the model.	2 Marks	L1	CO2
6.	List the applications of RNN.	2 Marks	L1	CO3
7.	Define Padding with example.	2 Marks	L1	CO3
8.	Define Restricted Boltzman machine.	2 Marks	L1	CO4
9.	List the different types of Autoencoders.	2 Marks	L1	CO4
10.	Define GAN.	2 Marks	L1	CO4

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

11.	a.	Explain in detail: 1. Sigmoid Activation Function 2. Leaky ReLU/Parametric ReLu.	10 Marks	L2	CO1
	b.	Solve the given NN using Back Propagation, use Sigmoid activation function for the hidden and output layer. Take learning rate=0.01. Update the weight w3 and bias b2 for one iteration.	10 Marks	L3	CO1
		Or			
12.	a.	Solve the given NN using Back Propagation, use Sigmoid activation function for the hidden and output layer. Take learning rate=0.01. Update the weight w3 and bias b2 for one iteration.	10 Marks	L3	CO1
	b.	Explain in detail the perceptron Neural Network with respect to Forward propagation	10 Marks	L2	CO1

13.	a.	Explain Batch Normalization with an example.	10 Marks	L2	CO2
	b.	Explain the methods /approaches for hyper parameter tuning.	10 Marks	L2	CO2
		Or			
14.	a.	Explain the following: i) Learning rate ii) L1 Norm Regularization iii) L2 Norm Regularization	10 Marks	L2	CO2

	b.	Explain overfitting and underfitting the model.	**10 Marks**	**L2**	**CO2**

15.	**a.**	Explain with a neat diagram the convolutional neural network architecture in detail.	**10 Marks**	**L2**	**CO3**
	b.	Assume x_t=0.1, h_{t-1} = 0.2, C_{t-1} = 0.35, Weights and biases: Input gate: W_i=0.25, U_i=0.1, b_i=0.1, Forget gate: W_f=0.1, U_f=0.3, b_f=0.5, Cell state: W_c=0.1, U_c=0.4, b_c=0.2, Output gate: W_o=0.5, U_o=0.1, b_o=0.2. Compute all the LSTM gates for the given date.	**10 Marks**	**L4**	**CO3**
		Or			
16.	**a.**	Explain with diagram how do the gates in GRU work together to regulate information flow?	**10 Marks**	**L3**	**CO3**
	b.	Assume x_t=0.5, h_{t-1} = 0.4, C_{t-1} = 0.3, Weights and biases: Input gate: W_i=0.2, U_i=0.3, b_i=0.11, Forget gate: W_f=0.5, U_f=0.4, b_f=0.2, Cell state: W_c=0.3, U_c=0.2, b_c=0.1, Output gate: W_o=0.4, U_o=0.3, b_o=0.1. Compute all the LSTM gates for the given date.	**10 Marks**	**L4**	**CO3**

17.	**a.**	Explain the architecture of Autoencoder in detail.	**10 Marks**	**L2**	**CO4**
	b.	Construct KSOFM cluster for the given data: Input vectors: [0 0 1 1], [1 0 0 0],[0,1,1,1],[0,0,0,1] Number of clusters: 2 Learning rate: 0.5 Initial Weight Matrix is given as : Unit 1=[0.2,0.3,0.4,0.6] and Unit2=[0.5,0.6,0.7,0.3].	**10 Marks**	**L3**	**CO4**
		Or			
18.	**a.**	Construct Hopfield Neural Network for the Input pattern: 11011, 10101. calculate weight matrix and find correct pattern of distorted pattern (11110) for the sequence: 5 3 4 1 2	**10 Marks**	**L3**	**CO4**
	b.	Explain in detail the architecture of GAN.	**10 Marks**	**L2**	**CO4**