



PRESIDENCY UNIVERSITY

BENGALURU

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End - Term Examinations - December 2025

Date: 18 - 12- 2025

Time: 01:00pm - 04:00pm

School: SOCSE	Program: B.Tech		
Course Code : CAI3428	Course Name: Practical Deep Learning with TensorFlow		
Semester: VII	Max Marks: 100	Weightage: 50%	

CO - Levels	C01	C02	C03	C04	C05
Marks	24	24	24	28	-

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 a perceptron and identify its main components.	2 Marks	L1	C01
2.	Write any two steps of the perceptron learning algorithm.	2 Marks	L1	C01
3.	Write the mathematical expressions for Tanh and Softmax functions.	2 Marks	L1	C02
4.	What is the role of activation functions in deep neural networks?	2 Marks	L2	C02
5.	What is a tensor? Give one example of its rank.	2 Marks	L1	C03
6.	Define Gradient Descent.	2 Marks	L2	C03
7.	What is Dropout in Keras?	2 Marks	L1	C04
8.	What is the purpose of the Functional API in Keras?	2 Marks	L2	C04
9.	What is binary_crossentropy used for?	2 Marks	L1	C04
10.	List two applications of CNNs.	2 Marks	L1	C04

Part B

Answer the Questions.

Total Marks 80M

11.	a.	Demonstrate how a perceptron implements an OR gate using assumed weights.	07 Marks	L2	CO1
	b.	Explain the effect of learning rate on perceptron convergence.	03 Marks	L2	CO1
Or					
12.	a.	Illustrate the architecture and working of a perceptron with a neat diagram.	07 Marks	L3	CO1
	b.	State any three limitations of a single-layer perceptron.	03 Marks	L1	CO1
Or					
13.	a.	Demonstrate the forward and backward pass of a 2-layer MLP using sigmoid activation for inputs $X_1=1, X_2=0.6$. Hidden weights: $W_{11}=0.1, W_{12}=0.3, W_{21}=0.2, W_{22}=0.5$ Output weights: $W_{31}=0.6, W_{32}=0.9$, Target = 1	10 Marks	L3	CO1
Or					
14.	a.	Construct a perceptron model to simulate an AND gate using the given dataset.	06 Marks	L3	CO1
	b.	Compute the error at the output and update weights using backpropagation (one epoch).	04 Marks	L3	CO1
Or					
15.	a.	Compare Sigmoid, Tanh, and ReLU with equations and graphs.	05 Marks	L2	CO2
	b.	Explain vanishing and exploding gradients with examples.	05 Marks	L3	CO2
Or					
16.	a.	Analyse how Softmax activation performs multi-class classification with probability normalization.	05 Marks	L2	CO2
	b.	Explain dropout with an example and demonstrate how it reduces overfitting.	05 Marks	L3	CO2
Or					
17.	a.	Compute the output of a 3-layer DNN with given weights and ReLU activation. Inputs: $X_1 = 0.6, X_2 = 0.4$ Hidden weights: $W_{11}=0.2, W_{12}=0.4, W_{21}=0.3, W_{22}=0.7$ Output weights: $W_{31}=0.5, W_{32}=0.9$, Hidden Bias: $b_1=0.1, b_2=0.2$, Output Bias: $z_1=0.3$ Activation: ReLU → Compute the final output.	10 Marks	L3	CO2
Or					
18.	a.	Evaluate how early stopping prevents overfitting in a deep learning model.	06 Marks	L2	CO2

	b.	Evaluate the influence of learning rate, batch size, and epochs on model accuracy.	04 Marks	L3	C02
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19.	a.	Explain eager execution in TensorFlow 2.x.	03 Marks	L1	C03
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	b.	Explain automatic differentiation using <code>tf.GradientTape()</code> with an example.	07 Marks	L3	C03
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Or

20.	b.	Demonstrate tensor creation using Python lists and NumPy arrays in TensorFlow.	08 Marks	L3	C03
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	c.	State the purpose of <code>tf.Variable</code> in TensorFlow.	02 Marks	L1	C03
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21.	a.	Build and evaluate a Linear Regression model in TensorFlow for a sample dataset.	06 Marks	L3	C03
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	b.	Explain the steps in creating a computational graph and its execution process.	04 Marks	L2	C03
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Or

22.	a.	Build a complete <code>tf.data</code> pipeline (<code>map</code> → <code>shuffle</code> → <code>batch</code> → <code>prefetch</code> → <code>cache</code>) and justify each step.	10 Marks	L3	C03
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23.	a.	Illustrate the architecture of Keras and explain its main components.	06 Marks	L2	C04
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	b.	Explain why activation functions are required in neural networks.	04 Marks	L2	C04
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Or

24.	a.	Describe the steps in creating, compiling, and training a Sequential model.	06 Marks	L3	C04
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	b.	Explain how Softmax activation converts logits into probabilities.	04 Marks	L2	C04
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25.	a.	Explain why activation functions are required in neural networks.	06 Marks	L3	C04
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	b.	List any four real-world applications of Deep Learning.	04 Marks	L4	C04
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Or

26.	a.	What is Dropout and explain why is it applied?	04 Marks	L4	C04
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	b.	Discuss Dropout and Batch Normalization as regularization techniques.	06 Marks	L3	C04
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