PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 11 – 12- 2025   **Time:** 01:00pm – 04:00pm

School: SOCSE	**Program:** B. TECH- For All Programs
Course Code: CAI3429	**Course Name**: Deep Learning Techniques for Computer Vision
Semester: VII	**Max Marks**: 100 **Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	24	26	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.	State the importance of feature maps in CNNs.	2 Marks	L1	CO1
2.	What happens when a very high learning rate is used in CNN training?	2 Marks	L2	CO1
3.	Write one key difference between R-CNN and YOLO.	2 Marks	L2	CO2
4.	What is the role of skip connections in U-Net?	2 Marks	L2	CO2
5.	Define real-time detection and give one application.	2 Marks	L1	CO2
6.	What does the "self-attention" layer in ViTs do?	2 Marks	L2	CO3
7.	Mention two practical applications of GANs.	2 Marks	L1	CO3
8.	What is CLIP and how does it use multimodal learning?	2 Marks	L2	CO3
9.	Mention any two edge deployment frameworks for AI models.	2 Marks	L1	CO4
10.	What is an adversarial example in computer vision?	2 Marks	L2	CO4

Part B

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

11.	a.	Explain the basic components and flow of a CNN architecture.	8 Marks	L2	CO1
	b.	Describe how gradient descent optimizes CNN parameters.	6 Marks	L2	CO1
	c.	Interpret the impact of using pre-trained weights in transfer learning.	6 Marks	L2	CO1
		Or			
12.	a.	Summarize the differences between SGD, Adam, and RMSProp optimizers.	8 Marks	L2	CO1
	b.	Differentiate activation functions based on their gradient behaviour.	6 Marks	L2	CO1
	c.	Outline how dropout prevents overfitting in deep CNNs.	6 Marks	L2	CO1

13.	a.	Use Faster R-CNN to detect objects and inspect how Region Proposal Networks affect speed.	8 Marks	L4	CO2
	b.	Make use of YOLO for real-time video detection and categorize errors observed during inference.	6 Marks	L4	CO2
	c.	Apply segmentation tools to solve lane-mark extraction in autonomous driving.	6 Marks	L3	CO2
		Or			
14.	a.	Develop an SSD framework and test for performance on low-light images.	8 Marks	L3	CO2
	b.	Analyze the effect of anchor sizes on detection confidence scores.	6 Marks	L4	CO2
	c.	Select a proper post-processing technique to enhance segmentation accuracy.	6 Marks	L3	CO2

15.	a.	Construct a Vision Transformer prototype and examine how patch-embedding size influences results.	8 Marks	L4	CO3
	b.	Apply a GAN to synthesize handwriting samples and discover discriminator limitations.	6 Marks	L4	CO3
	c.	Use self-supervised learning to solve unlabeled-data classification problems.	6 Marks	L3	CO3
		Or			

16.	a.	Plan experiments comparing GAN and VAE outputs for resolution fidelity.	8 Marks	L3	CO3
	b.	Analyze multimodal fusion performance using CLIP features.	6 Marks	L4	CO3
	c.	Employ attention mechanisms to detect spatial dependencies in complex scenes.	6 Marks	L3	CO3

17.	a.	Generate a TensorFlow Lite deployment pipeline for an edge IoT surveillance system that uses an object-detection model. Include optimization and calibration phases.	8 Marks	L6	CO4
	b.	Inspect the vulnerabilities in such IoT systems regarding data tampering and unauthorized inference, and correlate them with security countermeasures.	6 Marks	L4	CO4
	c.	Formulate an interpretable interface that visually summarizes detection confidence and false-positive patterns for smart-city operators.	6 Marks	L6	CO4
		Or			
18.	a.	In a smart-parking application, design a compact SSD-based model to run on embedded cameras, outlining quantization and testing methodology.	8 Marks	L6	CO4
	b.	Examine how bandwidth limitations influence the frequency of edge-cloud communication and suggest feasible adjustments.	6 Marks	L4	CO4
	c.	Originate a reporting system that translates visual detections into structured real-time analytics for city dashboards.	6 Marks	L6	CO4