



# PRESIDENCY UNIVERSITY

BENGALURU

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## Mid - Term Examinations – March 2026

Date: 12- 03-2026

Time: 02:00pm – 03:30pm

School: SOE	Program: B.TECH	
Course Code : ECE3107	Course Name: MACHINE VISION FOR ROBOTICS	
Semester: VI	Max Marks: 50	Weightage:25%

CO - Levels	C01	C02	C03	C04	C05
Marks	22	22	24	22	

### 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.

5Q x 2M=10M

1	Features can be point features, edge features, or region features. Write the meaning of an image and the concept of a region in image analysis.	2 Marks	L1	C01
2	What are four methods that can be applied to achieve noise reduction in images?	2 Marks	L1	C02
3	Object recognition identifies and classifies objects in an image. What are the key elements involved in object recognition?	2 Marks	L1	C03
4	Template matching compares images with stored reference patterns. What are the different types of features used in image processing, and briefly explain each?	2 Marks	L1	C03
5	Stereo vision estimates depth using two or more cameras. Explain the process of transforming sensor data into a visual image.	2 Marks	L1	C04

## Part B

**Answer the Questions.**

**Total Marks 40M**

<b>6.</b>	<b>a.</b>	Optical flow estimates motion between consecutive frames. With neat and necessary diagrams, explain the basic components of machine vision for robotics.	<b>10 Marks</b>	<b>L2</b>	<b>CO1</b>
	<b>b.</b>	Camera calibration determines intrinsic and extrinsic parameters. Elaborate the methods of image enhancement.	<b>10 Marks</b>	<b>L2</b>	<b>CO2</b>

**Or**

<b>7.</b>	<b>a.</b>	Coordinate transformation maps image coordinates to world coordinates. Explain how the image acquisition to be controlled externally by a camera and the types of sensors used in it.	<b>10 Marks</b>	<b>L2</b>	<b>CO1</b>
	<b>b.</b>	Lighting plays a critical role in image quality and accuracy. Describe how the geometric transformation sable to cope with the position and orientation changes in images.	<b>10 Marks</b>	<b>L2</b>	<b>CO2</b>

<b>8.</b>	<b>a.</b>	Machine vision systems can operate in 2D, 2.5D, or 3D. Explain stereo reconstruction with calibration and geometry.	<b>10 Marks</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Real-time vision requires fast algorithms and dedicated hardware. How the sensor data is transformed and mapped for actuation?	<b>10 Marks</b>	<b>L3</b>	<b>CO4</b>

**Or**

<b>9.</b>	<b>a.</b>	Machine vision is widely used in inspection, measurement, and guidance. What are the object recognition strategies? Explain in detail.	<b>10 Marks</b>	<b>L2</b>	<b>CO3</b>
	<b>b.</b>	Robotics deals with the design, control, and application of robots. Write a brief of aligning the laser scan measurements in machine vision.	<b>10 Marks</b>	<b>L2</b>	<b>CO4</b>