

SCHOOL OF ELECTRICAL ENGINEERING
WINTER SEMESTER 2025-2026
CONTINUOUS ASSESSMENT TEST - I

Programme Name & Branch : B.Tech EEE & EIE
Course Code and Course Name : BEEE425L - Machine Vision
Faculty Name(s) : Dr. M. Monica Subashini
Class Number(s) : VL2025260505042
Date of Examination : 02/02/2026 (AN)
Exam Duration : 90 minutes **Maximum Marks: 50**

General instruction(s): Answer All Questions; Assume missing data (if any)

- Rough work should not be done on question paper. It will be treated as malpractice.
- M - Max mark; CO – Course Outcome; BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Course Outcomes Statements:

CO. 1: Explain the concept of machine vision, its components and applications

CO. 2: Explain various transformations and interpolation in digital image

Q. No	Question	M	CO	BL
1.	a) A pinhole camera has a focal length of 40 mm. An object of height 1.6 m is placed 5 m in front of the camera. - Calculate the height of the image formed on the image plane. - State whether the image is upright or inverted. - If the object is moved to 2.5 m, calculate the new image height and comment on the change. b) What are the three perceptual attributes of color?	[8+2]	1	BL2
2.	Verify whether the MAX operator is linear or non-linear by testing the additivity and homogeneity properties using the given images f1, f2 and the specified arbitrary constants. $f1 = \begin{bmatrix} 0 & 2 \\ 2 & 3 \end{bmatrix}, f2 = \begin{bmatrix} 3 & 5 \\ 4 & 8 \end{bmatrix}, a1 = 1 \text{ and } a2 = -1$	10	1	BL2
3.	A camera has the following parameters: $K = \begin{bmatrix} 800 & 0 & 320 \\ 0 & 800 & 240 \\ 0 & 0 & 1 \end{bmatrix}, R = I, t = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix};$ A 3D world point is: X=(1, 2, 5, 1) - Compute the projected image point in homogeneous coordinates - Convert it into Cartesian image coordinates (u, v)	10	2	BL3
4.	Explain the human visual system with emphasis on rods, cones, and spectral sensitivity.	10	1	BL1
5.	Propose an AI-powered computer vision algorithm for real-time detection of pedestrians and cyclists and prediction of their intent near crossings. Describe the required image processing techniques and outline the pseudocode.	10	2	BL3