Reg. No.															

Question Paper Code	13417

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2025

Seventh Semester

Mechanical and Automation Engineering

20MUPC701 - ROBOTIC VISION AND INTELLIGENCE

Regulations - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Which sensor captures the entire image simultaneously? (a) Planar Sensor (b) Linear Scan sensor (c) Volume sensor (d) Raster sensor	1	K1	CO1
2.	Camera transfer characteristics describes the relation between (a) Compression ratio & Pixel Value (b) Light Intensity & Pixel Value (c) Pixel & Standard Deviation (d) Pixel value & Mean value	1	K1	CO1
3.	The process of improving the quality of an image for human interpretation or machine analysis Which features are the characteristics of the boundary of a region in an image? (a) Region (b) Gray Level (c) Morphological (d) Contour	1	K1	CO2
4.	The transition between continuous values of the image function and its digital equivalent is called (a) Quantization (b) Sampling (c) Restoration (d) None of the above	1	K1	CO2
5.	Which step follows image segmentation in the recognition process? (a) Image acquisition (b) Boundary detection (c) Object matching (d) Image quantization	1	K1	CO3
6.	Which one of the following is a numerical representation of the internal properties of a region? (a) Boundary descriptor (b) Edge Detection (c) Regional descriptor (d) None of the above	1	K1	CO3
7.	Which is refers to the process of moving the collision front inward towards the object's center. (a) Propogation (b) Thinning (c) Collision (d) Filtering	1	K1	CO4
8.	Which of the following is a primary goal of a thinning algorithm in image processing? (a) To increase the image's width (b) To reduce the image's width to a single-pixel line while preserving connectivity (c) To remove all edges from the image (d) To change the image's color palette	1	K1	CO4
9.	What is the primary function of vision-based depalletizing systems? (a) To create pallets (b) To identify and remove objects from pallets (c) To sort and package products (d) To inspect products for defects	1	K1	CO5
10.	Which of the following is a primary application of robot vision? (a) Data collection (b) Object recognition (c) Navigation (d) All of the above	1	K1	CO5

PART - B (12 × 2 = 24 Marks)

Answer ALL Questions

11.	Define image acquisition.	2	K1	CO1
12.	Difference between direct and indirect illumination.	2	K2	CO1
13.	State the law of refraction.	2	K1	CO1
14.	What is meant by image sampling and quantization?	2	K1	CO2
15.	List the common types of geometric transformations.	2	K1	CO2
16.	Name the basic morphological operations.	2	K1	CO2

17.	Write the general steps in a recognition procedure.		*2*	*K1*	*CO3*
18.	How is the Mahalanobis distance calculated?		*2*	*K2*	*CO3*
19.	Compare Euclidean distance and Chamfer distance.		*2*	*K2*	*CO4*
20.	Recall the properties of a skeleton.		*2*	*K1*	*CO4*
21.	What is the role of vision systems in automated navigation?		*2*	*K1*	*CO5*
22.	How does vision help in depalletizing?		*2*	*K1*	*CO5*

PART - C (6 × 11 = 66 Marks)

Answer ALL Questions

23.	a)	Explain the different types of lighting.	*11*	*K2*	*CO1*
		OR			
	b)	Explain the various picture coding techniques and their advantages and disadvantages.	*11*	*K2*	*CO1*
24.	a)	Discuss the principles of radiometric calibration and its importance in image processing.	*11*	*K2*	*CO2*
		OR			
	b)	Explain the various types of geometric transformations in image processing.	*11*	*K2*	*CO2*
25.	a)	Summary the concept of edge linking and its role in object recognition.	*11*	*K2*	*CO3*
		OR			
	b)	Explain the concept of structural methods for object recognition.	*11*	*K2*	*CO3*
26.	a)	Analyze the concept of skeletonization and its applications in object analysis.	*11*	*K3*	*CO4*
		OR			
	b)	Explain the concept of the thinning algorithm and its role in skeletonization.	*11*	*K3*	*CO4*
27.	a)	By utilizing the principles of line tracking, describe its applications in robot vision.	*11*	*K3*	*CO5*
		OR			
	b)	Develop the popular image processing software tools.	*11*	*K3*	*CO5*
28.	a) (i)	Explain the need and working of boundary descriptors.	*5*	*K2*	*CO4*
	(ii)	Illustrate the need of machine vision in Robotics and automation with suitable examples.	*6*	*K2*	*CO5*
		OR			
	b) (i)	Explain the advantages and disadvantages of skeletonization.	*5*	*K2*	*CO4*
	(ii)	Explain any one machine vision software with its syntax and algorithm.	*6*	*K2*	*CO5*