Q.P.Code: 23CS0905 | R23 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. III Year I Semester Regular Examinations December-2025
COMPUTER VISION & IMAGE PROCESSING
(Common to CSM & CAI)

Time: 3 Hours **Max. Marks: 70**

PART-A
(Answer all the Questions **10 x 2 = 20** Marks)

1	a	Define image sampling.	CO1	L1	2M
	b	What is brightness transformation?	CO1	L1	2M
	c	State any two edge detection operators.	CO2	L1	2M
	d	What is the purpose of image thresholding?	CO2	L1	2M
	e	Define disparity.	CO3	L1	2M
	f	What is intrinsic calibration of a camera?	CO3	L1	2M
	g	What is a feature descriptor?	CO4	L1	2M
	h	Expand CNN and write where it is used.	CO4	L2	2M
	i	Define image compression ratio.	CO5	L1	2M
	j	Name any two applications of medical image processing.	CO5	L2	2M

PART-B
(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	a	Explain sampling and quantization with a neat illustration.	CO1	L2	5M
	b	Describe the concepts involved in image restoration.	CO1	L2	5M
		OR			
3	a	A grayscale image has intensity values in range [0,255]. Propose a contrast stretching operation using piecewise formula.	CO1	L6	6M
	b	Identify the major challenges that affect the restoration of noisy or distorted images	CO1	L3	4M

UNIT-II

4	a	Describe Canny edge detection with its stages.	CO2	L2	5M
	b	Demonstrate step by step the Mean-Shift clustering algorithm.	CO2	L2	5M
		OR			
5	a	A binary mask is given below: 0 0 1 1 0 1 1 1 0 0 0 1 0 0 0 Apply erosion and dilation using a 3×3 square structuring element.	CO2	L3	8M
	b	Explain morphological opening operates.	CO2	L2	2M

UNIT-III

6	a	Explain stereo vision with epipolar geometry.	CO3	L2	5M
	b	Discuss the camera calibration techniques that are essential for achieving accurate measurements in 3D reconstruction tasks.	CO3	L2	5M
		OR			
7	a	Given two image frames, describe step-by-step the Lucas-Kanade optical flow estimation with assumptions.	CO3	L2	6M
	b	Explain the generation of 3D point clouds from stereo camera images.	CO3	L2	4M

UNIT-IV

8	a	Explain SURF descriptor computation.	CO4	L2	6M
	b	Compare Support Vector Machines (SVMs) and Decision Trees.	CO4	L3	4M

		OR			
9	a	Design an object recognition pipeline using CNN for detecting a specific class of objects (e.g., computer).	CO4	L3	
	b	Write a brief note on Random Forest classifiers.	CO4	L2	

UNIT-V

10	a	Classify types of image compression techniques with suitable examples.	CO5	L4	
	b	Describe how morphological operations support medical image analysis	CO5	L2	
		OR			
11	a	Propose a computer vision workflow including segmentation, feature extraction, and decision model.	CO5	L6	
	b	Explain the underlying principles of lossy image compression.	CO5	L2	

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