SET A

SRM Institute of Science and Technology
College of Engineering and Technology
DEPARTMENT OF ECE

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

Academic Year: 2022-2023 (ODD)

Test: CLAT- 2 | **Date: 11-10-2023**

Course Code & Title: 18ECE340T – Machine Perception with Cognition | **Duration:** 100 minutes

Year & Sem: IV/VII | **Max. Marks:** 50

Course Articulation Matrix:

	18ECS301J – Applied Programming	PROGRAM OUTCOMES												PROGRAM STUDENT OUTCOMES		
CO	COURSE OUTCOMES	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1	Understand the fundamentals of image Processing, camera and color models	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Analyze the binary shapes, region and boundary- based image modeling	3	-	-	2	-	-	-	-	-	-	-	-	-	-	-
3	Illustrate the various filter banks, shape and textures for image synthesis	-	-	-	2	-	-	-	-	-	-	-	3	-	-	-
4	Express the objects, frames based on template relations	3	-	2	-	-	-	-	-	-	-	-	-	-	-	-
5	Apply the concept of 2D and 3D face recognition	-	-	3	-	2	-	-	-	-	-	-	-	-	-	1
6	Implement the concept of image processing and machine vision in real time applications	3	2	-	-	-	-	-	-	-	-	-	-	2	-	-

Part – A (10 x 1 = 10 marks)
Answer all the Questions

Q. No	Question	Marks	BL	CO	PO
1	_____ boundary descriptor is defined as the line perpendicular to the major axis. a) Equilateral axis c) Minor axis b) Equidistant axis d) Median axis	1	1	2	1
2	The term, Curvature is defined as: a) Rate of change of area c) Rate of change of slope b) Rate of change of diameter d) Slope	1	1	2	1
3	Which of the following is the useful descriptor of a boundary, whose value is given by the ratio of the length of the major axis to the minor axis? a) Radius b) Perimeter c) Area d) Eccentricity	1	1	2	1
4	Statistical moments are used to describe the shape of boundary segments _____ a) precisely b) quantitatively c) closely d) qualitatively	1	1	2	1
5	For the pixel $p(x_1,y_1)$, $q(x_2,y_2)$, the chessboard distance between p & q is defined as a) $d = \max(\lvert x_1 - x_2\rvert, \lvert y_1 - y_2\rvert)$ c) $d = \min(\lvert x_1 - x_2\rvert, \lvert y_1 - y_2\rvert)$ b) $d = \max(\lvert y_1 - y_2\rvert, \lvert x_1 - x_2\rvert)$ d) $d = \min(\lvert y_1 - y_2\rvert, \lvert x_1 - x_2\rvert)$	1	2	2	1
6	Compute the local binary pattern for the following matrix use 5 as reference value. 3 4 6 1 5 4 7 6 2 a) 01110110 b) 00100110 c) 00110110 d) 10011100	1	2	3	4
7	_____ is the primary method to sharpen an image a) Blurring c) Highlighting the fine details b) Increasing the brightness d) Decreasing the brightness	1	1	3	4
8	Sharpening is analogous to _____. a) spatial integration c) spatial differentiation c) frequency integration d) frequency interpretation	1	1	3	4
9	The M_{00} of the given 3 x 3 binary image is _____ 1 0 0 1 1 1 0 0 1 a) 5 b) 7 c) 0 d) 3	1	2	3	4

10	Box filter is a type of _____ filter a) Linear b) Gabor c) Gaussian d) Laplacian	1	1	3	4
	PART B				
	Section B1 (2 x 4 = 8 marks) **Answer ANY 2 Questions**				
11	What are Connected Components? With relevant examples, specify 4 – Connectedness and 8 – Connectedness.	4	2	2	1
12	Calculate the Centroid of the given binary image 0 1 1 1 0 0 1 1 1 1 0 0 0 0 1 1 1 0 1 0 1 0 1 0	4	3	2	1
13	With suitable example, define the region descriptors based on eccentricity and elongation .	4	2	2	1
	Section B2 (2 x 4 = 8 Marks) **Answer ANY 2 Questions**				
14	Write short notes on Texture Analysis of an Image and enumerate the challenges in Texture analysis.	4	2	3	4
15	What is the use of histogram in image processing.?	4	2	3	4
16	Find the filtered image using 3 x 3 Weight Median non-linear filter for the given 3 x 3 image. 10 20 30 10 50 10 30 20 30 3 x 3 Inage 1 1 1 1 2 1 1 1 2 3 x 3 filter	4	3	3	4
	PART C (2 x 12 = 24 marks)				
17 (a)	For the given binary image, considering four connectedness modify the image to skeletal image through thinning process. 1 0 1 1 1 0 0 1 1 1 0 1 1 0 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	12	2	2	1
	OR				
17 (b)	Explain the Connected Component Labelling Algorithm with suitable example.	12	2	2	1
18 (a)	Explain with relevant example, how the testing and training model in feature extraction method is used for categorizing textures in a given image.	12	3	2	4
	OR				
18 (b)	Compute the filtered image, by applying 3x3 median filter for the given 5x5 input image. 30 40 50 60 90 30 70 80 50 100 40 60 150 225 110 40 30 30 0 220 50 50 70 50 150	12	3	2	4

Course Outcome (CO) and Bloom's level (BL) Coverage in Questions