

MSc. III(DS)/02.22.005

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M.Sc. COMPUTER SCIENCE WITH SPECIALISATION IN DATA SCIENCE
THIRD SEMESTER EXAMINATION, JANUARY 2022
20-359-0312 IMAGE AND VIDEO ANALYTICS
(Regular)

Time : 3 Hours

Maximum Marks:50

(Answer ANY FIVE questions)
 Each Question carry Equal Marks

Q. No		QUESTIONS	MARKS																
1.	(a)	Explain the term “m-connectivity” with respect to a digital image.	(2)																
	(b)	What do you understand by Sampling & Quantization with respect to Digital Image Processing? How will you convert an Analog image into a digital image?	(8)																
2.		How to measure distance between two pixels in an image? Explain with the help of examples.	(10)																
3.		List the properties of Hadamard transform and perform Hadamard transformation on the 2D image given <div><table><tr><td>2</td><td>1</td><td>2</td><td>1</td></tr><tr><td>1</td><td>2</td><td>3</td><td>2</td></tr><tr><td>2</td><td>3</td><td>4</td><td>3</td></tr><tr><td>1</td><td>2</td><td>3</td><td>2</td></tr></table></div>	2	1	2	1	1	2	3	2	2	3	4	3	1	2	3	2	(10)
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4.		Perform the four sequential steps Affine transformation on the Square ABCD, A=(0,0), B=(2,0), C=(2,2), D(0,2) a. horizontal shear by the factor 0.6, b. clockwise rotation through the angle $\theta = 90^\circ$, c. uniform scaling by the factor 3, and d. translation by (2,-2)	(10)																

5.	(a)	Compute the median value of the marked pixels shown in figure using 3 x 3 mask. Justify the statement “Median filter is an effective tool to minimize salt-and-pepper noise” through this given input image.	(7)																																																																
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	(b)	What is the difference between a high-pass filter and a high-frequency emphasis filter? How does this difference affect the resultant image?	(3)																																																																
6.		Image segmentation divides an image into its constituent regions or objects.																																																																	
	(a)	Briefly explain different image segmentation techniques.	(4)																																																																
	(b)	Segment the given image and identify the regions in the image using region splitting and merging algorithm, assume the threshold value ≤ 3 .	(6)																																																																
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7.		Video analytics has the capability of automatically analyzing video to detect and determine temporal and spatial events.																																																																	
	(a)	Discuss about the basic approaches to subtract a background from a video sequence with a moving object.	(4)																																																																
	(b)	Write a note on any two real-world applications of video analytics.	(6)																																																																
