

Nov – Dec 2022																				
(B.Tech.) Program: Artificial Intelligence and Data Science																				
Examination: TY Semester: V																				
Course Code: AIDLC5052		and Course Name: Digital Image and Video Processing																		
Duration: 2.5 Hours		Max. Marks: 60																		
Instructions:																				
(1) All questions are compulsory.																				
(2) Draw neat diagrams wherever applicable.																				
(3) Assume suitable data, if necessary.																				
		Max. Marks	CO	BT level																
Q 1	Solve any six questions out of eight:	12																		
i)	The quality of image directly proportional to number of samples. Justify/contradict	02	1	2																
ii)	What is neighborhood processing? List the filters used for the same.	02	2	2																
iii)	What is line processing and mention the different masks	02	3	2																
iv)	What do you mean by transform coding?	02	4	2																
v)	What is Biometric authentication and how it helps in security.	02	4	2																
vi)	Explain spatial resolution.	02	3	2																
vii)	Find the digital negative of given 4x4 image <table border="1" style="margin-left: 20px; border-collapse: collapse;"> <tr><td>5</td><td>4</td><td>0</td><td>1</td></tr> <tr><td>4</td><td>5</td><td>4</td><td>0</td></tr> <tr><td>3</td><td>2</td><td>3</td><td>7</td></tr> <tr><td>2</td><td>6</td><td>6</td><td>1</td></tr> </table>	5	4	0	1	4	5	4	0	3	2	3	7	2	6	6	1	02	2	3
5	4	0	1																	
4	5	4	0																	
3	2	3	7																	
2	6	6	1																	
viii)	What is digital video? Explain.	02	5	2																
Q.2	Solve any four questions out of six.	16																		
i)	Explain the fundamental steps in image processing with neat diagram	04	2	2																
ii)	Explain gray level slicing with and without background	04	1	2																
iii)	Explain predictive coding in brief.	04	5	2																

K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

iv)	For the given image and structuring element, find the dilation of image <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>1</td></tr> </table> <table border="1" style="display: inline-table;"> <tr><td>1</td><td>1</td></tr> <tr><td>1</td><td>1</td></tr> </table>	1	1	1	1	1	0	0	1	1	0	0	1	1	0	0	1	1	1	1	1	04	4	3																																																																																									
1	1	1	1																																																																																																														
1	0	0	1																																																																																																														
1	0	0	1																																																																																																														
1	0	0	1																																																																																																														
1	1																																																																																																																
1	1																																																																																																																
v)	Explain split and merge technique with example	04	3	2																																																																																																													
vi)	Discuss relation of pixel with respect to its neighbor	04	5	2																																																																																																													
Q.3	Solve any two questions out of three.	16																																																																																																															
i)	Given the image, apply the histogram equalization and generate equalized image. Plot the original and equalized histogram. Also provide the pixel distribution of the equalized image <table border="1" style="display: inline-table; margin-left: 20px;"> <tr><td>Gray Levels</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr> <tr><td>No. of Pixels</td><td>10</td><td>10</td><td>8</td><td>16</td><td>2</td><td>12</td><td>4</td><td>2</td></tr> </table>	Gray Levels	0	1	2	3	4	5	6	7	No. of Pixels	10	10	8	16	2	12	4	2	08	2	3																																																																																											
Gray Levels	0	1	2	3	4	5	6	7																																																																																																									
No. of Pixels	10	10	8	16	2	12	4	2																																																																																																									
ii)	Write short note on different file formats	08	1	2																																																																																																													
iii)	Discuss the different algorithms for motion estimation	08	5	2																																																																																																													
Q.4	Solve any two questions out of three.	16																																																																																																															
i)	Apply the opening on the image using the given structuring element <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table> <table border="1" style="display: inline-table;"> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td></tr> </table>																																																																																																														08	4	3
ii)	Explain how the gradient operators used for edge detection	08	4	2																																																																																																													
iii)	Explain different techniques to remove the redundancy in the image.	08	3	2																																																																																																													
