

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

Nov – Dec 2025		
B. Tech Program: AIDS Scheme I/II/IIB/III: III		
Regular Examination: TY Semester: V		
Course Code: AIDLC5042 and Course Name: Image and Video Processing		
Date of Exam: 28/11/2025	Duration: 02.5 Hours	Max. Marks: 60

**Instructions:**

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level															
Q 1	Solve any <b>two</b> questions out of three: (05 marks each)	10																	
a)	Perform histogram equalization on the following image: <table><tr><td>2</td><td>5</td><td>4</td><td>5</td><td>2</td></tr><tr><td>2</td><td>5</td><td>6</td><td>5</td><td>2</td></tr><tr><td>5</td><td>1</td><td>1</td><td>2</td><td>1</td></tr></table>		2	5	4	5	2	2	5	6	5	2	5	1	1	2	1	CO2	AP
2	5		4	5	2														
2	5		6	5	2														
5	1	1	2	1															
b)	Illustrate the process of point processing using examples of contrast stretching and intensity-level slicing.	CO3	AP																
c)	A noisy image contains salt noise (0-value pixels). Given the neighborhood <table><tr><td>50</td><td>48</td><td>52</td></tr><tr><td>0</td><td>0</td><td>0</td></tr><tr><td>55</td><td>60</td><td>58</td></tr></table> Apply a <b>median filter</b> to compute the enhanced center pixel and explain how median filtering preserves edges compared to averaging.	50	48	52	0	0	0	55	60	58	CO2	AP							
50	48	52																	
0	0	0																	
55	60	58																	
Q 2	Solve any <b>two</b> questions out of three: (05 marks each)	10																	
a)	Explain morphological dilation and erosion. Explain both operations using 5×5 binary image of your choice.		CO3	U															
b)	Describe edge detection using the Laplacian of Gaussian (LoG). Why is zero-crossing important?		CO3	U															
c)	Discuss the effect of gamma correction on image brightness. Provide a suitable example.		CO2	U															
Q.3	Solve any <b>two</b> questions out of three. (10 marks each)	20																	

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a)	i) Perform Discrete Cosine Transform (DCT) on the 4×4 image block of your choice. ii) Discuss the energy compaction property of DCT.		CO4	AP								
b)	i) Describe the step-by-step procedure for computing the Hadamard Transform of a 1-D signal. Illustrate your answer with a simple numerical example.  ii) Write a short note on the applications of the Hadamard Transform in digital image processing. Mention at least three key use cases.		CO4	AP								
c)	i) What is High-Boost Filtering? Explain how it differs from standard image sharpening techniques such as Laplacian filtering.  ii) Discuss the applications of High-Boost Filtering in digital image processing. How does the technique help in enhancing details in low-contrast images?		CO2	AP								
Q.4	Solve any <b>two</b> questions out of three. (10 marks each)	20										
a)	i) Explain the basic steps involved in video processing. Describe how video acquisition, sampling, and quantization contribute to preparing a video signal for further processing. ii) Discuss the importance of motion estimation and motion compensation in video processing. Explain how these steps improve video compression and overall processing efficiency.		CO5	AP								
b)	i) Describe any two AI-based denoising techniques. ii) Evaluate the benefits of super-resolution networks in medical imaging.		CO6	AP								
c)	i) Explain the Graph-Theoretic Technique for Edge Linking. ii) For the following 3×3 gradient magnitude values, construct the corresponding graph and demonstrate how edges are linked using threshold-based neighborhood connectivity. <table border="1"><tr><td>5</td><td>8</td><td>7</td></tr><tr><td>6</td><td>12</td><td>11</td></tr><tr><td>4</td><td>9</td><td>10</td></tr></table>		5	8	7	6	12	11	4	9	10	CO3
5	8	7										
6	12	11										
4	9	10										

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