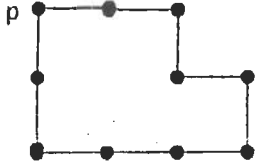


- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Assume **suitable** data wherever **necessary**.
 (3) Attempt any **four** questions from remaining questions.

1	State true or false and justify (Any Four): (a) Poorly illuminated images can be easily segmented. (b) All Image Compression techniques are invertible. (c) Chain Codes can be made invariant to translation and rotation. (d) The principal operation of median filter is to force points with distinct intensities to be more like their neighbors. (e) Quality of the picture depends on the number of pixels and the number of gray level that represent the picture.	20																									
2 (a)	An image represented by 8 bit/pixel has following gray level distribution. Perform histogram equalization and give new distribution of gray level. <table border="1" style="margin-left: 20px;"> <tr> <td>Gray Level</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>Number of pixels</td> <td>128</td> <td>75</td> <td>280</td> <td>416</td> <td>635</td> <td>1058</td> <td>820</td> <td>684</td> </tr> </table>	Gray Level	0	1	2	3	4	5	6	7	Number of pixels	128	75	280	416	635	1058	820	684	10							
Gray Level	0	1	2	3	4	5	6	7																			
Number of pixels	128	75	280	416	635	1058	820	684																			
(b)	Explain Segmentation based on discontinuity and similarity	10																									
3 (a)	Obtain Huffman Code for the word "COMMITTEE"	10																									
(b)	Explain Homomorphic filtering.	10																									
4(a)	What are the different types of redundancies in an image? Explain how they can be reduced / eliminated.	10																									
(b)	List any two properties of 2D DFT and prove any one of them.	10																									
5 (a)	Apply the following Image Enhancement techniques on the given Image. (i) Digital Negative (ii) Bit Plane Slicing (iii) Thresholding <table border="1" style="margin-left: 20px;"> <tr><td>2</td><td>1</td><td>3</td><td>7</td><td>4</td></tr> <tr><td>4</td><td>5</td><td>2</td><td>0</td><td>1</td></tr> <tr><td>3</td><td>5</td><td>1</td><td>4</td><td>6</td></tr> <tr><td>0</td><td>4</td><td>0</td><td>2</td><td>3</td></tr> <tr><td>2</td><td>1</td><td>6</td><td>1</td><td>4</td></tr> </table>	2	1	3	7	4	4	5	2	0	1	3	5	1	4	6	0	4	0	2	3	2	1	6	1	4	10
2	1	3	7	4																							
4	5	2	0	1																							
3	5	1	4	6																							
0	4	0	2	3																							
2	1	6	1	4																							
(b)	Obtain the 4 Directional Chain code for the image shown below. Find first Difference and circular first difference. 	10																									
6 (a)	For 2x2 transform A and the image U, Compute Transformed image V and the basis image $A = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}, \quad U = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$	10																									
(b)	Give following masks of size 3x3 and explain their usefulness in image Processing. (i) Sobel (ii) Roberts (iii) Low-pass filter (iv) Prewitt (v) Laplacian.	10																									
7	Write short notes (Any Four) (i) Dilation and erosion (ii) Image Sampling (iii) JPEG (iv) Connectivity of pixels (v) Filtering in Frequency domain	20																									