

**N.B. :** (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** questions out of remaining **six** questions.

(3) Figures to the **right** indicate **full** marks.

1. (a) Differentiate between point processing and neighbourhood processing techniques. 5
- (b) Derive the Laplacian of Gaussian operator in spatial domain. 5
- (c) Compare and contrast Lossy compression with lossless compression techniques. 5
- (d) Explain boundary detection using morphological operators. 5

2. (a) Find the Huffman code for the following six symbols. 10

<b>Symbol</b>	$a_1$	$a_2$	$a_3$	$a_4$	$a_5$	$a_6$
<b>Probability</b>	0.1	0.4	0.06	0.1	0.04	0.3

- (b) Explain the following methods of image segmentation in detail. 10
  - (i) Region growing
  - (ii) Region split and merge

3. (a) Define 2-dimensional DCT. Compute the DCT of the following 4 x 4 pseudo image. 10

1	3	3	1
3	4	5	3
3	5	4	3
1	3	3	1

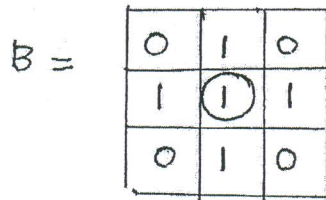
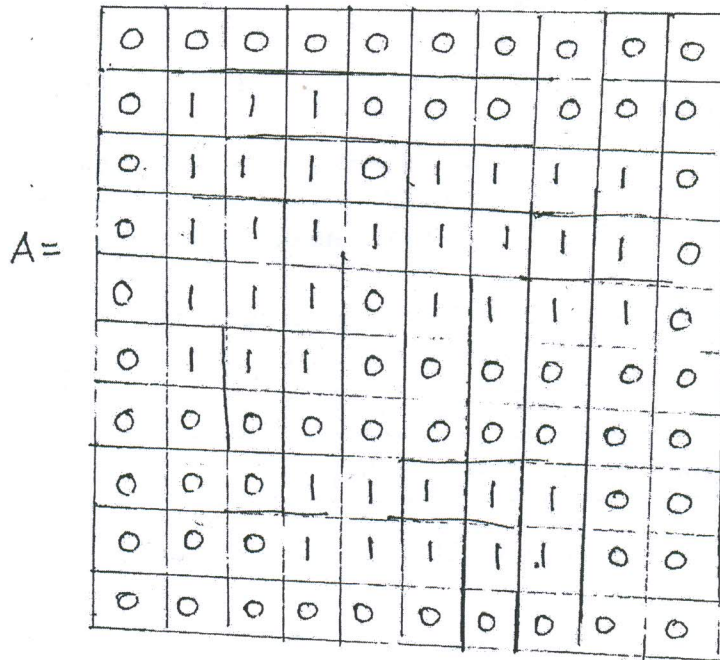
- (b) Explain the following gray-level transformation techniques giving their applications. 10

- (i) Power-law transformation
- (ii) Log transformation.

4. (a) Explain in detail the utility of Hough transform in image segmentation. 10
- (b) Explain inter-pixel redundancy and psychovisual redundancy with a method to reduce them. 10

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5. (a) Explain Homomorphic filtering in detail. 10  
 (b) Define and perform opening and closing operations on the given image A using the given structuring element B. 10



6. (a) Explain the following :— 10  
 (i) Chain Codes  
 (ii) Region filling  
 (b) Give the 8 x 8 matrix for the following transforms and explain what they do to the image. 10  
 (i) Haar transform  
 (ii) Hadamard transform

7. Write short notes on :— 20  
 (a) Image file formats (c) Compass Operator  
 (b) Histogram Stretching (d) Connectivity of pixels.
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