



QP Code : 812402

(3 Hours)

[Total Marks : 80

- N. B. :** (1) Question No. 1 is **compulsory**.
(2) Solve any **three** questions of the remaining questions.
(3) Assume any suitable data if required.

1. Attempt any **four** :-

20

- (a) Explain the terms :
(i) Sampling
(ii) Quantization. What is the effect of sampling and quantization on the resolution of a digital image?
(b) What do you mean by unitary matrix and orthogonal matrix?
(c) What is histogram? State the difference between Histogram Equalisation and Histogram Matching.
(d) State the five basic formulations for region based segmentation.
(e) Differentiate between lossy and lossless compression.

2. (a) Explain following terms with example

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- (i) Digital Negative
(ii) Gray level slicing
(iii) Log Transformation
(iv) Bit Plane Slicing

(b) Explain discrete cosine transform and compute DCT for the given image

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$F(x, y) =$

2	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

3. (a) Apply following filters on the given image and show the intermediate results

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- (i) Low Pass Filter
(ii) High Pass Filter
(iii) Median Filter

4	3	7
1	6	3
1	4	6

(b) Explain basic principles of detecting following in images

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- (i) Points
(ii) Lines
(iii) Edges. Generate 3×3 masks for each and explain operation

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4. (a) Code the following data stream using Huffman coding 10
 { 1,1,1,1,1,1,1,2,2,2,2,2,2,3,3,3,3,3,4,4,4,4,5,5,5,6,6,7}
- (b) Explain following morphological operations 10
 (i) Dilation
 (ii) Erosion
 (iii) Opening
 (iv) Closing
5. (a) Calculate the distance measures for the given image 10
- | | | | | |
|----------------------------|----|---|----|---|
| (i) Euclidean Distance | p1 | 2 | 3 | 4 |
| (ii) City Block Distance | 2 | 0 | 2 | 1 |
| (iii) Chess Board Distance | 3 | 1 | 3 | 1 |
| (iv) m-adjacency Distance | 4 | 1 | q0 | 2 |
- (b) Explain the basic concept of Haar Transform and state applications 10
6. Write short notes on the following :- 20
 (a) Homomorphic Filtering
 (b) Wiener Filter
 (c) High Boost Filter
 (d) Hough Transform