

# INST- Image Processing

Q.P. Code : 6157

(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 with diagrams.

- (i) Neighbours of a pixel
- (ii) Connectivity
- (iii) Adjacency
- (iv) Path

(b) Distinguish between global, local and dynamic thresholding.

(c) Explain dilation and erosion operators with examples.

(d) Explain run length encoding

(e) Explain the Masks for point detection and line detection.

(f) Explain the discrete light receptors over the surface of the retina of the Human eye.

2. (a) With a neat block diagram explain the steps involved in a typical image processing system. 10

(b) Explain the properties of 2D DFT. 10

3. (a) Apply the following filters on the following image and show the results. 10

- (i) Low pass filter
- (ii) High pass filter.

7	9	8	2	4
8	4	7	1	0
1	3	9	5	2
3	1	5	3	2

(b) Explain Morphological operations :

10

- (i) Opening
- (ii) Closing
- (iii) Thinning
- (iv) Thickening.

4. (a) Generate Huffman code for the given image source. Calculate entropy of the same and average length of the code generated. Also calculate the compression ratio achieved compared to standard binary encoding. 10

Levels	0	1	2	3	4	5	6	7
Probability	0.1	0.09	0.02	0.01	0.5	0.2	0.03	0.05

- (b) 10

Gray level	0	1	2	3	4	5	6	7
No. of Pixels	800	1013	850	650	335	200	150	98

Equalize the above Histogram.

5. (a) Explain edge detection masks in images. 10

- (b) Explain euclidean distance, D4 distance, D8 distance and Dm distance. 10

6. Write short notes on : 20

- Wiener filter
- Haar Transform
- Homomorphic filter
- Region splitting and Region merging algorithms.