

(3 Hours)

Total Marks: - 80

- N.B.** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **three** from the remaining questions.
 (3) Illustrate answers with neat sketches wherever required.
 (4) Answers to questions should be **grouped** and written **together**.

- Q.1** (a) What is Digital Image Processing? **05**
 (b) Write short note on contrast stretching **05**
 (c) Explain the methods of thresholding for image segmentation. **05**
 (d) Compare and contrast lossy and lossless image compression techniques. **05**

- Q.2** (a) Apply 3*3 median filter to the image given below. **10**

1	9	4	2
2	2	7	6
4	8	0	7

- (b) Describe the fundamental steps in image processing? **10**

- Q.3** (a) Distinguish between image enhancement and image restoration. Give an example for each. **10**
 (b) Perform histogram equalization of an image shown below: **10**

$$f(m,n) = \begin{bmatrix} 3 & 2 & 4 & 5 \\ 7 & 7 & 8 & 2 \\ 3 & 1 & 2 & 3 \\ 5 & 4 & 6 & 7 \end{bmatrix}$$

- Q.4** (a) Distinguish between smoothing and sharpening filters. Give the appropriate masks for any one smoothing and sharpening filters. **10**
 (b) Discuss about Roberts, Prewitt and Sobel edge detectors. **10**

- Q.5** (a) Obtain forward and inverse DCT for the given image. **10**

2	0	1	0
1	1	0	1
1	0	0	1
2	1	2	3

- (b) Explain morphology and various operations related to the same. **10**

- Q.6** (a) Illustrate Huffman coding with an example **10**
 (b) Draw and explain the general image compression system model. **10**