

**Duration: 3hrs****[Max Marks: 80]**

- N.B. :** (1) Question No 1 is Compulsory.  
 (2) Attempt any three questions out of the remaining five.  
 (3) All questions carry equal marks.  
 (4) Assume suitable data, if required and state it clearly.

1 Attempt **any FOUR****[20]**

- What is the function of an image sensor? How array sensor is different from line sensor?
- Why the size of the filter mask is odd? Justify
- What are different restoration noise models used for image restoration?
- Define morphological operations with mathematic representation for Erosion, Dilation, Opening and closing.
- Brief about the concept of region growing with suitable example.

2 a Perform histogram equalization for the following image. Plot original and equalized histogram.

**[10]**

4	4	4	4	4
3	4	5	4	3
3	5	5	5	3
3	4	5	4	3
4	4	4	4	4

b Compute DFT matrix for  $N=4$  and then compute 2D DFT of a given image.**[10]**

1	2	3	2
4	2	5	1
1	2	6	3
2	4	6	7

3 a Explain point processing techniques used for image enhancement in detail.

**[10]**b Create a Haar transform basis function for  $N=4$ . Perform Haar transform on given  $2 \times 2$  image.**[10]**

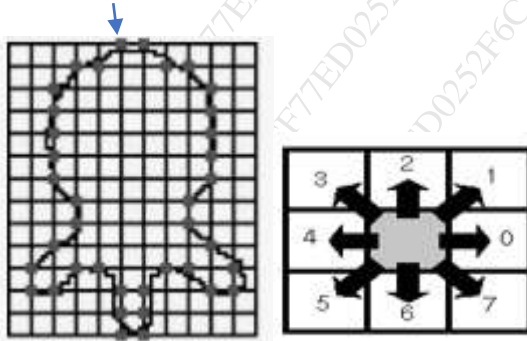
1	2
3	4

4 a Explain hole filling morphological processing with algorithm and suitable illustration. [10]

b Why averaging filter is used in canny edge detection? Explain canny edge detection method with block diagram. [10]

5 a Draw and explain Homomorphic filtering in detail. [10]

b Find chain code , shape number for given left side image using 8 connectivity [10]  
shown in right figure using clockwise direction.(Arrow shows starting point).



6 a Explain the parameters for computation of occurrence matrix. Compute occurrence matrix for  $0^0$  and  $90^0$  orientation with  $d=1$  for following image. [10]

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

b Explain Support vector Machine in detail. [10]