Time: 3 Hours Marks: 80

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

(2) Solve any **three questions** from the **remaining five**

(3) Figures to the right indicate full marks

(4) Assume suitable data if necessary and mention the same in answer sheet.

Q.1 Attempt **any 4** questions **[20]**

a) What is the function of an image sensor? How array sensor is different from line sensor?

b) If all the pixels in an image are shuffled, will there be any change in the histogram? Justify your answer?

c) Define opening and closing with mathematical expression.

d) Compute the mean value of the marked pixel in given image using 3 X 3 mask and rewrite the image.

2	4	6
10	25	14
1	3	5

e) Explain various boundary descriptors.

Q.2 a) Explain image enhancement techniques in detail. **[10]**

b) Explain edge linking and boundary detection using polygonal method. **[10]**

Q.3 a) Apply histogram equalization to the following image **[10]**

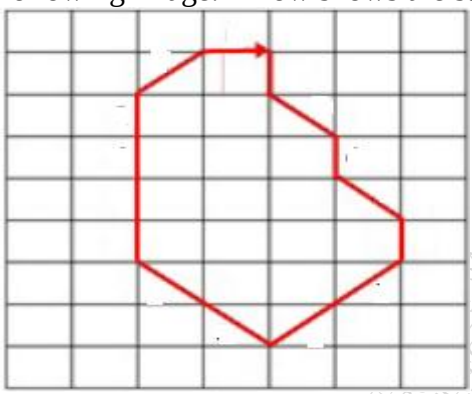
4	4	4	4	4
4	2	5	4	3
3	5	5	5	3
3	4	5	4	3
4	4	4	4	4

b) Filter the following image using 3 X 3 neighbouring averaging by zero padding. **[10]**

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

Q.4 a) What is Hit or Miss transformation? Explain in brief. **[10]**
b) Explain the principal of Homomorphic filtering. **[5]**
c) Explain advantages of Canny edge detection. **[5]**

Q.5 a) Find chain code and shape number using 8 code connectivity for the following image. Arrow shows the starting point for chain code. **[10]**



What is image segmentation? What are the basic approaches for segmenting an image? Classify segmentation. **[5]**

c) Find the number of co-occurrences of pixel i to neighbouring pixel j. **[5]**

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

Q.6 Short notes on: **(Attempt any Two)** **[20]**

a) SVM
b) B-spline algorithm
c) Noise models.

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