

lib.

BECEVT VII Image Processing

04/06/09
11-2 p.m.
VR-4842

Con. 3323-09.

(3 Hours)

[Total Marks : 100

- N.B.:** (1) Question No. 1 is compulsory.
 (2) Attempt any **four** questions out of remaining **six** questions.
 (3) **Figures** to the **right** indicate **full** marks.
 (4) Assume **suitable data** if **necessary** .

1. (a) Explain the structure of human eye and image formation in eye. **10**
 (b) Explain the following terms (any **two**) :— **10**
 (i) Isopreference curve (iii) Simultaneous Curve
 (ii) Mach Band (iv) Uniform and Nonuniform sampling.
2. (a) Explain in detail enhancement techniques in Spatial Domain used for images. **10**
 (b) Explain Homomorphic filtering in detail. **5**
 (c) Find the DFT of the given image. **5**

0	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

3. (a) Perform Histogram Equalization and also draw the Histogram for the given **10**
 gray level histogram of an image is given below :

Gray level	0	1	2	3	4	5	6	7
Frequency	123	78	281	417	639	1054	816	688

- (b) Consider the image **10**

$$A = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix}$$

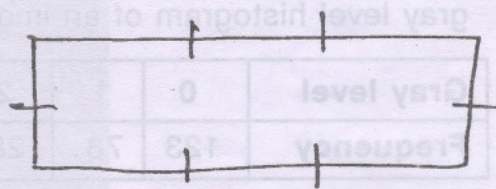
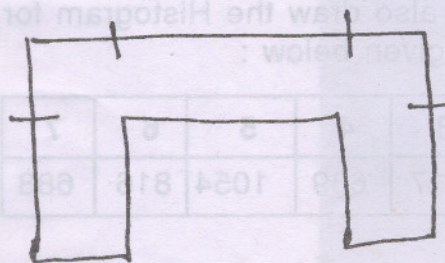
Let the structuring element B =

1	1
---	---

- Perform (1) Erosion
 (2) Dilation
 (3) Opening

4. (a) Explain with suitable example region splitting and merging technique for image segmentation. **10**
 (b) Explain Hough-Transform and its applications in detection of shapes from image edges. **10**
5. (a) What are the different types of redundancies in digital image ? Explain in brief. **8**
 (b) Explain any four method of data compression specify whether it is Lossy or Lossless and which type of redundancy it will minimize. **12**
- (i) Adaptive delta modulation
 - (ii) Differential pulse code modulation
 - (iii) Transform coding
 - (iv) Run length coding on bit planes
 - (v) LZW algorithm.

6. (a) Explain the following with example and its application : **10**
 (i) Chain code
 (ii) Moments.
- (b) For the following boundaries shown below find the order, chain code, first difference and shape no. **5**



- (c) Show that the Laplacian mask is Isotropic filter. (Use 3×3 mask) **5**

7. Write short notes (any **four**) :—

- (a) Discrete Cosine Transform
- (b) Wavelet Transform
- (c) Hit and Miss Transform
- (d) Polygonal Approximation and Signatures
- (e) Fourier Descriptor
- (f) Image Compression Models.

20