B.E. Sem 7 (Rev.)
I.T.

Image Processing

29/12/08

301/p3/ksl/upq/oct 012/2kl

Con. 5780-08. (REVISED COURSE) RC- 7379

(3 Hours) [Total Marks : 100

N. B. : (1) Question No. **1** is **compulsory**.
(2) Answer any **four** out of remaining **six** questions.
(3) Assume **suitable** data whenever **necessary** and state them **clearly**.

1. Justify / contradict the following statements : **20**
   (a) Run length coding always gives data compression.
   (b) For digital image having salt and pepper noise, median filter is the best filter.
   (c) Walsh transform is nothing but sequency ordered Hadamard matrix.
   (d) Laplacian is better than gradient for detection of edge.
   (e) Chain code can be made invariant to translation and rotation.

2. (a) Perform Histogram Equalization for following. Obtain a plot of original as well as Equalized Histogram. **10**

Intensity	0	1	2	3	4	5	6	7
No. of Pinel	70	100	40	60	0	80	10	40

   (b) Write DDA algorithm to draw a line. Also explain the basic transformation in Computer Graphics. **10**

3. (a) Assume that the edge starts in the first row and ends in the last row for the following gray image : **10**

Column \ Row			
	5	6	1
	6	7	0
	7	1	3

   Sketch all possible paths and determine the edge corresponding to minimum cost path.
   (b) Show that Highpass = Original — Lowpass **10**

4. (a) 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 $B = \begin{bmatrix} \textcircled{1} & 1 \end{bmatrix}$

   perform — (1) Erosion (2) Dialation (3) Opening (4) Closing.
   (b) Explain in detail enhancement techniques in spatial domain used for image. **10**

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5. (a) Explain the method of segmentation of images by Region splitting and merging. 10

(b) Given below is the table of 8 symbols and their frequency of occurance : 10

Symbol	S_0	S_1	S_2	S_3	S_4	S_5	S_6	S_7
Frequency	0·25	0·15	0·06	0·08	0·21	0·14	0·07	0·04

Give Huffman code for each eight symbols.

6. (a) Given a 4 × 4 image whose gray levels, order lexicographically are as follows :— 10

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

Calculate the spatial moments upto second order.

(b) What is an edge ? Give typical edge profiles and convolution masks for Roberts, Laplace and Prewitt edge detectors. 10

7. Write short notes on (any **four**) :— 20

(a) Wavelet Transform

(b) Discrete Cosine Transform

(c) Hitt or miss transform

(d) Fourier Descriptors

(e) Subband Coding.
