B.E. Sem 7. (Rev.) Computer. Image Processing 29/12/08

Con. 5722-08. **RC-7262**

(REVISED COURSE)

(3 Hours) **[Total Marks : 100**

N. B. : (1) Question No.1 is **compulsory**.
(2) Attempt any **four** out of remaining **six** questions.
(3) Assume **suitable data** wherever **necessary** and **state** it.

1. Justify/contradict following statements :— 20
   (a) Chain codes can be made invariant to translation and rotation
   (b) Median filter is the best solution to remove salt and pepper noise
   (c) All image compression techniques are invertible
   (d) Image subtraction is used for scene matching and detection
   (e) Image resulting from poor illumination cannot be segmented easily.

2. (a) A 64 * 64 image, represented by 8 bits/pixel has following gray level distribution :— 10

Gray Level	0	1	2	3	4	5	6	7
No. of Pixel	128	75	280	416	635	1058	820	684

   Perform histogram Equalization and give new distribution of gray level. Show plots of original and equalized image.
   (b) Explain basic principles of detecting following in the images. 10
   (i) points (ii) lines (iii) edges.
   Give 3 * 3 mask for each of them and explain their operation.

3. (a) Explain the method of segmentation of images by Region Splitting and Merging. 10
   (b) Explain the following morphological operation in terms of dilation and erosion operations, Hit or Miss, Open, Close, Boundary, Skeleton. 10

4. (a) What are different types of redundancies in digital images and give methods to remove those redundancies ? 10
   (b) How many calculations do we require to compute the Hadamard transform ? 4
   If X(n) = { 4, 2, 2 ,4 }
   (c) State and prove symmetry and periodicity property of DFT. 6

5. (a) Given a 4 x4 image whose gray level, orders 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 up to second order.
   (b) What do you understand by image averaging ? 5
   (c) What is chain code and what are its application ? 5

6. (a) What do you understand by Discrete Cosine Transform ? Explain its application in image compression. 10
   (b) Explain texture and image descriptor. 10

7. Write short notes on :— 20

(i) Wavelet transform

(ii) Edge linking and boundary detection via graph theoretic technique

(iii) Image compression standards

(iv) Homomorphic filtering.