(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2716   Roll No. [   ]

B.Tech.
(SEM. VII) ODD SEMESTER THEORY
EXAMINATION 2012-13
DIGITAL IMAGE PROCESSING

Time : 3 Hours   Total Marks : 100

Note :– Attempt all questions.

1. Attempt any **four** of the following :–   (5×4=20)

    (a) Explain sampling and quantization. Explain the effects of reducing sampling and quantization.

    (b) What do you mean by image processing ? Explain the steps in image processing with the help of block diagram.

    (c) Give various grey level slicing techniques. What is Contrast Stretching ?

    (d) Classify image restoration techniques. If a car is moving at a constant speed of 80 km/h and an image is taken, is it possible to use a wiener or inverse filter to restore the blurring of image ?

    (e) Suppose that A, B, C are three points Prove that :

    $$(((A \cdot B) \circ C) \cdot B) \circ C = (A \cdot B) \circ C$$

    (f) Explain the thresholding method of segmentation.

2. Attempt any **two** of the following :   (10×2=20)

    (a) Explain the steps involved in sampling and digitization of images. How many minutes are required for a 512 × 512 image with 256 grey levels at 300 baud rate for transmission ? The transmission is accomplished using packets consisting of a start bit, a byte (8 bits) of information and a stop bit. Baud rate means number of bits per second.

    (b) (i) Explain the action of the following spatial mask on an image.

0	−1	0
−1	4	−1
0	−1	0

    (ii) Write short note on mean filter.

    (c) Describe any one image sharping method in detail.

3. Attempt any **two** of the following :   (10×2=20)

    (a) Write a note on Noise Models in image restoration. Describe WIENER Filter and Inverse Filtering.

    (b) Given an image, write down the 8 chain code and find Shape Number of it.

(c) Suppose two discrete one dimensional functions are represented by the sequences :

f = [5 7 11 8 2 6 8 9 7 4 3]

h = [1 2 1].

Compute f + h, f ⊖ h, f o h, f · h

4. Attempt any **two** of the following : (10×2=20)

(a) Discuss the following :

   (i) Convex HUQ

   (ii) Logic operations involving binary images.

·(b) What do you mean by thinning and thickening of an image ? Discuss the method for thinning of an image.

(c) What do you mean by morphology ? Discuss any one morphological algorithm with suitable example.

5. Attempt any **two** of the following : (10×2=20)

(a) Write short notes on :

   (i) Watershed Segmentation Algo

   (ii) Feature Thresholding in Pixel Based Approach.

(b) Describe the region based segmentation. Apply the region splitting on following image. Assume the threshold value be <=3.

5	6	4	7	4	5	5	3
6	7	7	6	3	3	2	1
6	6	4	4	3	2	5	6
4	5	4	5	4	6	2	3
3	2	3	0	7	5	3	2
1	0	1	0	2	2	6	5
1	0	1	1	3	0	4	4
0	2	1	0	2	3	5	4

(c) Describe any one depth recover algorithm in detail.