(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

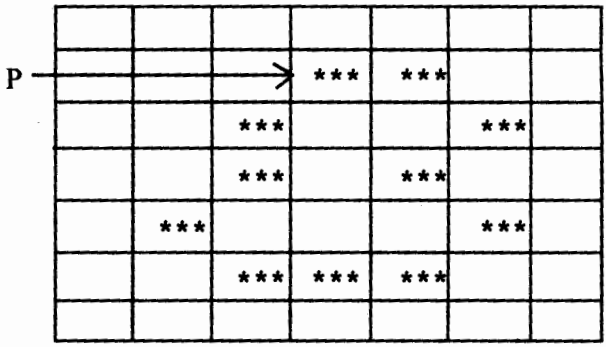
(ii) Write short note on mean filter.

(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 $f + h$, $f \ominus h$, $f \circ h$, $f \cdot h$

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.