

- (b) Describe the region based segmentation. Apply the region splitting on following image. Assume the threshold value be  $\leq 3$ .

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 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.

(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.

- Attempt any four of the following :- (5×4=20)
  - Explain sampling and quantization. Explain the effects of reducing sampling and quantization.
  - What do you mean by image processing? Explain the steps in image processing with the help of block diagram.
  - Give various grey level slicing techniques. What is Contrast Stretching?
  - 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?
  - Suppose that A, B, C are three points Prove that :
 
$$(((A \cdot B) \circ C) \cdot B) \circ C = (A \cdot B) \circ C$$
  - 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  $512 \times 512$  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 sharpening 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.

|   |     |     |     |     |     |  |
|---|-----|-----|-----|-----|-----|--|
|   |     |     |     |     |     |  |
| P |     |     | *** | *** |     |  |
|   |     | *** |     |     | *** |  |
|   |     | *** |     | *** |     |  |
|   | *** |     |     |     | *** |  |
|   |     | *** | *** | *** |     |  |
|   |     |     |     |     |     |  |

(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.