

M.Sc. (Computer Science)(CBCS 2018 Course) Sem – I : Winter 2018
Subject : 3) Digital Image Processing

Day : Tuesday
 Date : 16/10/2018

Time : 03.00 PM TO 06.00 PM
 Max. Marks :60

W-2018-1039

N.B.

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use of scientific calculator is **ALLOWED**.

- Q.1**
- a) Discuss the fundamental steps in image processing with the help of block diagram. **(08)**
 - b) Explain opening and closing along with their properties. **(07)**

OR

Name the different types of image segmentation techniques. Explain the splitting and merging techniques with the help of an example. **(15)**

- Q.2**
- A) Answer **ANY ONE** of the following: **(08)**
 - a) Given a 3-bit image of size 32x32 pixels having intensity distribution as shown in the table given below, where intensity levels are in the range 0-7. Apply histogram equalizations technique and find the transfer function $T(r)$ Which relates input image intensity level r_k output image intensity S_k .

Intensity Level	Number of pixels
$R_0 = 0$	76
$R_1 = 1$	344
$R_2 = 2$	211
$R_3 = 3$	103
$R_4 = 4$	57
$R_5 = 5$	127
$R_6 = 6$	47
$R_7 = 7$	59

- b) Explain any two properties of 2-D discrete Fourier Transform.

- B)** Answer **ANY ONE** of the following: **(07)**
- a) Mention the ways of estimating degradation functions. Explain any one in detail.
 - b) Describe the basic relationships between pixels.

- Q.3** Answer **ANY THREE** of the following: **(15)**
- a) Explain the Power-law transformations.
 - b) Given below 'X' a section horizontal intensity profile from an image. Illustrate the 1st and 2nd derivative of the 1-D digital functions represented by 'X' depict zero crossing if any.

Scan line X	6	6	6	6	6	5	4	3	2	1	1	1	1	1	1	6	6	6	6	6
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- c) Explain the concept of unsharp masking with the help of appropriate diagrams.
- d) What are the fundamental steps in edge detection?
- e) Explain morphological image processing operations.

P.T.O.

Q.4

Write short notes on **ANY THREE** of the following:

(15)

- a) Chain Codes
- b) Wiener filtering
- c) Image acquisition methods
- d) Ideal high pass filter
- e) Bit plane slicing

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