M. SC. (Computer Science) SEM – I (Choice Based Credit & Grade System) : WINTER - 2018

SUBJECT: ELECTIVE – I: c) DIGITAL IMAGE PROCESSING

Day: Tuesday
Date: 16/10/2018

W-2018-1045

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

N.B:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagrams **WHEREVER** necessary.

Q.1 State the equations for 2 – D discrete Fourier transform and its inverse. Describe any two properties of 2 – D discrete Fourier transform **(15)**

OR

Given a 3 – bit image of size 64 × 64 pixels hawing intensity distribution as shown is the table given below, where intensity levels are in the range 0-7. Apply histogram equalization technique and find the transfer function T (r) which relates input – image intensity level R_k to output image intensity S_k

Intensity level	Numbers of pixels
$R_0 = 0$	790
$R_1 = 1$	1023
$R_2 = 2$	850
$R_3 = 3$	656
$R_4 = 4$	329
$R_5 = 5$	245
$R_6 = 6$	122
$R_7 = 7$	81

Q.2 A) Answer any **ONE** of the following **(08)**

a) Explain the fundamentals steps in digital image processing with the help of a block diagram.

b) Explain Erosion and Dilation. Show that erosion and dilation are duals of each other.

B) Answer any **ONE** of the following **(07)**

a) Draw the shapes for the orders n = 4 , 6 and 8. Also give chain code representations, first difference and shape number.

b) Explain any two filtering methods in spatial domain.

Q.3 Answer any **THREE** of the following **(15)**

a) Define opening and closing operations. In what way do they differ from each other.

b) Explain the working of ideal low pass filter for digital image processing in the frequency domain.

c) Define 8 – adjacency and m – adjacency. What is the advantage of m – adjacency.

d) Describe the different ways of estimating degradation function.

e) State methods for image acquisition and explain any one.

Q.4 Write short notes on any **THREE** of the following **(15)**

a) Hit or Miss transform

b) Boundary approximation using 'mpp'

c) Bit - plane slicing

d) Thresholding

e) Image segmentation

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