

**M. SC. (COMPUTER SCIENCE) SEM – I (CHOICE BASED
CREDIT & GRADE SYSTEM) : WINTER - 2017
SUBJECT : ELECTIVE – I: c) DIGITAL IMAGE PROCESSING**

Day : Tuesday
Date : 31/10/2017

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

W-2017-0821

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 Explain the following with respect to digital image processing: **(15)**
i) Image negatives ii) Gamma correction iii) Bit -plane slicing

OR

What is digital image processing? Draw and explain the block diagram of digital image processing. **(15)**

Q.2 A) Answer **ANY ONE** of the following: **(08)**
a) A 32 x 32 pixel image has intensity distribution as shown in the table given below. The intensity levels are in the range of 0-7. Apply histogram equalization technique and find the transfer function that relates output Image intensity level S_k with input intensity level V_k .

Intensity level	No. of pixels
$V_0 = 0$	211
$V_1 = 1$	344
$V_2 = 2$	103
$V_3 = 3$	127
$V_4 = 4$	76
$V_5 = 5$	57
$V_6 = 6$	47
$V_7 = 7$	59

b) Explain opening and closing operations in detail.

B) Answer any **ONE** of the following: **(07)**
a) Define the following :
i) 4-adjacency ii) 8-adjacency iii) Boundaries iv) Regions
b) Explain any two thresholding techniques in details.

Q.3 Answer **ANY THREE** of the following: **(15)**
a) Derive equations for 2-D discrete Fourier transform and its inverse.
b) Explain methods of estimating the degradation function.
c) Explain the process of thickening and thinning.
d) Show that subtracting the Laplacian from an image is proportional to the unsharp masking.
e) Explain edge linking algorithm with local processing.

Q.4 Write short notes on **ANY THREE** of the following: **(15)**
a) Butterworth high pass filter
b) Convolution
c) Wiener filtering
d) Chain codes
e) Prewitt operators

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