Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech/ECE/SEM-8/EC-803D/2013

2013

DIGITAL IMAGE PROCESSING

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

$10 \times 1 = 10$

i) Digital Image Processing deals with

a) analog signal

b) digital signal

c) discrete signal

d) (b) & (c) both.

ii) The common major of transmission of digital data is

a) bit rate

b) baud rate

c) frame per second

d) none of these.

iii) HDTV stands for

a) High Definition Television

b) High level Digital Television

c) (a) & (b) both

d) none of these.

iv) Image restoration is a / an

a) subjective process

b) objective process

c) (a) & (b) both

d) none of these.

v) Huffman coding approach reduces

a) noise

b) coding redundancy

c) dynamic range of intensities

d) none of these.

vi) Which of the following is improved by histogram technique ?

a) Contrast

b) Sharpness

c) Brightness

d) Both (a) and (b).

vii) Wiener Filter is used for

a) restoration

b) smoothening

c) sharpening

d) none of these.

viii) Representation & description almost always follow the output of a

a) segmentation stage

b) filtering stage

c) compression stage

d) all of these.

ix) The basic principle of compression matches the principle of

a) Channel coding

b) Line coding

c) Source coding

d) All of these.

x) Discrete cosine transform is a

a) Real Transform

b) Imaginery Transform

c) both (a) and (b)

d) none of these.

xi) Averaging filter is used for

a) sharpening

b) contrast

c) brightness

d) smoothing.

xii) How many numbers of colours are present in RGB ?

a) 3

b) 6

c) 216

d) 256.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What do you mean by Digitization ? Explain its two important steps. 2 + 3

3. Write down the key stages in Digital Image Processing & explain.

4. What is the "frequency" of an image ? Explain the smoothing frequency domain filters. 2 + 3

5. What is image sampling ? Distinguish between image enhancement and image restoration. 2 + 3

6. What is 8 bit colour image ? For what purpose could it be used ? Explain. 3 + 2

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) What is the difference between local and global thresholding ? 5

   b) Explain Hough transformation and describe its application in image processing. 10

8. a) What do you mean by image negative ? Explain.

   b) Explain Intensity slicing with example.

   c) Why do we need Log Transformation in dynamic range compression ? 5 + 5 + 5

9. a) Explain the restoration model for continuous function in detail.

   b) What is the role of quantization in image processing ?

   c) What is the difference between lossy and lossless compression ?

   d) What is salt and pepper noise ? What is Gaussian noise ? 5 + 3 + 2 + (3 + 2)

10. a) Draw the schematic diagram of 2-D DWT synthesis filter bank structure for Haar Wavelet Transform and explain the components.

    b) State the JPEG compression algorithm and draw the schematic diagram of JPEG compressor. 8 + 4 + 3

11. Write short notes on any *three* of the following : 3 × 5

a) Spatial filtering

b) Wiener filtering

c) Contrast stretching

d) Histogram specification

e) Wavelet

f) Point processing.