



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 ?

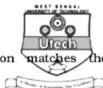
- a) Contrast
- b) Sharpness
- c) Brightness
- d) Both (a) and (b).

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) Imaginary 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. $3 \times 5 = 15$

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

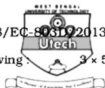
(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

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.

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