



Name :

Roll No. :

Invigilator's Signature :

CS/MCA/SEM-5/MCAE-501B/2011-12

2011

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

(Objective Type Questions)

1. Answer any *ten* of the following in not more than *two* sentences each : 10 × 1 = 10

- i) What is negative image ?
- ii) What is recursive filter ?
- iii) What is pixel ?
- iv) Define Signal to Noise Ratio (SNR).
- v) What is image averaging ?

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- vi) Write down the expression of Fourier transform $F(\omega)$ of the function $f(t)$.
- vii) How can a monochromatic digital image be represented ?
- viii) What is convolution ?
- ix) Write down the orders of complexity in FFT.
- x) Is Huffman coding lossless ?
- xi) Define compression ratio.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- 2. Differentiate between lossy and lossless compressions with suitable examples.
- 3. Explain the terms 'mean filtering' and 'median filtering'.
- 4. Determine the Fourier transform of the Dirac delta function, $\delta(x)$.
- 5. Briefly discuss the elements of visual perception.
- 6. Define two dimensional discrete cosine transform DCT-II. State the conditions under which this transformation should be used.



GROUP – C

(Long Answer Type Questions)

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

7. a) State and explain the fundamental steps in digital image processing. 8
b) How are images digitized ? Explain with an example. 7
8. Describe the elements of visual perception, clearly indicating the image formation, brightness adaptation and discrimination in the eye.
9. a) What is filter ? Explain in detail how spatial filtering is done, clearly indicating the factors to be considered for choice of mask. 9
b) What is histogram of a digital image ? Describe one use of image histogram in digital image processing. 2 + 4
10. a) Why is transformation of image done from spatial domain to frequent performed ? Name three such transformation methods and compare them critically. 9
b) What is data redundancy and relative data redundancy ? Explain with suitable examples. 6
11. Write short notes on any *three* of the following : 3 × 5
 - a) KL transformation and its application
 - b) Enhancement and segmentation of images
 - c) Constrained and unconstrained restoration methods
 - d) Run length coding
 - e) Image processing system.

