



Name :

Roll No. :

Invigilator's Signature :

**CS/B.TECH (CSE)/SEM-7/CS-704G/2012-13
2012**

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.*

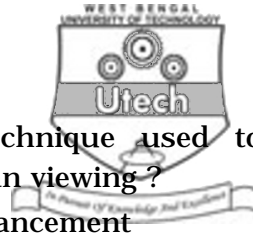
GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following :

10 × 1 = 10

- i) The process of extracting information from the image is called as
 - a) image enhancement b) image restoration
 - c) image analysis d) image compression.
- ii) The initial step in any image processing technique is
 - a) segmentation b) masking
 - c) image acquisition d) normalization.
- iii) An image is considered to be a function of $a(x, y)$ where a represents
 - a) height of image b) width of image
 - c) amplitude of image d) resolution of image.



- iv) Which is the image processing technique used to improve the quality of image for human viewing ?
 - a) Compression b) Enhancement
 - c) Restoration d) Analysis.
- v) Which type of enhancement operations are used to modify pixel values according to the value of the pixel's neighbours ?
 - a) Point operations b) Local operations
 - c) Global operations d) Mask operations.
- vi) Which of the following is a lossy coding ?
 - a) Run length coding
 - b) Huffman coding
 - c) Uniform quantizer
 - d) Predictive coding without quantizer.
- vii) Quantization in which image processing technique is used to eliminate electronic noise by mathematical process is
 - a) digitizing the co-ordinate value (x, y)
 - b) digitizing the amplitude value
 - c) digitizing the intensity value
 - d) digitizing the pixel value.
- viii) The amount of noise decreases by of number of frames averaged.
 - a) division b) square root
 - c) linear d) none of these.
- ix) Segmentation is process that partitions image into
 - a) blocks b) regions
 - c) pixels d) vertices.
- x) Image compression is
 - a) making image look better
 - b) sharpening the intensity-transition regions
 - c) minimizing degradation over image
 - d) reducing the redundancy of the image data.



GROUP – B

(Short Answer Type Questions)

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

2. a) Define Digital Image.
b) Explain components of Image Processing System. $1 + 4$
3. a) Write the properties of 2D Fourier Transform.
b) What are the applications of Transformation ? $3 + 2$
4. In aspects of Digital Image, explain the terms 'Adjacency' and 'Connectivity'.
5. a) What is Image Negative ?
b) Compare Mean Filtering with Median Filtering. $2 + 3$
6. a) Why is Edge Detection the most common approach for detecting discontinuities ?
b) What are the features of GIS system ? $2 + 3$

GROUP – C

(Long Answer Type Questions)

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

7. a) Explain how the edge detection is obtained by Prewitt and Sobel operators and compare the two techniques.
 $2 \frac{1}{2} + 2 \frac{1}{2} + 2$
b) Discuss how edge linking is done by local processing.

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8. a) Discuss about the model of the image degradation / restoration process. 4
- b) Discuss the PDF of impulse, Gaussian and Uniform noise. 2 + 2 + 2
- c) What are Arithmetic, Harmonic and Geometric mean filters ? 5
9. a) What is the difference between GPS and GIS ? 3
- b) What is vectorization and why is it required in GIS ? 5
- c) What do you mean by neighbours of a pixel ? Define 4, 8 and M adjacency of pixels in a gray scale image. 2 + 5
10. a) Discuss run length and bit plane encoding technique with example. 10
- b) Compare between lossless and lossy image compression techniques. 5
11. Write short notes on any *three* of the following : 3 × 5
- a) Image negatives
 - b) Huffman Coding
 - c) Haar Transform
 - d) Walsh-Hadamard Transform (WHT)
 - e) Histogram Equalization
 - f) Image subtraction and Image averaging.