DIGITAL IMAGE PROCESSING (SEMESTER - 8)

CS/B.TECH (ECE-NEW)/SEM-8/EC-803D/09

1. ..... *Signature of Invigilator*

2. ..... *Signature of the Officer-in-Charge*

Reg. No. | | | | | | | | | | | | | | |

Roll No. of the Candidate | | | | | | | | | | | | | | |

CS/B.TECH (ECE-NEW)/SEM-8/EC-803D/09

ENGINEERING & MANAGEMENT EXAMINATIONS, APRIL – 2009

DIGITAL IMAGE PROCESSING (SEMESTER - 8)

Time : 3 Hours] [Full Marks : 70

INSTRUCTIONS TO THE CANDIDATES :

1. This Booklet is a Question-cum-Answer Booklet. The Booklet consists of **32 pages**. The questions of this concerned subject commence from Page No. 3.
2. a) In **Group – A**, Questions are of Multiple Choice type. You have to write the correct choice in the box provided **against each question**.
   b) For **Groups – B** & **C** you have to answer the questions in the space provided marked 'Answer Sheet'. Questions of **Group – B** are Short answer type. Questions of **Group – C** are Long answer type. Write on both sides of the paper.
3. **Fill in your Roll No. in the box** provided as in your Admit Card before answering the questions.
4. Read the instructions given inside carefully before answering.
5. You should not forget to write the corresponding question numbers while answering.
6. Do not write your name or put any special mark in the booklet that may disclose your identity, which will render you liable to disqualification. Any candidate found copying will be subject to Disciplinary Action under the relevant rules.
7. **Use of Mobile Phone and Programmable Calculator is totally prohibited in the examination hall.**
8. You should return the booklet to the invigilator at the end of the examination and should not take any page of this booklet with you outside the examination hall, **which will lead to disqualification**.
9. Rough work, if necessary is to be done in this booklet only and cross it through.

No additional sheets are to be used and no loose paper will be provided

FOR OFFICE USE / EVALUATION ONLY

Marks Obtained

	Group – A										Group – B			Group – C			*Total Marks*	*Examiner's Signature*
Question Number																		
Marks Obtained																		

.....

Head-Examiner/Co-Ordinator/Scrutineer

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GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : 10 × 1 = 10

i) An image is a 2D array of

a) digital data b) electrical signals

c) photographic objects d) light signals. ☐

ii) A line sensor is used to

a) capture a scene b) capture a 3D image

c) scan a 2D image d) none of these are true. ☐

iii) What device is used to form an image on the film of a camera ?

a) A *p-n-p* transistor b) A converging lens

c) An Op-Amp d) A plane mirror. ☐

iv) If an input image is $f(x, y)$ and a transform T is operated to get an processed image $g(x, y)$, we can write

a) $f(x, y) = T[g(x, y)]$ b) $f(x, y) = T / g(x, y)$

c) $g(x, y) = T[f(x, y)]$ d) none of these are true. ☐

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v) If a function $f(x, y)$ is real and we have $F(u, v) = 2DFFT[f(x, y)]$,

a) $F(u, v)$ conntains only real parts

b) $F(u, v)$ contains only imaginary parts

c) $F(u, v)$ contains both real and imaginary parts

d) none of these are true. ☐

vi) Edge detection of an image broadly means

a) low spatial frequency enhancement

b) high spatial frequency enhancement

c) thresholding low spatial frequencies

d) none of these are true. ☐

vii) If a function $f(x, y)$ is finite in the space domain, the Fourier transform of $f(x, y)$ will be

a) finite b) infinite

c) undefined d) zero. ☐

viii) The classical Hough transform is concerned with the identification of

a) lines in an image b) zeros in an image

c) poles in an image d) none of these are true. ☐

ix) A wavelet transform is a special case of

a) Laplace transform b) Z-transform

c) Fourier transform d) none of these are true. ☐

x) We have an image in EPS and JPEG formats

a) the JPEG file will be large in zie

b) the EPS file will be larger in size

c) both files will be equal in size

d) none of these are true. ☐

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GROUP – B

(Short Answer Type Questions)

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

2. a) What is image Sampling ? 2

   b) Define saturation in digital image. 3

3. a) Write down the various 2D transforms. 2

   b) Compare one dimension and two Dimension DFT. 3

4. a) List down the various Geometric Transformation. 2

   b) Difference between Unconstrained and Constrained Restoration. 3

5. a) What are called median filters ? 2

   b) Distinguish between image enhancement and image restoration. 3

6. a) Define Edge detection. 2

   b) What are image negatives ? 3

GROUP – C

(Long Answer Type Questions)

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

7. Describe the model of image degradation. Give some example of added noise. Explain some ways of estimating the degradation function. Describe the estimation of degradation function by mathematical modeling for the degraded image captured while the object is moving in X & Y direction in constant velocity. Briefly state the need of Wiener filter. 3 + 1 + 3 + 6 + 2

8. Explain the data redundancy and compression ratio of an imaging system. How many types of data redundancy are there in an imaging system ? Explain them. Explain lossless and lossy predictive coding. 4 + 5 + 6

9. Describe LZW coding with example. What is transform coding ? Give some example of transform coding. 10 + 5

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10. Briefly describe any three color models. Write the conversion rules for converting RGB color model to HSI color model and vice-versa. How can a color image be converted to gray scale image ? 6 + 6 + 3

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

a) Fourier descriptor

b) Morphology

c) Huffman coding

d) DCT

e) Optimum Thresholding.

END

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