Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
(Constituent Institute of Manipal University)
MANIPAL-576104

SIXTH SEMESTER B.E DEGREE END SEMESTER EXAM - MAY 2012
SUBJECT: ELECTIVE I – DIGITAL IMAGE ANALYSIS (CSE 310.1)
(REVISED CREDIT SYSTEM)

TIME: 3 HOURS MAY 24th 2012 MAX. MARKS: 50

INSTRUCTIONS TO CANDIDATES
- ANSWER ANY **FIVE** FULL QUESTIONS.
- ANSWER QUESTIONS IN ORDER.

1A. Describe three different levels in digital image processing. Suggest appropriate rays in electromagnetic spectrum for acquiring the following type of images:
(i) Magnetic resonance imaging (ii) Mountain terrain (iii) Fluorescence microscopy (iv) Computerized tomography (v) Positron emission tomography (vi) Image of burned flakes. [03]

1B. Explain how m-adjacency of pixels is different from 8-adjacency with an example. [02]

1C. Explain in detail the process of image digitization. [05]

2A. Explain the histogram equalization technique for contrast enhancement? How it is used in histogram matching. [05]

2B. How do you correct gamma value in monitor using power-law transformation? [02]

2C. Derive the Laplacian for image sharpening. How it is used in high-boost filtering? [03]

3A. Describe the image filtering operation in frequency domain. Give the mathematical formulation of Butterworth low pass and high pass filters. [05]

3B. Explain the model of the image degradation/restoration process. [03]

3C. Describe any four order statistic filters. [02]

4A. Explain the line detection method using Hough transform. [04]

4B. Give the steps for automatic calculation of global threshold. What is the problem in global thresholding? How it is corrected using basic adaptive thresholding? [03]

4C. Explain the region growing, region splitting and merging techniques for image segmentation. [03]

5A. Explain the following morphological operations:
(i) Skeletonization (ii) Convex hull (iii) Thinning [06]

5B. Prove that dilation and erosion are exhibit duality property. [02]

5C. Give the mathematical representation for gray scale dilation and erosion. What is the use of gray scale opening and closing? [02]

6A. How do you represent the boundary using chain code? Describe the normalization of the chain code with respect to starting point, rotation and scaling. [04]

6B. Explain with an example the following boundary representations:
(i) Signature (ii) Minimum perimeter polygon approximation [02]

6C. Write short notes on the following:
(i) LoG filter (ii) Mask mode radiography [02]

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