Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

(Constituent Institute of Manipal University)

SIXTH SEMESTER B.E DEGREE END SEMESTER EXAM-MAY/JUNE 2011

SUBJECT: ELECTIVE I – DIGITAL IMAGE ANALYSIS

(REVISED CREDIT SYSTEM)

TIME: 3 HOURS MAX. MARKS: 50

INSTRUCTIONS TO CANDIDATES

- ANSWER ANY **FIVE** FULL QUESTIONS.
- ANSWER QUESTIONS IN ORDER.

1. A) Discuss the representation of digital images in spatial domain. (2 marks)
   B) What are adjacency and connectivity of pixels in a digital image? Illustrate connected components in a binary image. (4+1 marks)
   C) Give a practical application of image subtraction. (3 marks)

2. A) Discuss the advantage of bit plane slicing. (2 marks)
   B) What is histogram of an image? How is normalized histogram achieved? (1+2 marks)
   C) Depict and explain any two grey level transformation functions for contrast manipulation. (2+3 marks)

3. A) List two common and opposing linear spatial filtering operations. Explain in what way are they common and opposing? (1+2=3 marks)
   B) What is high boost filtering? How is it related to unsharp masking? (2+1 marks)
   C) What is the application of first order derivative (the gradient operator) in image processing? How is it different from second order derivative operator? (2+2 marks)

4. A) How do you relate the frequency components and spatial features in an image? (2 marks)
   B) Depict filtering technique in frequency domain. (2 marks)
   C) Discuss any two filters each for smoothing and sharpening images in the Fourier domain. (3+3 marks)

5. A) List two noise models. Illustrate their probability density functions. (1+2 marks)
   B) How can eccentricity be used as a boundary descriptor? (2 marks)
   C) What is the significance of convex hull in representing regions of images? (2 marks)
   D) Illustrate and discuss the advantage of topological descriptors. (3 marks)

6. A) How is zero-crossing property useful in edge detection? (2 marks)
   B) Discuss an algorithm to obtain a threshold value in basic thresholding technique for image segmentation. (2 marks)
   C) Suggest a method by which region filling is achieved in binary images. Explain the method by illustration. (4 marks)
   D) What is the role of structuring element in morphological image processing? (2 marks)

ඹඹඹඹඹඹඹ