FACULTY OF ENGINEERING
B.E. 4/4 (CSE) I Semester (Main) Examination, December 2011
IMAGE PROCESSING (Elective – I)

Time: 3 Hours]   [Max. Marks: 75

Note : Answer **all** questions from Part **A**. Answer **any five** questions from Part **B**.

PART – A   (25 Marks)

1. Calculate the memory requirements of an image of resolution 600 × 800 pixels using 256 gray scale levels.

2. What is the role of a digitizer in an image processing system ?

3. Draw the frequency spectrum of a function

   $f(t) = A \ldots {}^{-\omega}\!\!/_2 \le t \le {}^{\omega}\!\!/_2$
   = 0 elsewhere and explain its significance.

4. Explain what do you understand by sampling and quantization of a digital image.

5. Explain the use of a second derivative for the purpose of image sharpening.

6. Explain briefly the three fundamental steps-image smoothing for noise reduction, detection of edge points and edge localization-performed in edge detection.

7. Explain the three types of redundancies -coding redundancy, spatial and temporal redundancy and irrelevant information-that can be identified in 2D arrays.

8. Explain briefly the principles behind any one compression algorithm.

9. Draw some important probability density functions of noise in images and briefly explain them.

10. What do you understand by inverse filtering ? Briefly explain.

PART – B   (5×10=50 Marks)

11. Write a detailed essay on the structure of a human eye, image formation in the eye and brightness adaptation and discrimination.   **10**

12. Write detailed notes on image sharpening using two frequency domain filters.   **10**

13. a) Distinguish between global histogram equalization and local histogram equalization and their utility.

   b) What do you understand by thresholding ?

   (7+3)

14. a) Explain the basic model of a image compression system with a block diagram.

   b) Explain LZW coding with a suitable example.

   (5+5)

15. Write detailed notes on using recursive filtering as a method of image restoration.

   10

16. a) Describe a global thresholding technique for image segmentation.

   b) Write details about sampling of an image and quantization of the data. Describe the problems involved in the size of data.

   (5+5)

17. Write short notes on the following :

   (4+3+3)

   a) Edge detection

   b) Compression standards

   c) 2-D discrete Fourier transform.