ROLL NO. _____

Code: CT73 **Subject: DIGITAL IMAGE PROCESSING**

ALCCS – NEW SCHEME

Time: 3 Hours **FEBRUARY 2013** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE:

- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

Q.1 a. What is color model? Explain the concept using RGB model.

b. How does Histogram equalization achieve filtering?

c. Differentiate between splitting and merging used in image segmentation.

d. What is convolution and in what type of filtering it is used?

e. Briefly describe the role of statistical moments as boundary descriptor.

f. Draw block diagram for DCT coding depicting the major steps involved.

g. What is Hit or Miss transformation? **(7×4)**

Q.2 a. What are the fundamental steps involved in digital image processing? How an image is acquired? **(5)**

b. Explain the use of directional smoothing in image processing. **(5)**

c. What is use of image sharpening and how is it achieved? Give an example to explain your answer. **(8)**

Q.3 a. What do you mean by unsharp masking? What steps does this process consist of? What is highboost filtering? **(6)**

b. Explain the thresholding? Write algorithm to compute basic global threshold value. **(6)**

c. What are the different steps of Canny Edge detection algorithm? Briefly describe the way gradient is computed. **(6)**

Q.4 a. What is the use of Discrete Fourier Transform in image processing, particularly in filtering? **(4)**

b. Name the operations used to highlight the high frequency components in an image. Briefly explain the process. **(8)**

c. What is chain code? How this code is used to represent an image? **(6)**

Q.5 a. Two-dimensional intensity arrays suffer from three principal types of data redundancies namely – coding, spatial & temporal, irrelevant information. Briefly describe each. **(6)**

b. Describe the LZW compression method. **(8)**

c. What is lossless and lossy compression? What are the limitations of lossless compression? List four lossless compression techniques used in standard graphics file format. **(4)**

Q.6 a. What are the structuring elements used in morphological processing. Give three structuring elements that are symmetric. **(6)**

b. Write most common morphological operations and explain the concept of close operation. **(6)**

c. Explain the hole filling operation used in morphing images. **(6)**

Q.7 Write short notes on the followings:

(i) Thinning **(6)**
(ii) Line Detection **(6)**
(iii) Bit plane coding **(6)**