ROLL NO. _____

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

ALCCS – NEW SCHEME

Time: 3 Hours **AUGUST 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. Describe the importance of resolution factor in image representation.

b. What is smoothing and how is it performed?

c. Write a method used for line detection in an image.

d. What is use of sharpening in image operation and analysis?

e. Briefly describe the use of 'shape number' in image processing.

f. What is image compression? Whether any data is lost when an image is compressed?

g. How does erosion differ from dilation? **(7×4)**

Q.2 a. Explain the application of X-ray imaging in image processing. **(6)**

b. What is color model? Briefly explain the HSI color model. **(6)**

c. Write equation for Walsh transform and list properties of Walsh transform. **(6)**

Q.3 a. What is brightness adaptation and discrimination? Describe the process of image formation in the eye. **(8)**

b. Why the Laplacian is not used in original form for edge detection? Explain the way it is used for edge detection in an image. **(10)**

Q.4 a. Write the formula for convolution of two functions and how this concept is used for filtering in frequency domain? **(8)**

b. Derive formula for first and second statistical moments and write its application in digital image processing. **(10)**

Q.5 a. Explain the concept of Huffman coding with a suitable example. Also explain how does it achieve compression? **(6)**

b. Derive gray level co-occurrence matrix for texture representation in an image. **(6)**

c. Define block transform coding and then explain zonal coding algorithm used for image compression. **(6)**

Q.6 a. Derive the Haar transform formula. **(10)**

b. What is morphing? How the connected components are extracted during morphological processing. **(8)**

Q.7 Write short notes on the followings:

(i) Quantization **(6)**
(ii) Highboost filtering **(6)**
(iii) JPEG standard **(6)**