Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 73412

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Seventh Semester

Electronics and Communication Engineering

EC 2029/EC 708/10144 ECE 41 — DIGITAL IMAGE PROCESSING

(Common to Electronics and Instrumentation Engineering)

(Regulations 2008/2010)

(Also Common to PTEC2029 – Digital Image Processing for B.E. (Part-Time) Seventh Semester — ECE – Regulations 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is Dithering?

2. Justify KL transform is an optimal transform.

3. What is directional smoothing?

4. How color image sharpening is performed?

5. Draw the model of image degradation/restoration process.

6. What is Lagrange multiplier?

7. Give the properties of the second derivative around an edge.

8. What do you mean by dynamic or adaptive threshold?

9. What is meant by coding redundancy?

10. How sub image size selection affects transform coding?

PART B — (5 × 16 = 80 marks)

11. (a) Derive 2D sampling theorem and state the condition for perfect reconstruction. (16)

Or

(b) (i) Discuss about

(1) Spatial and gray level resolution (4)

(2) Zooming and shrinking of digital images. (4)

(ii) Explain about RGB and HSI models. (8)

12. (a) (i) Apply Histogram equalization for the following 5 bit input image. Explain what type of image is equalized (10)

22	22	22	18	16
15	15	17	17	17
15	15	19	15	17
16	17	30	30	30
20	18	17	30	30

(5 × 5) matrix

(ii) Explain how noise smoothening is obtained with image averaging. (6)

Or

(b) (i) Write the expression for

(1) Geometric mean filter

(2) Harmonic mean filter (6)

(3) Contrahormonic mean filter.

(ii) Discuss the concept behind homomorphic filter in image enhancement. (10)

13. (a) Explain the concept of geometric transformation for image restoration. (16)

Or

(b) How image restoration can be obtained with weiner filtering? Explain. (16)

14. (a) (i) How do you link edge pixels through Hough transform? (8)

(ii) Explain how region splitting and merging technique is carried out for image segmentation. (8)

Or

(b) Describe Watershed segmentation algorithm. (16)

15. (a) Write short notes on :

(i) Arithmetic coding (8)

(ii) Vector quantization. (8)

Or

(b) Explain in detail the standard JPEG. (16)