Code: 15A10801 **R15**

B.Tech IV Year II Semester (R15) Regular Examinations April 2019

DIGITAL IMAGE PROCESSING

(Electronics & Instrumentation Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) List out the various types of adjacency and its significance.

(b) Draw the basic sensor arrangement and define how to transform illumination energy into digital images.

(c) State the periodicity property of 2-D-DFT.

(d) Write any two applications of hotelling transforms.

(e) What is histogram? How to equalize the histogram?

(f) State any two differences between image smoothing and image sharpening.

(g) Mention the disadvantage of inverse filtering.

(h) Define edge linking with an example.

(i) What is bit plane coding and what are its advantages?

(j) List out the various image compression standards.

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

2 Elaborate on sampling and quantization of an image in brief.

OR

3 With suitable example, explain the spatial operations on an image and the geometric spatial transformation of an image.

UNIT – II

4 Prove that both 2-D continuous and discrete Fourier transforms are linear operations.

OR

5 Consider an image form of size 2 X 2 and find the 2-D DCT of an image and verify the output after inverse DCT.

$f(m,n) = \begin{Bmatrix} 10 & 5 \\ 5 & 10 \end{Bmatrix}$

UNIT – III

6 Explain any four spatial operations performed on images for enhancement.

OR

7 Elaborate on different histogram techniques used to modify an image with a suitable example.

UNIT – IV

8 Explain the model of image degradation/restoration process and the restoration process using constrained least square error filter.

OR

9 With suitable example, elaborate on the threshold based segmentation methods.

UNIT – V

10 Consider certain images which are represented as (a, b, c, d, e, f) whose probabilities are {0.1, 0.4, 0.06, 0.1, 0.04, 0.3} using Huffman coding. Find its efficiency, redundancy and length of the code.

OR

11 State the advantages of transform coding and explain with suitable block diagram.