Code: 13A04704 **R13**

B.Tech IV Year II Semester (R13) Regular & Supplementary Examinations April 2018

DIGITAL IMAGE PROCESSING

(Electronics and 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) Define quantization.
(b) List the components of digital image processing systems.
(c) What are the types of noise models?
(d) Give the expression for 2D N point DFT.
(e) Define histogram.
(f) List out numerous color models.
(g) What are the filters used in image restoration?
(h) Write expression for inverse filtering.
(i) What are the basic steps in JPEG?
(j) What is arithmetic coding?

PART – B

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

UNIT – I

2 Discuss the following mathematical operations on digital images:

(a) Linear versus nonlinear operations.
(b) Array versus matrix operations.

OR

3 Draw and explain the fundamental steps involved in image processing.

UNIT – II

4 Define discrete cosine transform and explain it properties.

OR

5 Compute the Hadamard transform matrix for N = 4.

UNIT – III

6 Explain various types of filters used in smoothing image in frequency domain enhancement.

OR

7 Elaborate the steps involved in histogram equalization and perform the histogram equalization for the given 3-bit image.

$$f(x,y) = \begin{bmatrix} 1 & 3 & 5 \\ 4 & 4 & 3 \\ 5 & 2 & 2 \end{bmatrix}$$

UNIT – IV

8 Draw and explain the degradation and restoration model with necessary expressions.

OR

9 Explain the process of edge detection in image segmentation.

UNIT – V

10 Explain briefly the classification of redundancy in images.

OR

11 With the help of a block diagram, explain the compression model.

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