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Max. Marks: 70

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

(Electronics and Instrumentation Engineering)

Time: 3 hours

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PART – A

(Compulsory Question)

- 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.

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

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