

Con. 5628-05.

(REVISED COURSE)

PR-7722

(3 Hours)

[Total Marks : 100

- N.B. : (1) Attempt any five questions.
 (2) Figures to the right indicate full marks.
 (3) Assume any suitable data wherever required but justify the same.
1. (a) Explain the elements of digital image processing system 10
 (b) What is fidelity criteria ? How are these used in quantifying the nature and extent of information loss ? 10
 2. (a) Obtain the slant transformation of the image $f(x, y) =$

1	5
6	7

10
 (b) Suppose that a digital image is subjected to histogram equalization. Show that second pass of histogram equalization will produce exactly the same result as first pass. 10
 3. (a) Explain the different types of color models and where they used. Also how to convert colors from RGB-to-HSI and HSI-to-RGB models. 15
 (b) Explain with block diagram basic steps for filtering in frequency domain. 5
 4. (a) What is texture ? Explain in brief three principal approaches used in image processing to describe the texture of region. 10
 (b) Write a short note on Log transformation and Power Law transformation. 10
 5. (a) Explain in detail image compression model. 8
 (b) Obtained the Hotelling transform given four vectors. 12

$$x_1 = (0, 0, 0)^T, \quad x_2 = (1, 0, 0)^T, \quad x_3 = (1, 1, 0)^T \text{ and } x_4 = (1, 0, 1)^T.$$
 6. (a) Given 4×4 image whose gray level, order lexicographically are as follows— 10

$$3120203123101302$$
 Calculate the spatial moments upto second order.
 (b) Differentiate between Lossy compression and Lossless compression. 4
 (c) Write down the mask and usage of following operator— 6
 (i) Sobel (ii) Prewitt (iii) Laplacian.
 7. Write a short note on :— 20
 (a) Basic Adaptive thresholding. (c) DPCM/DCT Encoder.
 (b) Image Averaging. (d) Pseudocolor Image Processing.