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Con. 6111–10.

BE / COM / Sem VII / Rev
DS & IP

(REVISED COURSE)

2-12-10

GT–8844

(3 Hours)

[**Total Marks : 100**

N.B. :
 1) Question No. **1** is compulsory
 2) Attempt any **four** questions out of remaining six questions
 3) Figure to the right indicate full marks.

1. Justify the following statements. (any **four**)   20
   (a) If the kernel of the image transform is separable and symmetric the transform can be explained in matrix form.
   (b) Laplacian is not good edge detector.
   (c) Lossy compression is not suitable for compressing executable files.
   (d) Low pass filter is a smoothing filter.
   (e) Unit step sequence is a power signal.

2. (a) List and prove any four properties of DFT   10
   (b) Find the circular convolution on the given two sequences $x_1(n) = \{1, -1, 2, -4\}$ 05
       $x_2(n) = \{1, 2\}$.
   (c) Compute the Hadamard of the image shown   05

2	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

3. (a) Give the classification of noise in images. Compare restoration and enhancement.   10
   (b) Three column vectors are given below. Show that they are orthogonal. Also generate all possible patterns.   10
       $x_1 = [1\ 1\ 1]$ $x_2 = [-2\ 1\ 1]$ $x_3 = [0\ -1\ 1]$.

4. (a) Equalize the given Histogram. What happens when we equalize it twice? Justify 10

Grey level	0	1	2	3
Number of pixels	70	20	7	3

   (b) Explain image segmentation using thresholding. How to apply thresholding to unevenly illuminated images.   10

5. (a) Explain log transformation. How is gamma correction done.   10
   (b) Determine the Z-transform of the following discrete time signals and also specify the region of convergence(ROC).   10
       (i) $x(n) = \{1, 2, 3, 4\}$
                    $\uparrow$
       (ii) $x(n) = \{1, 3, 5, 7\}$
                    $\uparrow$
       (iii) $x(n) = \{1, 2, 3, 4, 5, 6, 7\}$
                    $\uparrow$

6. (a) Find the Huffman code for the following stream of data (28 points). **10**
{1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 6, 7, 7}.

(b) What do you mean by Gaussian noise and why is averaging filter used to eliminate it ? **05**

(c) List down the advantages and disadvantages of Wiener filter. **05**

7. Write shortnotes (any two) **20**
   (a) KL Transform.
   (b) JPEG compression
   (c) Hough Transform
   (d) Classification of signals.