Printed Pages : 3

EIT-081

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 113851

Roll No.

B. Tech.

(SEM. VIII) THEORY EXAMINATION, 2014-15

DIGITAL IMAGE PROCESSING

Time : **3** Hours] [Total Marks : **100**

Note : Attempt all questions.

1. Attempt any FOUR parts of the following : 5×4=20

   a) What is a digital image? Classify the digital images.

   b) Describe different elements of an image processing system.

   c) Perform linear convolution between two matrices :

$$X(m,n)=\begin{bmatrix}1 & 2 & 3\\ 4 & 5 & 6\\ 7 & 8 & 9\end{bmatrix} \text{ and } h(m,n)=[3,4,5]$$

d) Explain the concept of 2D Fourier transform in detail.

e) Compute the linear auto-correlation between the two matrices:

$$X(m,n)=\begin{bmatrix}1 & 1\\ 1 & 1\end{bmatrix} \text{ and } h(m,n)=\begin{bmatrix}1 & 1\\ 1 & 1\end{bmatrix}$$

(f) Compare and contrast highpass and lowpass digital filters.

2. Attempt any TWO parts of the following: 10×2=20

a) What are the different types of image enhancement techniques used in image analysis? Explain any two techniques in detail.

b) Can two different images have the same histogram? Justify your answer with examples.

c) Explain the working of Laplacian of Gaussian Filters.

3. Attempt any TWO parts of the following: 10×2=20

(a) Describe the image restoration techniques in detail.

(b) Write short notes on the following:

(i) Mean filtering

(ii) Median filtering.

(c) Describe different noise models of frequency domain.

4 Attempt any TWO parts of the following: 10×2=20

(a) What is morphological image processing? Explain dilation and erosion in brief with proper examples.

(b) Explain the concept of Convex Hull in image processing.

(c) Explain the following terms:
   (i) Boundary extraction and
   (ii) Region splitting.

5 Write short note on any FOUR of the following : 4×5=20
   (a) Image Registration
   (b) Geometric Transformation
   (c) Stereo Imaging
   (d) Feature Extraction
   (e) Image Compression
   (f) Image Processing Applications.

———————