PVP 14

Code: EC7T2

IV B.Tech - I Semester – Regular Examinations – October - 2017

DIGITAL IMAGE PROCESSING
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22

1.

a) What are the image quality assessment parameters?
b) Define i) Spatial Resolution ii) Unitary transform
c) List out any four properties of 2D Discrete Fourier Transform (DFT).
d) Differentiate Path, connectivity and adjacency with an example.
e) List out the properties of region based segmentation.
f) What are the three types of discontinuity in digital image?
g) List Four reasons, why image compression is important?
h) Give a few applications of morphological operations in the field of image processing.
i) How gray level morphology is differ from binary morphology?
j) Define (i) Hue (ii) Saturation (iii) Contrast (iv) brightness
k) Define Structuring Element.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Describe the functions of elements of digital image processing system with a neat diagram. 8 M

b) Compute 2D DCT Kernel matrix of order N=2 and verify whether it works properly or not with the 2X2 image [3 6; 6 4]. 8 M

3. a) Illustrate the steps in Histogram equalization of the following image. 8 M

$$\begin{pmatrix} 4 & 4 & 4 & 4 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{pmatrix}$$

b) Explain the following filter masks for image enhancement. 8 M

i) Gaussian Low-pass filter ii) Gaussian high pass filter

4. a) Find Code redundancy and code efficiency using Huffman coding scheme for a set of input gray levels with probabilities as given below. 8 M

Gray level	a_1	a_2	a_3	a_4	a_5	a_6
Probability	0.1	0.4	0.06	0.1	0.04	0.3

b) What is predictive coding? Explain lossy predictive coding procedure with suitable example. 8 M

5. a) Briefly explain point detection and Edge detection in Image segmentation. 8 M

b) Describe the region splitting and region merging procedure for image segmentation. 8 M

6. a) Discuss about the different color models in image processing. 8 M

b) Perform the Hit or Miss Transform with the structuring element SE1 and Small window (SE2) on input image as following. 8 M

0	0	0	0	0	0
0	1	0	1	0	0
0	1	1	1	0	1
0	1	0	1	0	0
0	0	0	0	0	0

Input image

1	0		1	1
0	1		1	1

SE 1 SE 2