Printed Pages : 3

EEC-022

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

PAPER ID : 131752

Roll No.

B. Tech.

(SEM. VII) (ODD SEM.) 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 x 4=20)**

(a) Explain the various steps in Digital Image Processing.

(b) What is sampling and quantization?

(c) Discuss any one technique of Gray Level Transformation.

(d) Consider the two image subsets, S_1 and S_2 as shown below. For V = {1}, determine whether these two subsets are

a. 4-adjacent

b. m-adjacent

S_1				S_2			
0	0	0	0	0	0	1	1
0	0	1	0	0	1	0	0
0	0	1	0	1	1	0	0
0	1	1	1	0	0	0	0

(e) Consider the following image segment

q

3	1	2	1
2	2	0	2
1	2	1	1
1	0	1	2

p

For V = {1, 2} compute the shortest 8-path between points p and q.

2 Attempt any **TWO** parts of the following: **(10 x 2=20)**

(a) Discuss DCT (Discrete Cosine Transform) with the help of mathematical expressions. Enumerate the properties of discrete cosine transform.

(b) Why Hadamard Transform is most suitable for digital image processing? Discuss Hadamard Transform with the help of mathematical expression.

(c) What do you mean by image enhancement? What are various image enhancement techniques? Describe Histogram modeling method for image enhancement.

3 Attempt any **TWO** parts of the following: **(10 x 2=20)**

(a) Differentiate between image enhancement and image restoration. Draw the block diagram of image restoration system and explain.

(b) Define and differentiate the inverse and Wiener filter. Discuss the use of Wiener filter in image processing. What do you mean by speckle? Describe a method for speckle reduction.

(c) Prove that dilation and erosion are dual of each other.

4 Attempt any **TWO** parts of the following: **(10 x 2=20)**

(a) Suppose an object in a binary image is represented by the run length coded chain code(c_i, n_i) (0,5) (3,6) (0,6) (1,4) (0,5) (3,9) (2,16) (1,11) where c_i is the code and n_i is its run-length. Calculate (i) Diameter of the circle enclosing and (ii) area of the object.

(b) Write short notes on Inter-frame Coding and Predictive Compression.

(c) What do you mean by registration? Explain in brief the Geometrical transformation.

5 Attempt any **TWO** parts of the following: **(10 x 2=20)**

(a) What do you mean by segmentation? Suppose an image is segmented into two region R_1 & R_2. The priori probability that a pixel belong to region R_1 & R_2 is P_1 and P_2. Probability density functions of intensity in R_1 & R_2 are Gaussian with mean μ_1 and μ_2 and standard deviation σ. Determine the optimum threshold for image segmentation by the gray level thresholding technique.

(b) Write short notes on edge detection and edge linking.

(c) Define any four the following terms in detail

(i) Clustering

(ii) Template matching

(iii) Boundary based Description

(iv) Representation

(v) Derivative operators
