



U.S.N

--	--	--	--	--	--	--	--	--	--

P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belagavi)
Sixth Semester, B.E. - Electronics and Communication Engineering
Semester End Examination; June - 2017
Digital Image Processing

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. Obtain the electronic spectrum according to the energy per photon. 6
 b. Analyze along with necessary expressions, a simple image formation model. 6
 c. Briefly explain distance measures with an example for D_4 distance and D_8 distance. 8
 2 a. With a neat block diagram, explain the components of a general propose image processing system. 8
 b. Explain the image acquisition using a single server along with necessary arrangement. 6
 c. Define and explain the following terms : 6
 (i) 4-adjacency (ii) 8 - adjacency (iii) m-adjacency.

UNIT - II

- 3 a. Obtain the response of some basic gray-level transformation functions used for image enhancement. 8
 b. Briefly explain Image averaging along with relevant expressions. 6
 c. Explain Gray-level and Bit plane slicing along with relevant transformation and arrangement respectively. 6
 4 a. Define Butter-worth low pass filter smoothing and obtain response of filter radial cross sections of orders 1 through 4. 6
 b. With a neat block diagram, explain the basic steps for filtering in the frequency domain. 8
 c. Discuss the operation involving Laplacian in the frequency domain with necessary expressions. 6

UNIT - III

- 5 a. Discuss the following noise models along with expressions and the response curve: 8
 (i) Rayleigh (ii) Gamma (iii) Exponential (iv) Impulse.
 b. Mention the application of max and min filter along with the respective expressions. 6
 c. Define periodic noise reduction notch filter in frequency domain and obtain its transfer function. 6
 6 a. Define and write the expression for the following filters: 6
 (i) Geometric mean (ii) harmonic mean
 Mention one application of each.

Contd....2

- b. Describe the median and adaptive median filtering with necessary equations. 8
- c. Define and obtain transfer function of periodic noise reduction Band reject filter in frequency domain. 6

UNIT - IV

- 7 a. Compare and contrast three edge detection methods. 10
- b. Illustrate segmentation of isolated points in an image with the aid of equations. 10
- 8 a. Discuss the thinning (use Hit-or-miss transform) and thickening operation with a suitable example. 10
- b. Discuss the Laplacian of a 2-D function procedure on second order derivative. 10

UNIT - V

- 9 a. Along with diagrams, explain hue and saturation in the HSI colour model. 8
- b. Discuss pseudo colour coding approach used when several monochrome images are available. 8
- c. Draw the general compression system model. 4
- 10 a. Obtain the expression for converting the colours from RGB to HSI. 8
- b. Explain the block of source encoder and decoder model along with neat block diagram. 6
- c. In brief explain the channel encoding and decoding process. 6

* * * *