



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, M.Tech - Computer Engineering (MCEN)

Semester End Examination; May/June - 2018

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. Define Digital Image. Describe the basic procedure used for generation of ultra sound images. 10
 b. With a neat diagram, describe the fundamental steps in digital image processing. 10
- 2 a. Define Sampling and Quantization. Describe the coordinate convention used for representation of digital images. 10
 b. Describe Euclidian, City-Block and Chess Board distance metrics with examples for each. 10

UNIT - II

- 3 a. Define spatial domain. Explain any two basic grey level transformations. 10
 b. Define Histogram for digital image with grey levels. Describe image subtraction and image averaging method for image enhancement. 10
- 4 a. Define frequency domain. Describe Butterworth and Gaussian low pass filters. 10
 b. With a neat diagram describe Homomorphic filtering approach. 10

UNIT - III

- 5 a. List the two important sources of noise in digital images. Describe any four noises Probability Density Functions (PDF). 10
 b. Describe the adaptive local noise reduction filter and adaptive median filter. 10
- 6 a. Explain the important characteristic features of band pass filters, notch filters and optimum notch filters. 10
 b. With the expressions for error measure and error functions in frequency domain, explain the minimum mean square error filtering. 10

UNIT - IV

- 7 a. Define full color and pseudo color image processing. With a neat diagram, describe the RGB color model. 10
 b. With proper equations, describe the process to convert colors from RGB to HSI and HSI to RGB models. 10
- 8 a. Define Data compression. List and explain three basic Data Redundancies identified in Digital Image compression. 10
 b. With an example, explain the LZW coding for error free compression. 10

UNIT - V

- 9 a. Explain in detail the following Morphological operations :
- i) Dilation
 - ii) Erosion 10
 - iii) Open and Close
 - iv) Hit or Miss
- b. Describe the boundary extraction and region filling morphological algorithms. 10
- 10 a. Describe the techniques for detection of discontinuous with respect to point, line and edges in digital images. 10
- b. List the criteria for partitioning the Region R into n subregion and describe the algorithm for Region growing based on 8-connectivity. 10

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