

Code No: RT41043

**R13**

**Set No. 1**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

**DIGITAL IMAGE PROCESSING**

(Common to Electronics and Computer Engineering, Electronics and Communication Engineering and Electronics and Instrumentation Engineering)

Time: 3 hours

Max. Marks: 70

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any THREE questions from Part-B*

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**PART-A** (22 Marks)

1. a) Explain the function of image sensor. [3]
- b) Differentiate between image enhancement and image restoration. [4]
- c) Write the drawback of inverse filtering. [4]
- d) Write short note on CMYK color model. [4]
- e) Compare orthogonal and biorthogonal wavelets. [3]
- f) Define gradient of an image. [4]

**PART-B** (3x16 = 48 Marks)

2. a) Explain the theory of sampling of an image. [8]
- b) Explain about KL Transform. [8]
3. a) Define histogram equalization. Explain the procedure for histogram equalization. [8]
- b) Define DFT. State and prove the following properties:  
(i) Correlation (ii) Scaling (iii) Periodicity [8]
4. a) Define blur of an image. Explain the different types of blurs. [8]
- b) Prove that median filter is a nonlinear filter with an example. [8]
5. a) Explain about HSI color mode. [8]
- b) Explain about color image segmentation. [8]
6. a) Define compression and explain the general compression system model. [8]
- b) Explain watermarking in Frequency domain. List out various applications of watermarking. [8]
7. a) Explain about erosion operation. [8]
- b) Explain watershed transformation and discuss about its advantages and disadvantages. [8]



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Max. Marks: 70

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any THREE questions from Part-B*

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**PART-A** (22 Marks)

1. a) Write the properties of DST. [3]
- b) Define convolution and explain its use in image processing. [4]
- c) List out different noises in images. [4]
- d) Write the purpose of color model. [4]
- e) Explain the advantage of DWT over DCT. [3]
- f) Define laplacian of Gaussian. [4]

**PART-B** (3x16 = 48 Marks)

2. a) Explain the elements of an image processing system. [8]
- b) Explain about the discrete cosine transform and write its applications. [8]
3. a) Explain about image smoothing using Ideal low pass filter. [8]
- b) Explain about local histogram processing. [8]
4. a) Explain the image restoration with wiener filtering. [8]
- b) Explain parallel projection and fan beam projection based methods for image restoration. [8]
5. a) Explain the operation of color image smoothing and sharpening. [8]
- b) Explain about RGB color model. [8]
6. a) Explain about Huffman coding by taking an example. [8]
- b) What is an Image pyramid? Explain Gaussian and Laplace pyramids. [8]
7. a) Prove that erosion and dilation are dual to each other. [8]
- b) Define image segmentation. Give classification. Explain region based segmentation. [8]



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Time: 3 hours

Max. Marks: 70

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any THREE questions from Part-B*

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**PART-A (22 Marks)**

1. a) Write the applications of KL Transform. [3]
- b) Write the properties of DCT. [4]
- c) Write the drawbacks of wiener filtering. [3]
- d) Write short notes on color slicing. [4]
- e) Derive haar basis for N=4. [4]
- f) Compare canny and laplacian of Gaussian edge operator. [4]

**PART-B (3x16 = 48 Marks)**

2. a) Define an image. List out and explain the various areas of applications of image processing. [8]
- b) Explain the slant transform. Derive the slant transform for N=8. [8]
3. a) Define 2D DFT. Prove the convolution property of 2D DFT. [8]
- b) Explain about intensity transformation functions. [8]
4. a) Explain the process of inverse filtering. [8]
- b) Explain about periodic noise reduction using frequency domain filtering. [8]
5. a) What is a chromacity diagram? Explain CIE chromacity diagram. [8]
- b) Explain about CMY color model. [8]
6. a) What is the need of compression? Explain about vector quantization method. [8]
- b) Explain about directional filter bank. [8]
7. a) What is Hit-or-Miss transformation? Explain. [8]
- b) Discuss about Roberts, Prewitt and Sobel edge detectors. [8]



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**Set No. 4**

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**Time: 3 hours**

**Max. Marks: 70**

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any THREE questions from Part-B*

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**PART-A (22 Marks)**

1. a) Write the applications of SVD. [3]
- b) Define log transformation and write its application. [4]
- c) Explain the advantage of wiener filter over inverse filter. [4]
- d) Write the advantages of color image processing. [4]
- e) Compare different image formats with reference to number of bits and compression. [3]
- f) Explain about point detection in image. [4]

**PART-B (3x16 = 48 Marks)**

2. a) Explain about image acquisition. [8]
- b) Construct Walsh basis for N=4. [8]
3. a) State and prove conjugate symmetry and orthogonality property of 2D DFT. [8]
- b) Explain about histogram specification. [8]
4. a) Define an image restoration. Explain the image restoration model. [8]
- b) Explain the geometric mean filtering. Write the advantages and disadvantages. [8]
5. a) Explain about histogram processing in color images. [8]
- b) Explain about Pseudo color image processing. [8]
6. a) Explain about Run Length coding with an example. [8]
- b) Discuss about sub band coding of 2D signal [8]
7. a) Explain opening and closing operations. [8]
- b) Explain about Hough transform. [8]

