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Set No. 1

### Code No: **RT41043**

# 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 \*\*\*\*\*

# PART-A (22 Marks)

1.	<ul> <li>a)</li> <li>b)</li> <li>c)</li> <li>d)</li> <li>e)</li> <li>f)</li> </ul>	Explain the function of image sensor. Differentiate between image enhancement and image restoration. Write the drawback of inverse filtering. Write short note on CMYK color model. Compare orthogonal and biorthogonal wavelets. Define gradient of an image.	[3] [4] [4] [4] [3] [4]
		<b>PART-B</b> $(3x16 = 48 Marks)$	
2.	a) b)	Explain the theory of sampling of an image. Explain about KL Transform.	[8] [8]
3.	a) b)	Define histogram equalization. Explain the procedure for histogram equalization. Define DFT. State and prove the following properties:	[8]
		(i) Correlation (ii) Scaling (iii) Periodicity	[8]
4.	a) b)	Define blur of an image. Explain the different types of blurs. Prove that median filter is a nonlinear filter with an example.	[8] [8]
5.	a) b)	Explain about HSI color mode. Explain about color image segmentation.	[8] [8]
6.	a) b)	Define compression and explain the general compression system model. Explain watermarking in Frequency domain. List out various applications of	[8]
		watermarking.	[8]
7.	a) b)	Explain about erosion operation. Explain watershed transformation and discuss about its advantages and	[8]
	,	disadvantages.	[8]

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Set No. 2

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**FO** 

Question paper consists of Part-A and Part-B Answer ALL sub questions from Part-A Answer any THREE questions from Part-B \*\*\*\*\*

## 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]
	D)	befine image segmentation. Give classification. Explain region based segmentation.	[8]

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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]

# <u>**PART-B**</u> (3x16 = 48 Marks)

2.	a)	Define an image. List out and explain the various areas of applications of image	101
	• 、	processing.	[8]
	b)	Explain the slant transform. Derive the slant transform for $N=8$ .	[8]
3	a)	Define 2D DET Prove the convolution property of 2D DET	F <b>Q</b> 1
5.	$\frac{a}{1}$	E li l tit i to i to fonditoli property of 2D DF1.	[0]
	D)	Explain about intensity transformation functions.	[8]
Λ	a)	Explain the process of inverse filtering	[8]
4.	a)		[0]
	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]
	0)		[0]
6.	a)	What is the need of compression? Explain about vector quantization method.	[8]
	b)	Explain about directional filter bank	[8]
	0)		[0]
7.	a)	What is Hit-or-Miss transformation? Explain.	[8]
	b)	Discuss about Roberts. Prewitt and Sobel edge detectors.	[8]
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#### Question paper consists of Part-A and Part-B Answer ALL sub questions from Part-A Answer any THREE questions from Part-B \*\*\*\*\*

# 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]
		<b>PART–B</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 orthoganality property of 2D DFT.	[8]
	b)	Explain about histogram specification.	[8]
4		Define an image restantion Explain the image restantion model	г <b>о</b> 1
4.	a)	Define an image restoration. Explain the image restoration model.	[0]
	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		Evaluin energing and closing energings	гот
1.	a)	Explain opening and closing operations.	[0]
	b)	Explain about Hough transform.	[8]

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