

Q.6	Attempt any two:					
i.	Explain the differences between lossy and lossless image compression schemes with examples.	5	3	2	5	2
ii.	What is vector quantization in image compression? How does it reduce data redundancy?	5	2	2	5	2
iii.	Explain how Huffman coding works as a compression method and provide an example of its application in image compression.	5	3	2	5	2

Total No. of Questions: 6

Total No. of Printed Pages:4

Enrollment No.....



Faculty of Engineering
End Sem Examination Dec 2024
CS3EA14 Digital Image Processing

Programme: B.Tech.

Branch/Specialisation: CSE All

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

		Marks	BL	PO	CO	PSO
Q.1	i. Which of the following is NOT a fundamental step in digital image processing?	1	1	1	1,3	1
	(a) Image acquisition					
	(b) Image enhancement					
	(c) Image manipulation					
	(d) Image compression					
	ii. What is the function of the lens in the human eye?	1	1	1	1	1
	(a) To control the amount of light entering the eye					
	(b) To capture color information					
	(c) To focus light onto the retina					
	(d) To transmit electrical signals to the brain					
	iii. The Discrete Fourier Transform (DFT) is primarily used in image processing to:	1	2	2	1	1
	(a) Compress images					
	(b) Represent images in the frequency domain					
	(c) Convert images to grayscale					
	(d) Smooth images					
	iv. Which type of digital image is typically composed of only two values, often representing black and white?	1	2	2	1	1
	(a) RGB image					
	(b) Grayscale image					
	(c) Binary image					
	(d) Indexed image					

[2]

v.	Which of the following is a smoothing spatial filter?	1	2	3	1	1
	(a) Sobel filter					
	(b) Median filter					
	(c) Laplacian filter					
	(d) Prewitt filter					
vi.	The water shade algorithm is mainly used for-	1	2	3	1	1
	(a) Image smoothing					
	(b) Image segmentation					
	(c) Edge detection					
	(d) Noise reduction					
vii.	What is the main purpose of the chromaticity diagram?	1	1	4	1	1
	(a) To represent brightness levels					
	(b) To map color hues and saturation					
	(c) To adjust image contrast					
	(d) To display color edges					
viii.	Which color model is mainly used for printing purposes?	1	1	4	1	1
	(a) RGB					
	(b) YIQ					
	(c) CMY					
	(d) HSI					
ix.	In image compression, what is the primary purpose of prediction-based compression schemes?	1	2	5	1	1
	(a) To detect edges					
	(b) To reduce file size by estimating pixel values based on neighboring pixels					
	(c) To enhance contrast					
	(d) To increase color depth					
x.	Vector quantization in image compression primarily reduces-	1	2	5	1	1
	(a) Temporal redundancy					
	(b) Chromaticity					
	(c) Spatial redundancy					
	(d) Color depth					

[3]

Q.2	i.	Explain the significance of image acquisition in the context of digital image processing.	2	2	1	1	1
	ii.	Describe the structure of the human eye and its importance in visual perception.	3	2	1	1	1
	iii.	Outline and describe the fundamental steps in digital image processing.	5	2	1	1	1
OR	iv.	Elaborate the different components of an image processing system.	5	2	1	1	1
Q.3	i.	Define imaging geometry in the context of digital image processing.	2	2	2	2	2
	ii.	Explain the concept of separable image transforms with an example.	3	2	2	2	1
	iii.	Compare and contrast the slant transform and Karhunen-Loeve transform in terms of applications and efficiency.	5	3	2	2	2
OR	iv.	Describe the role of the Discrete Fourier Transform (DFT) in image analysis.	5	3	2	2	1
Q.4	i.	Briefly explain fuzzy logic in intensity transformations.	3	2	3	3	2
	ii.	Explain how the combination of different spatial filter methods can be used for edge detection and image enhancement.	7	2	3	3	1
OR	iii.	Discuss in detail the process of histogram processing and its significance in image enhancement.	7	3	2	3	2
Q.5	i.	What is a chromaticity diagram? What information does it provide about colors?	4	2	2	4	1
	ii.	Explain the laws of color matching and their role in accurate color representation in digital imaging.	6	2	3	4	2
OR	iii.	Compare and contrast different color models and discuss their respective applications in color image processing.	6	3	3	4	2

Marking Scheme
CS3EA14 Digital Image Processing

Q.1	i)	Ans- c) Image Manipulation	1
	ii)	Ans:- c) To focus light onto the retina	1
	iii)	Ans:- b) Represent images in the frequency domain	1
	iv)	Ans:- c) Binary Image	1
	v)	Ans:- b) Median filter	1
	vi)	Ans:- b) Image segmentation	1
	vii)	Ans:- b) To map color hues and saturation	1
	viii)	Ans:- c) CMY	1
	ix)	Ans:- b) To reduce file size by estimating pixel values based on neighboring pixels	1
	x)	Ans:- c) Spatial redundancy	1

Q.2	i.	Explain the significance of image acquisition in the context of digital image processing	2
	ii.	Describe the structure of the human eye and its importance in visual perception. Diagram-2M Importance-1M	3
	iii.	Outline and describe the fundamental steps in digital image processing. Diagram-2M Steps explanation-3M	5
OR	iv.	Elaborate the different components of an image processing system. Diagram-2M Component-3M	5

Q.3	i.	Define imaging geometry in the context of digital image processing.	2
	ii.	Explain the concept of separable image transforms with an example. Image transformation-2M Example-1M	3

	iii.	Compare and contrast the Slant Transform and Karhunen-Loeve Transform in terms of applications and efficiency. 1 mark each point	5
OR	iv.	Describe the role of DET in image analysis	5

Q.4	i.	Briefly explain fuzzy logic in intensity transformation.	3
	ii.	Image enhancement – 1 mark Minimum 3 methods – 2 mark each	7
OR	iii.	Histogram processing- 4 mark Significance in image enhancement-3 mark	7
Q.5	i.	What is a chromaticity diagram- 2 mark information does it provide about colours – 2 mark	4
	ii.	Explain the laws of color matching – 4 mark accurate color representation in digital imaging role – 2 mark	6
OR	iii.	Compare and contrast different color models and discuss their respective applications in color image processing. 2 mark for each colour model	6

Q.6	Attempt any two:		
	i.	Explain the differences between lossy and lossless image compression schemes with examples. 1 mark for each difference	5
	ii.	Vector quantization in image compression-2.5 mark reduce data redundancy- 2.5 mark	5
	iii.	Huffman coding works as a compression method- 3 marks example of its application- 2 marks	5
