Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Eighth Semester B.Tech Degree Supplementary Examination October 2023 (2019 Scheme)

Course Code: CST438

Course Name: IMAGE PROCESSING TECHNIQUE

Max. Marks: 100 **Duration: 3 Hours**

PART A

Answer all questions, each carries 3 marks. Marks

1	Explain any 3-interpolation technique	(3)
2	Given an image representation model and describe how the representation can changes in different types of images.	(3)
3	What is the need for image transform	(3)
4	Compute Hadamard transform of the image $\begin{bmatrix} 3 & 2 \\ 4 & 3 \end{bmatrix}$	(3)
5	Explain about Clipping and Thresholding.	(3)
6	What is the effect of Homomorphic Filtering while enhancing an image?	(3)
7	Explain the significance of adaptive thresholding compared to global thresholding.	(3)
8	Specify the significance of the Zero crossing detector.	(3)
9	Explain Closing and Opening morphological operations with examples.	(3)
10	Define boundary. Explain how boundary is used in representing images.	(3)

PART B

Answer any one full question from each module, each carries 14 marks.

Module I

11	a)	Explain simple image formation with the help of a neat diagram.	(8)
	b)	Explain the types of arithmetic and logical operators in image processing.	(6)
		OR	
12	a)	Explain in detail different image file format.	(6)
	b)	Explain colour fundamentals in image.	(8)

Module II

13 a) Derive 4 order DFT transform coefficient derivation. (5)

b) Determine whether the given matrix is unitary or not (9)

$$A=\frac{1}{\sqrt{2}}\begin{bmatrix}1 & 1\\ -1 & 1\end{bmatrix}$$

OR

14 a) State the advantages of Discrete Cosine Transform over Discrete Fourier Transform. (5)

b) Compute the inverse 2D DFT of the transform coefficients F(k,l) given below. (9)

$$f(k,l)=\begin{bmatrix}64 & 0 & 0 & 0\\ 0 & 0 & 0 & 0\\ 0 & 0 & 0 & 0\\ 0 & 0 & 0 & 0\end{bmatrix}$$

Module III

15 a) Explain the following point operations: (i) Bit Extraction. (ii). Intensity Level Slicing. (iii). Range Compression. (9)

b) What are the steps to be followed for filtering in the frequency domain? (5)

OR

16 a) Explain the following image enhancement techniques in Frequency domain (8)

i) Gaussian High pass filter

ii) Butterworth high pass filter

b) Explain spatial averaging and spatial low pass filtering. (6)

Module IV

17 a) Define the process of image restoration. Explain any 4 important noise probability functions (9)

b) Explain region-based segmentation. (5)

OR

18 a) Discuss the importance of adaptive filters in image restoration system. Highlight the working of adaptive median filters. (8)

b) Explain region growing and region splitting and merging techniques. (6)

Module V

19 a) Explain the following (i). Polygon approximation approaches. (ii) Boundary Following. (8)

	b)	Explain and illustrate Hit or miss transform morphological algorithm with an example.	(6)

OR

20	a)	Elucidate the use of chain codes to represent the boundary in an image.	(8)
	b)	Explain opening and closing operations with example.	(6)

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