Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SEVENTH SEMESTER B.TECH (S) EXAMINATION, MAY 2019

Course Code: CS463

Course Name: DIGITAL IMAGE PROCESSING

Max. Marks: 100   Duration: 3 Hours

PART A
Answer all questions, each carries 4 marks.
Marks

1	Define the terms: i) digital image and ii) digital image processing. What are the various types of images?	(4)
2	Describe the various types of connectivity between pixels. Give examples.	(4)
3	List any two properties of unitary transform.	(4)
4	What is the significance of image enhancement? Explain how Log Transformation helps in image enhancement.	(4)
5	Describe about contrast stretching in spatial domain.	(4)
6	Explain how sharpening can be done in the frequency domain using Gaussian high pass filter?	(4)
7	Explain the method of image segmentation using multilevel thresholding.	(4)
8	Discuss about Region Growing based segmentation.	(4)
9	Differentiate between dilation and erosion.	(4)
10	Define boundary. Explain how boundary is used in representing images.	(4)

PART B
Answer any two full questions, each carries 9 marks.

11	a)	With a neat block diagram, explain the fundamental steps involved in digital image processing.	(9)
12	a)	Define 1D and 2D Walsh Transformation Functions.	(4)
	b)	State and explain the translation and rotation properties of 2-D DFT.	(5)
13	a)	Discuss the basic concepts of sampling and quantization with a neat sketch.	(5)
	b)	Compute 2D DFT of the following image segment.	(4)

$$I = \begin{bmatrix} 2 & 4 \\ 3 & 8 \end{bmatrix}$$

PART C
Answer any two full questions, each carries 9 marks.

14 a) Explain the following methods of image enhancement in spatial domain.   (5)

                i) Power Law Transformation.

                ii) Gray level slicing

    b) Differentiate between linear and nonlinear spatial filter.   (4)

15 a) Explain the various smoothing filters used in frequency domain.   (6)

    b) What are the steps involved in frequency domain filtering?   (3)

16 a) Describe about unsharp masking and highboost filtering in frequency domain.   (4)

    b) What do you mean by histogram of an image? Explain about the histogram of   (5)

        basic image types.

PART D
Answer any two full questions, each carries 12 marks.

17 a) How is a line detected? Give the masks for detecting a line.   (4)

    b) Define thresholding. Briefly explain about local thresholding.   (4)

    c) How is edge detection done using Sobel operator? What are the advantages of   (4)

        Sobel operator over Prewitt operator?

18 a) Explain the polygon approximation approach using minimum perimeter polygon   (12)

        method.

19 a) Discuss the concept of boundary segments.   (6)

    b) Explain isolated point detection based on second derivative.   (6)

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