Reg No.:_____　　　　　　　　Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Regular and Supplementary Examination December 2021 (2015 Scheme)

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	What are the different types of digital images?	(4)
2	What is meant by Moire patterns and aliasing in imaging?.	(4)
3	Define 1D and 2D Discrete Fourier transformation function.	(4)
4	Explain the following gray level transformations:	(4)

　　　　i.　　　Image Negatives.　ii.　　Logarithmic.

5	Define histogram equalization and histogram matching.	(4)
6	Write basic steps for filtering in the frequency domain.	(4)
7	What are the various types of thresholding ?	(4)
8	Write steps for edge detection.	(4)
9	Explain the morphological operations dilation and erosion.	(4)
10	Define Chain Codes.	(4)

PART B

Answer any two full questions, each carries 9 marks.

11　a)　With a neat block diagram, explain the major components of an image　　(9)
　　　　processing system?

12　a)　Apply Walsh Transform on the image　　　　　　　　　　　　　　　(5)

$$f = \begin{matrix} 3 & 2 & 1 & 2 \\ 1 & 3 & 1 & 2 \\ 4 & 1 & 2 & 1 \\ 3 & 2 & 3 & 4 \end{matrix}$$

　　b)　Give general form of 2-D linear transforms.　　　　　　　　　　　　(4)

13　a)　Explain i) Euclidean distance　　　　　　　　　　　　　　　　　　(6)

　　　　　　　ii) D_4 distance

　　　　　　　iii) D_8 distance

　　b)　State separable and identical property of 2D DCT.　　　　　　　　　(3)

PART C

Answer any two full questions, each carries 9 marks.

14	a)	Write short note on 1) Roof edge 2) Ramp edge.	(5)
	b)	What visual effect does histogram equalization have on an image?	(4)
15	a)	What is Gaussian high pass filters. Give two effects of GHPF.	(6)
	b)	Draw the block diagram for homomorphic filtering.	(3)
16	a)	Describe about contrast stretching in spatial domain.	(7)

Apply contrast stretching technique on 3-bit gray level image of size 4*4.

2	1	2	1
4	5	5	6
3	2	1	4
6	2	1	6

	b)	What are the various smoothing frequency domain filters.	(2)

PART D

Answer any two full questions, each carries 12 marks.

17	a)	Write the Sobel masks for detecting diagonal edges.	(6)
	b)	Give the algorithm of global thresholding.	(6)
18	a)	What is the importance of hit and miss transform?	(6)
	b)	Explain the following morphological operations with suitable examples i) Closing ii) Opening	(6)
19	a)	Explain the term	(6)

      i.   Edge normal

      ii.   Edge direction

	b)	Given an image, obtain the 4-chain code and find shape number of it.	(6)

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