Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (R,S) Examinations April 2026 (2019 Scheme)

Course Code: MRT304
Course Name: DIGITAL IMAGE PROCESSING & MACHINE VISION

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

PART A
Answer all questions, each carries 3 marks. Marks

1	Explain the three types of connectivity procedures between pixels.	(3)
2	Elucidate about the principle of image subtraction.	(3)
3	Describe briefly about median filtering.	(3)
4	Explain about the model of image degradation/restoration process.	(3)
5	What is the need for image compression?	(3)
6	Why DCT is used in JPEG image compression standard?	(3)
7	Discuss on the basic types of image representation.	(3)
8	With suitable sketches describe chain codes for boundary representation.	(3)
9	Discuss the basic illumination techniques used in machine vision.	(3)
10	Explain the principle of operation of charge injection devices.	(3)

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

Module I

11	Explain in detail about various basic grey level transformations.	(14)

OR

12	Derive the basis function of Walsh transform for N=4.	(14)

Module II

13	Compute the median value of marked pixels using a 3x3 mask.	(14)

$$\begin{bmatrix} 18 & 22 & 33 & 25 & 32 & 24 \\ 34 & (128) & (24) & (172) & (26) & 23 \\ 22 & 19 & 32 & 31 & 28 & 26 \end{bmatrix}$$

OR

14	Explain Wiener filtering approach for image restoration.	(14)

Module III

15	a)	For given image, compute degree of compression that can be achieved using	(10)

Huffman coding.

$$\begin{bmatrix} 3 & 3 & 3 & 2 \\ 2 & 3 & 3 & 3 \\ 3 & 2 & 2 & 2 \\ 2 & 1 & 1 & 0 \end{bmatrix}$$

b) Illustrate LZW coding with suitable example. (4)

OR

16 a) Discuss in detail about wavelet coding. (10)

b) Differentiate between lossy and lossless compression. (4)

Module IV

17 Explain about Boundary descriptors in detail. (14)

OR

18 Explain the various types of thresholding in an image and discuss its limitations. (14)

Module V

19 Describe the functions of machine vision system with a neat sketch. (14)

OR

20 a) What is feature extraction? Describe the various steps involved in feature extraction. (10)

b) Write short notes on charge priming devices. (4)

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