

Code No: 157BF**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech IV Year I Semester Examinations, July/August - 2023****DIGITAL IMAGE PROCESSING****(Electronics and Communication Engineering)****Time: 3 Hours****Max. Marks: 75****Note:** i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A**(25 Marks)**

- 1.a) How to represent an image? [2]
- b) What is the neighborhood criterion? Write some examples. [3]
- c) What is the main difference between brightness correction and gray-scale transformation? [2]
- d) Why the histogram of a discrete image is not flat after histogram equalization? [3]
- e) What is restoration? [2]
- f) What are the causes of degradation of an image? [3]
- g) Write the masks for Roberts and Sobel operators. [2]
- h) Why smoothing typically blurs image edges? [3]
- i) What are symmetric and asymmetric image compression applications? [2]
- j) What are the four compression modes available in the JPEG compression standard? [3]

PART – B**(50 Marks)**

- 2.a) Discuss the various factors that influence the brightness of a pixel in an image.
- b) Define the following metrics with respect to image:
(i) Euclidean (ii) city block (iii) chessboard [4+6]

OR

- 3.a) Determine the Slant transform for the following image segment:

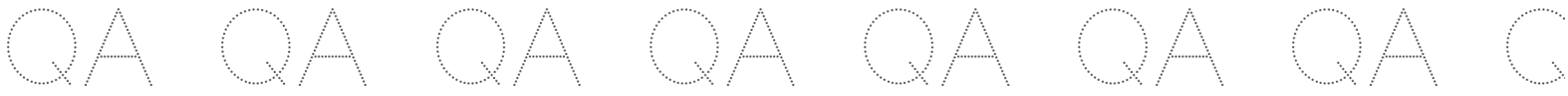
$$\begin{bmatrix} 1 & 2 & 4 & 1 \\ 2 & 1 & 3 & 5 \\ 4 & 2 & 5 & 6 \\ 6 & 5 & 3 & 2 \end{bmatrix}$$

- b) How Haar transform is used in image processing? [6+4]

- 4.a) Determine how much smoothing is necessary to suppress turning points in the histogram due to small-scale image effects.
- b) How point processing is used for image enhancement and explain with examples [5+5]

OR

5. Write a different filter masks used for image smoothing and sharpening in frequency domain? What are advantages of them compared to time domain image processing? [10]



6. How image restoration techniques are classified? Explain and compare them. [10]

OR

7.a) Show that an inverse filtering works well for images that are not corrupted by noise.

b) Explain the principles of image restoration based on Wiener filtration [5+5]

8.a) What are the different methods are there to find the line in an image? Explain them.

b) Explain why LoG is a better edge detector than Laplace edge detector? [5+5]

OR

9.a) How to smoothen the image? Explain any two methods in detail.

b) What are the Hit or Miss transformations? How these operators are used in an image processing? [5+5]

10.a) What is fidelity criterion? How it is useful in Image processing?

b) Derive the relation between redundancy and compression ratio. Explain the significance of compression ration in an image processing. [5+5]

OR

11. Explain lossless and lossy predictive coding for image compression and compare them.[10]

