

Code No: 127CJ

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech IV Year I Semester Examinations, December-2023/ January -2024

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

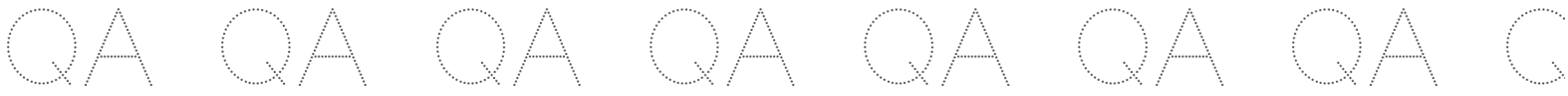
(25 Marks)

- 1.a) Define sampling and quantization. [2]
- b) What is the purpose of image transforms in image processing? [3]
- c) What is Histogram manipulation? [2]
- d) What is the role of high pass filters in image enhancement in the frequency domain? [3]
- e) What role does interactive restoration play in improving image quality? [2]
- f) List the common challenges faced in image restoration. [3]
- g) Define erosion in the context of morphological image processing. [2]
- h) How does image segmentation help in the detection of discontinuities? [3]
- i) Define fidelity criteria in the context of image compression. [2]
- j) Compare image segmentation and compression. [3]

PART – B

(50 Marks)

- 2.a) Explain the process of sampling and quantization in digital images.
 - b) Elaborate on the relationship between pixels in a digital image. [5+5]
- OR**
3. Compare and contrast the properties of the Walsh transform and the Hadamard transform, highlighting their unique characteristics. [10]
- 4.a) Provide an in-depth explanation of low pass filters in the frequency domain.
 - b) Compare the benefits of spatial and frequency domain enhancements. [5+5]
- OR**
- 5.a) Elaborate on Enhancement through point operation.
 - b) Discuss the working principle of a Median filter and its applications in image processing. [5+5]
- 6.a) Describe the degradation model in image restoration.
 - b) Explain the algebraic approach to image restoration. [5+5]
- OR**
7. Provide a step-by-step explanation of how interactive restoration is typically performed and discuss its significance in practical applications. [10]



- 8.a) Elaborate on the various methods of thresholding used in image segmentation.
b) Provide a detailed explanation of dilation in morphological image processing. [5+5]

OR

9. Describe the applications and significance of opening and closing operations in morphological image processing. [10]



10. Explain the following.
a) JPEG 2000 Standards.
b) Redundancies and their removal methods. [5+5]

OR

11. Explain the various image compression models in detail. [10]



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