

Code No: 157BF

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, January/February - 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 sample the image? [2]
- b) Explain three different level processes in image processing. [3]
- c) Differentiate between image enhancement and image restoration. [2]
- d) Explain image negative transformation. [3]
- e) What is restoration? [2]
- f) Define Gaussian noise and its probability density function. [3]
- g) Write about Dilation. [2]
- h) How to detect a line in an image? [3]
- i) Define spatial and temporal redundancy. [2]
- j) Explain the concept of fidelity criteria. [3]

**PART – B****(50 Marks)**

- 2.a) Explain about the basic steps in image Processing.
- b) Explain Discrete Cosine Transform and specify its properties. [5+5]

**OR**

- 3.a) Define the following terms with respect to image:  
i) Distance measure ii) Connectivity iii) Neighborhood
- b) Derive 4×4 Haar transform. [6+4]

- 4.a) What are the techniques used for image smoothing? Explain any one spatial and one frequency techniques used for image smoothing.
- b) State different types of point processing used for image enhancement. [5+5]

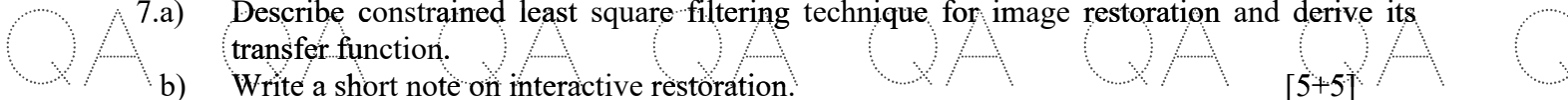
**OR**

- 5.a) Specify the objective of image enhancement techniques.
- b) What is histogram equalization?
- c) Differentiate between linear spatial filter and non-linear spatial filter. [3+4+3]



- 6.a) Describe with mathematical model, both constrained and unconstrained restoration.  
b) Explain the model of image degradation process. [6+4]

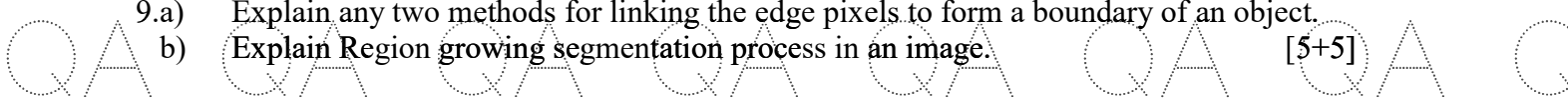
**OR**



- 7.a) Describe constrained least square filtering technique for image restoration and derive its transfer function.  
b) Write a short note on interactive restoration. [5+5]

- 8.a) Explain the Morphological Erosion and Dilation combination process with one example.  
b) Discuss about Hit or Miss Transformation. [5+5]

**OR**

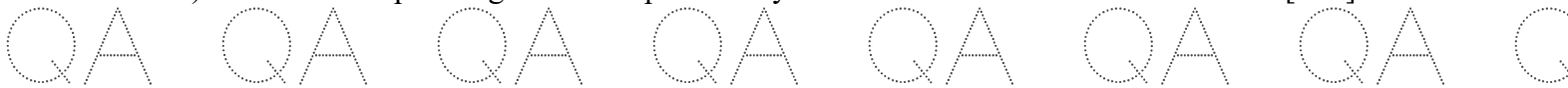


- 9.a) Explain any two methods for linking the edge pixels to form a boundary of an object.  
b) Explain Region growing segmentation process in an image. [5+5]

- 10.a) Discuss the importance of image compression.  
b) Explain about error free compression and lossy compression. [4+6]

**OR**

- 11.a) Write image JPEG 2000 standards.  
b) Draw and explain a general compression system model. [4+6]



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