

Department of Computer Science & Engineering
School of Engineering Sciences & Technology
Jamia Hamdard
Odd Semester Examination 2024

Subject Name: Digital Image Processing
Time: 3 Hrs

Subject Code: BTCSEAI DE41
Maximum Marks: 75 Marks

Section A

Note: All questions are compulsory

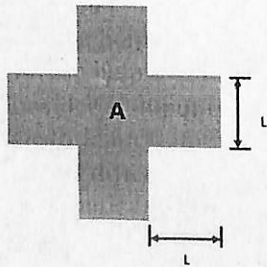
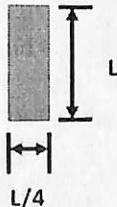
(7 x 5 Marks = 35 Marks)

Q.No	Question	CO	BL
Q.1	Explain with the help of suitable diagram the concept of image sampling and quantization. What is the maximum quantization error in the conversion of image from analog to digital image?	1	3
Q.2	With the help of mathematical relationship, prove that the PDF of histogram equalization is a unit function?	1	3
Q.3	For the given set of pixel values of a scan line, determine the result after performing the first order and second order difference equation? Scan Line: 2,2,2,2,4,5,6,7,7,7,5,3,2,2,5,7,5,5,5,5	2	5
Q.4	What is convolution? How do you perform convolution of an image? Explain the process using mathematical model. Also, discuss different utility of determining the convolution of an image.	2	4
Q.5	What are the different color models used in digital image processing	3	2
Q.6	Consider any two binary images of size 4x4 pixel and perform different binary operations?	3	4
Q.7	What is the difference between different thresholding techniques? Explain with the help of suitable explanation using the histogram based example?	4	2

Section B

Note: Attempt any four questions.

(4 x 10 Marks = 40 Marks)

Q.No	Question	CO	BL
Q.1	With the help of a suitable block diagram, explain different aspects of digital image processing with the help of suitable examples? Also, discuss the significance of each block?	1	2
Q.2	Consider an input image of size 6 x 6 pixel and explain the concept of piece wise linear transformation function?	1	3
Q.3	Discuss different types of sharpening and smoothing filter in frequency domain and show their mathematical relationships?	2	3
Q.4	How are spatial and spectral filtering related to each other? What is the correspondence between the two?	2	4
Q.5	Write a short note on different aspects of color transformations?	3	2
Q.6	For the given structure perform the following morphological processes: a) Dilation b) Erosion c) Opening d) Closing <u>Input image</u> <u>Structuring element:</u>  		

BL- Bloom's Taxonomy Levels (1-Remembering, 2-Understanding, 3-Applying, 4-Analysing, 5-Evaluating, 6-Creating); CO- Course Outcomes

***** End of Paper *****