# Digital Image Processing
# Unit I and II

**Question Bank: Part - B and Part - C**

**PART-B**

1. Describe the Image Sampling and Quantization with suitable graph.

2. Explain how an imaging sensor, line sensor and an array sensor capture images differently in image sensing and acquisition process.

3 .Recall the two-dimensional mathematical preliminaries in the context of:

i. Spatial(time) Domain Transform(frequency) Domain
ii. Kernel
iii. Convolution
iv. Correlation

4. Infer the differences in edge enhancement when using first-order and second-order derivative values in sharpening spatial filters

Image strip

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 5 | 4 | 3 | 2 | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 7 | 7 | 7 | 7 | • | • |

5. Demonstrate the types of Grey-level transformations impacts in the digital image processing.

6. Summarize the effect of sharpening spatial filters on image details in frequency domain

7. Examine the importance of RGB and HSI model

8. Apply histogram equalization techniques and discuss their impacts over an image.

**PART-C**

1. (i) List the steps in Digital Image Processing.

(ii) Summarize the utilization of various components of Digital Image processing

(iii) Compare the relationship between pixels

2. Discuss the following filters in detail.

(i) Smoothing spatial filters

(ii) Sharpening spatial filters

3. Consider the following 4×4 binary image where 1 represents object pixels and 0 represents background pixels: Identify the number of connected components for the pixel positions (2,2) (3,3) (4,2) in the given binary image using:

a)4-Connectivity b)8-Connectivity c) D-Connectivity

1 1 0 0
0 1 1 0
0 0 1 1
1 0 0 1

4. Given 3×3 Image Matrix, Apply the Histogram Equalization formula to determine the new intensity

3 3 5
2 2 6
1 1 7

5. Interpret how the human visual system perceives contrast and brightness in a digital image.

(ii)A noisy grayscale image contains the following 3×3 pixel window:

100 200 150
50 120 90
30 80 110

6.Compute the new intensity value of the center pixel (120**)** by applying the Mean, Median, Maximum and minimum filter and apply weighted averaging filter in the filter mask

$$1/16 \begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 1 \end{bmatrix}$$