# IE 404 – Digital Image Processing

## Dhirubhai Ambani Institute of Information and Communication Technology (DA-IICT)

## Second In-Sem Examination, October 2019

**[Time – 2 Hours]**
**[Total Marks - 50]**

**Instructions:**

- **Answer all question. All questions are self-explanatory and understanding of question is a part of evaluation.**
- **No query regarding questions will entertained during examination by course instructor or invigilator.**

## Section A
## (10 x 2 = 20 Marks)

**1.** What are the advantages of filtering in frequency domain?

**2.** What is global, Local and Dynamic or adaptive threshold?

**3.** Defined Fourier spectrum and Phase angle of 2D-DFT.

**4.** What is Log Transformation and write its use in image processing.

**5.** Define convolution and explain its use in image processing.

**6.** What is contrast stretching. Specify the objective of image enhancement technique.

**7.** Explain spatial filtering. What is median filter?

**8.** Explain the types of gray level transformation used for image enhancement

**9.** Differentiate between linear spatial filter and non-linear spatial filter.

**10.** What is meant by Laplacian filter? Write the mask used for high boost filtering?

## Section B
## (3 x 10 = 30 Marks)

**11.** Perform histogram equalization of an image whose pixel intensity distribution is given in following table. Construct the histogram of the image before and after equalization.

| Gray Level | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Number of Pixels | 790 | 1023 | 850 | 656 | 329 | 245 | 122 | 81 |

**12.** Perform Filter operation on the image shown in below figure by using (a). 3 x 3 smoothing linear filter, and (b). 3 x 3 median filter.

| | | | | | |
|---|---|---|---|---|---|
| 64 | 23 | 33 | 35 | 32 | 24 |
| 34 | 155 | 24 | 0 | 26 | 23 |
| 23 | 21 | 32 | 31 | 28 | 26 |
| 15 | 20 | 108 | 90 | 43 | 20 |

**13.** (a). Explain the processing of Image enhancement in frequency domain. What are different properties of 2D-DFT?

(b). Explain the smoothing of image in frequency domain using

(i). Ideal lowpass filter

(ii). Butterworth low pass filter

(iii). Gaussian low pass filter