SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
M.Sc.Comp Sci - END SEMESTER EXAMINATIONS APRIL - 2024
SEMESTER - II

**23PCSCT2005 – Digital Image Processing**

Total Duration : 2 Hrs. 30 Mins. Total Marks : 60

## Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Classify the following mathematical operations on digital images with relevant expressions and diagrams.
   a) Arithmetic operations b) Linear versus Nonlinear Operations
2. Compare and analyse the different type of redundancy techniques.
3. Apply the run length coding for the following Binary Image represented by a 6X6 matrix.

$$\begin{matrix} 1 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 1 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{matrix}$$

4. Compare the different types of thresholding techniques.
5. Evaluate Histogram and Histogram equalization for a given image (4 x 4) – 4 bit per pixel is given by

$$\begin{matrix} 10 & 12 & 8 & 9 \\ 10 & 12 & 12 & 14 \\ 12 & 13 & 10 & 9 \\ 14 & 12 & 10 & 12 \end{matrix}$$

6. Apply the conversion from the HSI color model to the RGB color model using equations.
7. Illustrate the methods used for detecting discontinuities and identifying edges in digital images.
8. Infer Restoration in the Presence of Noise Only using Spatial Filtering.

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## Section C

I - Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Sketch the fundamental Steps in Digital Image Processing with a neat block diagram.
10. Discuss the different types of Image Restoration techniques.
11. Assess a grayscale image of dimensions 256x256 pixels represented using 8 bits per pixel. Perform the following operations:
    1.Geometrical Transformation
    2.Interpolation
    3.Image Arithmetic
    provide detailed explanations, mathematical formulations, and any assumptions made during the process for each operation.
12. Explain the edge linking techniques to establish the meaningful image segmentation process.

II - Compulsory question $(1 \times 10 = 10$ Marks)

13. Determine the Code word, Average Length (L), Entropy (H(s)), Efficiency of the word "COMMITTEE" using binary Huffman coding.

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