

**MCA**  
**(SEM III) THEORY EXAMINATION 2022-23**  
**DIGITAL IMAGE PROCESSING**

**Time: 3 Hours****Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.

**SECTION A**

**1. Attempt all questions in brief. 2 x 10 = 20**

- a. Define neighbors of a pixel.
- b. Explain spatial domain processing.
- c. What is blind image restoration?
- d. Define morphological image processing.
- e. What is run length Encoding?
- f. What do you mean by image processing?
- g. Give various grey level slicing techniques
- h. Define the degradation phenomena.
- i. Define region growing.
- j. What is Arithmetic Coding?

**SECTION B**

**2. Attempt any three of the following: 10 x 3 = 30**

- a. What is meant by image interpolation? Discuss about various interpolation methods.
- b. Define Histogram of Image. Explain the concept of Histogram Equalization technique for Image enhancement.
- c. Explain about image restoration using inverse filtering. Write the draw backs of this method.
- d. How can you control Over segmentation problem? Explain it.
- e. Explain about Boundary Extraction and Region Filling Algorithm.

**SECTION C**

**3. Attempt any one part of the following: 10 x 1 = 10**

- a. Illustrate homomorphic filtering approach for image enhancement.
- b. What is notch filter? Explain its use in image processing.

**4. Attempt any one part of the following: 10 x 1 = 10**

- a. Explain the basic concepts of sampling and quantization in the generation of digital image.
- b. Explain about image restoration using minimum mean square error filtering.

**5. Attempt any one part of the following: 10 x 1 = 10**

- a. Explain the following two properties of 2D-DFT:  
(i) Convolution (ii) Correlation
- b. Explain image sharpening using Butterworth high pass and Gaussian high pass filters.

**6. Attempt any one part of the following: 10 x 1 = 10**

- a. Explain Huffman coding with an example.
- b. Explain about color edge detection with necessary equations.

**7. Attempt any one part of the following: 10 x 1 = 10**

- a. Explain edge linking using Hough transform.
- b. What are the different image compression standards? Explain.