

CMR ENGINEERING COLLEGE: : HYDERABAD**UGC AUTONOMOUS****IV–B.TECH–I–Semester End Examinations (Regular) - December- 2025****DIGITAL IMAGE PROCESSING****(ECE)****[Time: 3 Hours]****[Max. Marks: 60]****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 10 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A**(10 Marks)**

1. a) What is meant by image sampling? [1M]
- b) Define pixel and give its importance in image representation. [1M]
- c) Define image enhancement. [1M]
- d) Write the relationship between spatial and frequency domain filters. [1M]
- e) What are the main causes of image degradation? [1M]
- f) Mention one practical application of image restoration. [1M]
- g) Write the formula for dilation operation. [1M]
- h) Mention any two methods used for edge detection. [1M]
- i) Mention one advantage of JPEG 2000 over standard JPEG. [1M]
- j) Define image compression. [1M]

PART-B**(50 Marks)**

2. Explain the significance of image transforms in digital image processing. [10M]

OR

3. Derive the mathematical expression for 2-D DCT (Discrete Cosine Transform) and explain its advantages over other transforms in image compression. [10M]

4. Design and explain a procedure for implementing image enhancement using frequency domain filtering. [10M]

OR

5. Explain histogram processing techniques such as histogram equalization and histogram stretching. [10M]

6. Discuss in detail the image restoration using inverse filtering. [10M]

OR

7. Discuss the Constrained Least Square (CLS) restoration technique. [10M]

8. Discuss how dilation and erosion are combined to form morphological opening and closing operations. [10M]

OR

9. Discuss detection of discontinuities, edge detection, and boundary detection techniques with examples. [10M]

10. Explain each stage of JPEG compression: DCT, quantization, and entropy coding. [10M]

OR

11. Discuss in detail about various image compression models. [10M]
