

**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]

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