CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
IV–B.TECH–I–Semester End Examinations (Supply) – April – 2025
IMAGE PROCESSING
(IT)

[Time: 3 Hours]   **[Max. Marks: 70]**

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 20 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   (20 Marks)

1. a) What is quantization, and how does quantization error affect signal quality? [2M]
   b) What role do resolution and color depth play in the quality of a scanned digital image? [2M]
   c) What is histogram equalization in image processing, and why is it used? [2M]
   d) How does image sharpening enhance image details, and which filter is used for sharpening? [2M]
   e) What is the algebraic approach in image restoration? [2M]
   f) What is a Least Mean Square (LMS) filter, and how does it work? [2M]
   g) How does the Canny edge detector perform boundary detection? [2M]
   h) What is thresholding in image segmentation, and how does it work? [2M]
   i) What types of redundancies are typically present in images that can be exploited for compression? [2M]
   j) What is the function of a source encoder in digital communication? [2M]

PART-B   (50 Marks)

2. Examine the role of spatial domain techniques in enhancing digital image quality compared to frequency domain techniques. [10M]

OR

3. How does the Singular Value Decomposition (SVD) help in image compression? [10M]

4. Describe the process of histogram processing and its role in improving image contrast. [10M]

OR

5. Explain the process of image enhancement using the Discrete Fourier Transform (DFT). [10M]

6. Evaluate the effectiveness of constrained least squares restoration when applied to highly degraded images. [10M]

OR

7. Discuss the limitations of inverse filtering in the presence of noise and blur. [10M]

8. Analyze the limitations of edge-based segmentation techniques in noisy images and how they can be mitigated. [10M]

OR

9. What is image segmentation and why is it important in image processing? [10M]

10. How does JPEG compression work, and why is it considered a lossy compression method? [10M]

OR

11. Explain how advanced techniques like fractal compression and wavelet-based compression outperform traditional methods in specific use cases. [10M]

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