

SIXTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2026**(Regular/Improvement/Supplementary)****COMPUTER SCIENCE AND MATHEMATICS (DOUBLE MAIN)****GDCS6B10T: IMAGE PROCESSING****Time: 2 Hours****Maximum Marks: 60****SECTION A: Answer the following questions. Each carries two marks.****(Ceiling 20 marks)**

1. What is an image?
2. What is visual perception, and why is it important in image processing?
3. Why is quantization necessary in digital image processing?
4. Differentiate between the Fourier Transform and the Discrete Fourier Transform.
5. How does the Haar Transform simplify image representation compared to other transforms?
6. Mention the properties of DCT.
7. What is contrast stretching, and how is it used in image enhancement?
8. Define sharpening spatial filter.
9. What is box filter?
10. Draw the block diagram of a model image degradation /restoration process.
11. Mention different image restoration techniques.
12. What is Block Truncation Coding (BTC), and how is it used in image compression?

SECTION B: Answer the following questions. Each carries five marks.**(Ceiling 30 marks)**

13. Mention the advantages and disadvantages of digital image processing.
14. Explain the concept of pixel adjacency. How are adjacent pixels defined in terms of 4-connectivity and 8-connectivity in an image?
15. Define the term image transform. Compare Hadamard and Slant transforms.
16. Explain how histogram equalization enhances the contrast of an image.
17. What is the difference between low-pass and high-pass filters in spatial filtering?
18. Explain the concept of frequency domain filtering in image processing. Discuss the role of the Fourier Transform in converting an image to the frequency domain.
19. What is JPEG compression? Discuss the role of the Discrete Cosine Transform in JPEG compression.

SECTION C: Answer any one question. The question carries ten marks.

20. Compare the different image transforms (Fourier, Wavelet, DCT, KLT, and SVD) based on their applications, advantages, and computational efficiency.
21. What is noise in image processing? Explain different types of noise models with their effects on images.

(1 x 10 = 10 Marks)