Reg No.: Name:

0720MCA285112401

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester MCA (Two Year) Degree (R,S) Examination December 2024

Course Code: 20MCA285

Course Name: DIGITAL IMAGE PROCESSING

Max. Marks: 60 Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks. Marks

1	Discuss the concepts of sampling and quantization in digital image processing. How do changes in sampling frequency affect image quality?	(3)
2	What are binary, grayscale, and colour images? Provide a brief description of each.	(3)
3	Can two distinct images possess identical histograms? Explain your reasoning with examples.	(3)
4	Define image enhancement and explain its significance in digital image processing with an application.	(3)
5	What is the frequency domain representation of an image? Explain its significance in image processing with an example.	(3)
6	What is Wiener filtering, and how is it used in image processing?	(3)
7	Explain the concept of Point Spread Function (PSF) and its role in image restoration.	(3)
8	What is the difference between inverse filtering and Wiener filtering in the context of image restoration? Provide a brief comparison.	(3)
9	Explain the concepts of erosion and dilation in morphological image processing. How do they affect image structure?	(3)
10	Explain point detection technique and line detection technique used in image segmentation process.	(3)

PART B

Answer any one question from each module. Each question carries 6 marks.

Module I

11	Discuss the RGB and HSI colour models, highlighting their differences and applications.	(6)

OR

12 Describe the process of simple image formation and illustrate your explanation with a labelled diagram. (6)

Module II

13 Explain about piece wise linear transformation used in image enhancement with its types. (6)

OR

14 Describe smoothing and sharpening spatial filters, including the types of filters used and their applications. (6)

Module III

15 Explain the properties of the 2D Discrete Fourier Transform (DFT). Discuss its applications in image processing. (6)

OR

16 Discuss the properties of unitary transformations in the context of image processing. (6)

Module IV

17 Discuss the different Image Noise Models, and explain how each model affects the image degradation/restoration process. Provide examples of how restoration techniques can address noise from these models. (6)

OR

18 Compare and contrast lossless and lossy image compression techniques, including their advantages and disadvantages in practical applications. (6)

Module V

19 Describe the differences between Marr-Hildreth and Canny edge detectors. Highlight their advantages and limitations in edge detection. (6)

OR

20 Explain the concept of region-based segmentation, focusing on region growing and region splitting and merging techniques. How do they differ in terms of their approach to segmentation? (6)

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