

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER M.TECH DEGREE EXAMINATION (Regular), JULY 2022**ROBOTICS AND AUTOMATION****(2021 Scheme)****Course Code: 21RA205-A****Course Name: Digital Image Processing and Computer Vision****Max. Marks: 60****Duration: 3 Hours****PART A***(Answer all questions. Each question carries 3 marks)*

1. Explain Walsh transform?
2. Describe the representation of color images.
3. Justify the need for histogram equalization.
4. Illustrate and explain the working of any one spatial filter.
5. Explain lossy compression.
6. Describe non-parametric edge detection.
7. Explain how thresholding is used in edge detection.
8. Describe any one application of Fourier slice theorem.

PART B*(Answer one full question from each module, each question carries 6 marks)***MODULE I**

9. Describe in detail how DFT is performed. (6)

OR

10. Calculate the DFT transform of the 4X4 image {1,2,3,4; 3,4,5,6; 1,3,5,7; 6,5,4,3};
Given the DFT matrix is:

$$\frac{1}{\sqrt{4}} \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & -i & -1 & i \\ 1 & -1 & 1 & -1 \\ 1 & i & -1 & -i \end{bmatrix} \quad (6)$$

MODULE II

11. a) Explain salt and pepper noise with respect to digital image. (2)
b) Describe any one technique for removing salt and pepper noise (4)

OR

12. Perform Histogram equalization on the given image: (6)

| | | | | |
|---|---|---|---|---|
| 0 | 2 | 4 | 4 | 7 |
| 1 | 2 | 2 | 4 | 7 |
| 1 | 1 | 4 | 6 | 6 |
| 1 | 1 | 4 | 6 | 7 |
| 0 | 4 | 4 | 4 | 7 |
| 0 | 2 | 2 | 4 | 7 |

MODULE III

13. Compare and contrast lossy and lossless compression techniques (6)

OR

14. Illustrate the working of JPEG encoder. (6)

MODULE IV

15. a) Explain parametric edge detection (2)
b) Describe how Sobel filter is used for edge detection. (4)

OR

16. a) Describe image restoration for blurred images. (3)
b) Explain a circulant matrix and its use. (3)

MODULE V

17. Describe any two morphological operations used in image processing. (6)

OR

18. Illustrate the steps involved in morphological opening. (6)

MODULE VI

19. Explain Radon transform in detail. (6)

OR

20. Describe Fan beam projection with necessary diagrams. (6)
