D 101220 **(Pages : 2)** **Name.....**

Reg. No.....

FOURTH SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, APRIL 2024

(CBCSS)

Computer Science

CSS 4E 04 A—DIGITAL IMAGE PROCESSING

(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

Section A (Short Answer)

Answer any **four** *questions.*
Each question carries 2 *weightage.*

1. Draw a block diagram depicting image compression model.
2. Give a 3 × 3 mask for detecting diagonal edges.
3. Define spatial convolution.
4. Identify one application each of image subtraction and image averaging.
5. Identify any *two* differences between Walsh-Hadamard transform and Discrete Cosine Transform.
6. Define Sampling. How is it related to the image resolution ?
7. What do you mean by brightness adaptation ?

(4 × 2 = 8 weightage)

Section B (Short Essay)

Answer any **four** *questions.*
Each question carries 3 *weightage.*

8. Explain run length coding with an example.
9. Identify and discuss an algorithm for global thresholding.

Turn over

10. Apply spatial averaging filter to the following image :

120	200	220	98	100
220	195	120	10	85
42	78	80	20	100
100	200	60	40	20

11. Explain smoothening filters in frequency domain.

12. Explain 4, 8 and *m* adjacency with examples.

13. Outline Hotelling transformation.

14. What do you mean by image interpolation ? Outline any *one* approach for image interpolation.

(4 × 3 = 12 weightage)

Section C (Essay)

Answer any **two** *questions.*
Each question carries 5 *weightage.*

15. Differentiate lossy and lossless compression. Explain compression ratio. Analyze the steps in transform coding. Identify and highlight the merits of any two image compression standards.

16. Explain order statistic filters. Outline inverse filtering concept.

17. Define first and second derivatives in image filtering. Discuss the following with the steps and mask(s) used : Laplacian for sharpening, unsharp masking and high boos filtering, the gradient for image sharpening.

18. Describe the basic concepts in Discrete Fourier Transform. Explain the properties of DFT. Outline any one application of DFT.

(2 × 5 = 10 weightage)