# CBCS SCHEME

USN 18CS741

# Seventh Semester B.E. Degree Examination, June/July 2023 Digital Image Processing

Time: 3 hrs. Max. Marks; 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

#### Module-1

- a. Define an image. With block diagram, explain the fundamental steps in digital image processing.
   (12 Marks)
  - b. Explain 4-connectivity, 8-connectivity and m-connectivity with suitable example. (08 Marks)

#### OR

- 2 a. With necessary diagrams, discuss image digitization process. (10 Marks)
  - b. Discuss any four applications of digital image processing. (10 Marks)

# Module-2

- Define histogram equalization. Develop an algorithm to enhance image quality using this method.
  - b. Discuss any three gray level transformation techniques with suitable graph plots. (08 Marks)

#### OR

- 4 a. Explain the importance of Sobel and Prewitt operators in image processing. (08 Marks)
  - b. Discuss Laplacian and Log Edge detectors with suitable mathematical model. (12 Marks)

# Module-3

- 5 a. List the properties of DFT. Explain Discrete Fourier Transform Process along with its computational complexity. (12 Marks)
  - b. Discuss steps in frequency domain based filtering techniques. (68 Marks)

# OR

- 6 a. Discuss the filters used to smooth an image in frequency domain. (10 Marks)
  - b. Explain the significance of tromomorphic filters with a block diagram. (10 Marks)

# Module-4

- 7 a. Define image segmentation. What are the properties of segmentation? (16 Marks)
  - b. Explain Region Growing' and 'Split and Merge' approach used in image segmentation.

(10 Marks)

### OR

8 a Explain how Hough Transform helps in extracting line segments from an image. (10 Marks)

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Define thresholding. Explain Global thresholding technique with an example. (10 Marks)

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# Module-5

- a. Define image compression. Explain general image compression model with a stock diagram.
  - b. Develop an algorithm that encodes data using Huffman coding technique. Illustrate Muffman coding for the following data:

Data	$S_1$	S <sub>2</sub>	$S_3$	S <sub>4</sub>	S <sub>5</sub>	S <sub>6</sub>
Probability	0.1	0.4	0.06	0.1	0.04	0.3

(10 Marks)

# OR

- a. Discuss LZW encoding and decoding technique with an example.
  - b. With a block, discuss transform coding technique.

(08 Marks)

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