

# CBCS SCHEME

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15CS753

**Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020**

## Digital Image Processing

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Explain the fundamental steps in digital image processing. (08 Marks)
- b. Explain some of the basic relationship between pixels in a digital image. (08 Marks)

**OR**

- 2 a. With a help of neat block diagram, explain the components of an image processing system. (08 Marks)
- b. Consider the image segment shown below :

3	1	2	1
			(q)
2	2	0	2
1	2	1	1
1	0	1	2
(p)			

Let  $v = \{0, 1\}$ . Compute the lengths of the shortest 4-path, 8-path and m-path between p and q. (08 Marks)

### Module-2

- 3 a. Perform Histogram Equalization (HE) for the following  $8 \times 8$  image data. (08 Marks)

Gray levels	0	1	2	3	4	5	6	7
Number of pixels	8	10	10	2	12	16	4	2

- b. Explain the smoothing linear filter in spatial domain for digital image. (08 Marks)

**OR**

- 4 Explain the following terms with respect to image enhancement.

- a. Power-law transformation
- b. Image negatives
- c. Histogram sliding
- d. Log transformation.

(16 Marks)

### Module-3

- 5 a. Draw the block diagram of a homomorphic filtering approach for image enhancement and explain it. (10 Marks)
- b. Explain ideal and Gaussian low pass filter for image smoothing. (06 Marks)

**OR**

- 6 a. Define DFT. Explain the properties of Discrete Fourier Transform (DFT). (08 Marks)
- b. Explain image sharpening using frequency domain filters. (08 Marks)

**Module-4**

- 7 a. Explain different region based segmentation methods with example. (10 Marks)  
b. Discuss how line detection algorithm works. (06 Marks)

**OR**

- 8 a. Define image threshold. Explain the thresholding methods for image segmentation. (08 Marks)  
b. Explain the detection of Isolated points in an image. (04 Marks)  
c. Write short notes on Hough transform. (04 Marks)

**Module-5**

- 9 a. Explain coding redundancy and inter pixel redundancy in image compression. (08 Marks)  
b. With neat block diagram, explain image compression models. (08 Marks)

**OR**

- 10 Explain the following terms with respect to image compression :  
a. Huffman coding  
b. LZW coding  
c. Run length coding  
d. Lossless and Lossy compression. (16 Marks)

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