



# CBCS SCHEME

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18EC733

## Seventh Semester B.E. Degree Examination, June/July 2024 Digital Image Processing

Time: 3 hrs.

Max. Marks: 100

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

### Module-1

- 1 a. With the help of a neat figure, explain the main elements of the human eye. (10 Marks)
- b. Consider the image segment shown in Fig.Q1(b). Let  $V = \{1, 2, 3, 4\}$ , compute the lengths of the shortest 4, 8 and m-path between p and q. If a particular path does not exist between the two points, explain why.

(p)

4	1	2	6	8	3	5
8	6	5	1	4	6	3
4	6	5	2	5	8	7
2	3	4	8	3	7	2
4	5	3	2	3	8	7
2	2	5	4	3	2	1 (q)

Fig.Q1(b)

(10 Marks)

OR

- 2 a. Explain  $D_m$  distance with example. (08 Marks)
- b. What is image sampling and quantization? What are the different parameters which will decide the number of storage bits of the image in the discrete domain? (12 Marks)

### Module-2

- 3 a. Write a short note on unsharp masking and high boost filtering. (08 Marks)
- b. Perform histogram equalization for the 8-level  $64 \times 64$  image. The histogram of which is given as:

r	0	1	2	3	4	5	6	7
$n_r$	790	1023	850	656	329	245	122	81

(12 Marks)

OR

- 4 a. Explain some basic gray level transformation used for image enhancement. (10 Marks)
- b. Explain image sharpening in spatial domain using second order Laplacian derivative. (10 Marks)

### Module-3

- 5 a. Briefly explain any four properties of 2D-DFT. (08 Marks)
- b. List and explain any three high pass filters in frequency domain and comment on ringing effect. (12 Marks)

OR

- 6 a. Briefly explain ideal lowpass filtering in frequency domain. (08 Marks)
- b. Explain homomorphic filtering in image processing with neat block diagram. (12 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg.  $42+8=50$ , will be treated as malpractice.

**Module-4**

- 7 a. Comment on various methods used in estimation of degradation model. (10 Marks)  
b. Write a short note on inverse filtering and its drawbacks. (10 Marks)

OR

- 8 a. With neat block diagram explain image degradation and restoration model. (10 Marks)  
b. Explain the need for adaptive median filters and its working. (10 Marks)

**Module-5**

- 9 a. With necessary diagram explain the RGB and CMY colour models. (08 Marks)  
b. Explain and illustrate Erosion and dilation operations used in morphological image processing. (12 Marks)

OR

- 10 a. Explain with necessary diagram the HSI colour model. (08 Marks)  
b. Explain and illustrate opening and closing operations used in morphological image processing. (12 Marks)

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