



CBCS SCHEME

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18EC733

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

- 1 a. Explain fundamental steps in digital image processing with block diagram. (10 Marks)
- b. Describe image acquisition using sensor strips. (10 Marks)

OR

- 2 a. What is Digital Image? Explain components of Digital Image Processing. (10 Marks)
- b. Explain Image Formation Model. (06 Marks)
- c. List the application of Digital Image Processing. (04 Marks)

Module-2

- 3 a. Explain the process of image sampling and quantization. (08 Marks)
- b. Image transmission is done in packets. A packet consists of a start bit, a byte of data, and a stop bit. Answer the following:
 - (i) How many minutes it would take to transmit 512×512 image with 256 gray levels at 300 baud rate?
 - (ii) What would be time at 9600 baud? (04 Marks)
- c. Consider the image segment shown:

4	2	3	ⓐ	q
3	3	1	3	
2	3	2	2	
p	ⓑ	1	2	3

Compute the length of shortest 4, 8 and m paths between p and q where $v = \{1, 2\}$ (08 Marks)

OR

- 4 a. Apply histogram specification on image shown in Fig.Q4(a).

0	1	0	2
2	3	3	2
0	1	0	1
1	3	2	0

Fig.Q4(a)

Having $r_i = z_i = 0, 1, 2, 3$

$\Pr(r_i) = 0.25$ for $i = 0, 1, 2, 3$

$\Pr(z_0) = 0, \Pr(z_1) = 0.5, \Pr(z_2) = 0.5, \Pr(z_3) = 0$

(08 Marks)

- b. Explain the following transformation:

- (i) Image negative
- (ii) Gray level slicing
- (iii) Log transformation

(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-3

- 5 a. Illustrate homomorphic filtering in image enhancement. Derive suitable result. (10 Marks)
b. Explain different smoothing frequency domain filter for image enhancement. (10 Marks)

OR

- 6 a. Explain with block diagram, basic steps for image filtering in frequency domain. (10 Marks)
b. Explain any three sharpening frequency domain filters for image enhancement. (10 Marks)

Module-4

- 7 a. Explain how image degradation estimation done using :
(i) Observation (10 Marks)
(ii) Mathematical modeling (10 Marks)
b. Explain different types of order-statistic filters used in image restoration. (10 Marks)

OR

- 8 a. Discuss different types of mean filters used in image restoration. (10 Marks)
b. Explain adaptive median filter used in image restoration. (10 Marks)

Module-5

- 9 a. Explain the following color models:
(i) RGB color model (10 Marks)
(ii) HSI model (06 Marks)
b. Given HSI = (356.99, 0.534, 0.3453), convert this into RGB model. (06 Marks)
c. Define the following terms:
(i) Hue (04 Marks)
(ii) Saturation
(iii) Intensity
(iv) Chromaticity

OR

- 10 a. Explain opening and closing in image processing. (12 Marks)
b. Draw block diagram of pseudocolor processing and explain it. (08 Marks)
