CBCS SCHEME

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17EC72

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.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. Explain the fundamental steps in digital image processing. **(10 Marks)**

b. Explain various image sensing and acquisition methods. **(10 Marks)**

OR

2 a. Explain the process of image sampling and quantization in digital image processing. **(08 Marks)**

b. Explain the significance of isoference curve in an image processing. **(06 Marks)**

c. Consider the image segment shown in Fig.Q2(c). Let V = {1, 2} and compute the length of the shortest 4–, 8– and m-path between p and q. If particular path does not exist between these two points, explain why?

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

Fig.Q2(c) **(06 Marks)**

Module-2

3 a. Explain with plots, some basic intensity transformation functions. **(10 Marks)**

b. With relevant equations, discuss the discrete Laplacian of two variables and different implementation of Laplacian operator masks. **(10 Marks)**

OR

4 a. Discuss with relevant diagrams, the image smoothing using the frequency domain low pass filters :
i) Ideal
ii) Butterworth
iii) Gaussian **(10 Marks)**

b. Explain the following selective filter :
i) Bandreject and Bandpass Filters
ii) Notch Filters **(10 Marks)**

Module-3

5 a. Discuss how periodic noise can be reduced by frequency domain filtering. **(10 Marks)**

b. Explain the ordered statistic filter's used for image restoration. **(10 Marks)**

OR

6 a. Explain the following methods to estimate the degradation function used in image restoration:
i) Estimation by image observation.
ii) Estimation by experiment **(10 Marks)**

b. Explain the Weiner filtering method of restoring images in presence of noise and blur. **(10 Marks)**

Module-4

7 a. Explain the following color models :
i) RGB ii) HSI **(10 Marks)**

b. Explain Pseudocolor Image Processing. **(10 Marks)**

OR

8 a. Explain the following Morphological operations:
i) Erosion
ii) Dilation
iii) Opening
iv) Closing **(10 Marks)**

b. Explain multi-resolution expansions used in image processing. **(10 Marks)**

Module-5

9 a. Discuss various masks used to compute the gradient of an image. **(10 Marks)**

b. Explain region splitting and merging. **(10 Marks)**

OR

10 a. Explain the following image representation techniques:
i) Signatures
ii) Skeletons **(10 Marks)**

b. Discuss segmentation using morphological watersheds. **(10 Marks)**

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