

CBCS SCHEME



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15EC72

Seventh Semester B.E. Degree Examination, June/July 2019 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. Mention thematic bands in NASA's LANDSAT satellite, its wavelength and uses. (05 Marks)
b. Consider the image segment shown in Table. Q1(b), compute the length of the shortest 4, 8 and m-path between P and Q for (i) $V = \{2, 3, 4\}$. (06 Marks)

	3	4	1	2	0	
	0	1	0	4	②	Q
	2	2	3	1	4	
P	③	0	4	2	1	

- c. Explain the process of image acquisition using single sensor with motion to generate a 2-D image. (05 Marks)

OR

- 2 a. Explain the process of generating a digital image. (05 Marks)
b. Discuss the most commonly used distance measures in image processing. (06 Marks)
c. With the mathematical equation, explain the bicubic interpolation. (05 Marks)

Module-2

- 3 Explain the following intensity transformation functions :
a. Image negatives (05 Marks)
b. Log transformation (05 Marks)
c. Power - law transformation. (06 Marks)

OR

- 4 a. For the given 4×4 image of Table Q4(a) having gray scale between 0 to 9, perform histogram equalization and draw the histogram of image before and after equalization. (08 Marks)

2	3	3	2
4	2	4	3
3	2	3	5
2	4	2	4

Table. Q4(a)

- b. Explain the image smoothing in frequency domain using ideal low pass filter. (08 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.



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Module-3

- 5 a. What are the most commonly used probability density functions in image processing applications and explain it with the help of plot. (08 Marks)
b. With the mathematical equations, discuss the minimum Mean Square Error Filtering. (08 Marks)

OR

- 6 a. Explain the process of restoration in the presence of noise only using spatial filtering for various mean filters. (08 Marks)
b. What are the three principal ways to estimate the degradation function for use in image restoration and explain it? (08 Marks)

Module-4

- 7 a. Explain the process of generating RGB image. (08 Marks)
b. Write the formulas used for converting RGB to HSI. Using these formula find the value of HSI for the given RGB = (0.683, 0.1608, 0.1922). (08 Marks)

OR

- 8 a. Draw the block diagram for converting gray level intensity to color transformation and explain it. (08 Marks)
b. What is image pyramids? Explain the system for creating approximation and prediction residual pyramids. (08 Marks)

Module-5

- 9 a. Explain image gradient and gradient operators for Edge detection. (08 Marks)
b. Discuss the process of region splitting and merging for region based segmentation. (08 Marks)

OR

- 10 a. Write the steps to be followed for developing algorithm for a given binary region R and example it. (08 Marks)
b. Mention the aberrations of Minimum Perimeter Polygons (MPP) algorithm and explain it. (08 Marks)
