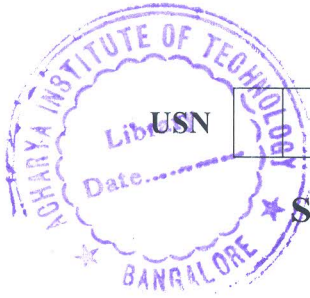


# CBCS SCHEME

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  $4 \times 4$  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.

**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)

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