

# CBCS SCHEME

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15EC72

Seventh Semester B.E. Degree Examination, Jan./Feb. 2021

## Digital Image Processing

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- What is Digital Image Processing? Explain in brief. (02 Marks)
  - With a neat block diagram, describe the fundamental steps used in image processing. (10 Marks)
  - Describe briefly the principle of image formation in the human eye. (04 Marks)

OR

- Define 4-adjacency, 8- adjacency and m- adjacency. (06 Marks)
  - Consider the image segment shown in Fig.Q2(b).
    - Let  $V = \{0, 1, 2\}$  and compute the length of shortest 4, 8 and m – paths between p and q. If a particular path does not exist between these two points explain why?
    - Repeat for  $V = \{2, 3, 4\}$

3	4	1	2	0
0	1	0	4	2
2	2	3	1	4
3	0	4	2	1
1	2	0	3	4

(p)

(q)

Fig.Q2(b)

(10 Marks)

### Module-2

- With the help of neat graphical illustration, explain the following basic intensity transformations with their applications.
    - Image negative
    - Log transformations
    - Power law transformations. (10 Marks)
  - Explain Histogram matching technique. (06 Marks)

OR

- What is homomorphic filtering? With block diagram, explain the homomorphic filtering approach used for image enhancement. (10 Marks)
  - Name and explain any three properties of two dimensional discrete Fourier transform. (06 Marks)

### Module-3

- Define the process of image restoration. Draw and explain image degradation and restoration model. (05 Marks)
  - Discuss adaptive median filter used in image restoration system. (05 Marks)
  - Explain inverse filtering used in image Restoration process. List its limitations. (06 Marks)

OR

- 6 a. Name the commonly used noise probability density functions in digital image processing and explain any four of them. (08 Marks)
- b. Explain Wiener filtering/minimum mean square error used in image processing. (08 Marks)

**Module-4**

- 7 a. Explain color conversion from RGB to HIS and from HIS to RGB. (08 Marks)
- b. What is pseudo color image processing? Explain intensity slicing technique of pseudo color image processing with geometric interpretation diagram. (08 Marks)

OR

- 8 a. With necessary diagram, explain the two band sub band coding and decoding system with its spectrum with its spectrum splitting properties used in multi-resolution analysis. (08 Marks)
- b. With necessary diagrams describe the erosion and Dilatio process of morphological image processing. (08 Marks)

**Module-5**

- 9 a. Describe the canny edge detector algorithm with its basic objectives used in image edge detection process. (08 Marks)
- b. Explain the optimum global thresholding using Otsu's algorithm used in image segmentation process. (08 Marks)

OR

- 10 a. Explain the following representation approaches
- i) Boundary following.
  - ii) Chain codes. (08 Marks)
- b. Explain the following boundary descriptors
- i) Shape number
  - ii) Fourier descriptor. (08 Marks)

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