

# 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

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

OR

- 2 a. Define 4-adjacency, 8-adjacency and m-adjacency. (06 Marks)
- b. Consider the image segment shown in Fig.Q2(b).
  - i) 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?
  - ii) Repeat for  $V = \{2, 3, 4\}$

	3	4	1	2	0
	0	1	0	4	2
	2	2	3	1	4
(p)	3	0	4	2	1
	1	2	0	3	4

Fig.Q2(b)

(10 Marks)

### Module-2

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

OR

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

### Module-3

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



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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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