

# CBCS SCHEME



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17EC72

## Seventh Semester B.E. Degree Examination, Jan./Feb. 2021 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 with block diagram, the fundamental steps used in digital image processing. (10 Marks)  
b. Explain with relevant diagrams, different sensor arrangements. (10 Marks)

OR

- 2 a. Explain the process of sampling and quantization, with relevant diagrams. (10 Marks)  
b. Define following: (i) Spatial and Intensity Resolution (ii) 4-, 8- and m-adjacency (iii) Euclidean distance, city-block distance and chessboard distance (10 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 various noise models with respect to image restoration process. (10 Marks)  
b. Explain the following methods for estimating degradation function: (i) Estimation by image observation (ii) Estimation by experimentation (10 Marks)

OR

- 6 a. Explain the process of restoration of images using Inverse Filtering technique. (10 Marks)  
b. Explain with relevant equations, Minimum Mean Square Error (Wiener) Filtering. (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. Explain Thresholding based segmentation. Discuss: (i) Global Thresholding (ii) Adaptive Thresholding (10 Marks)  
b. Explain segmentation of images using Morphological Watersheds. (10 Marks)

OR

- 10 a. Explain Chain Codes used to represent a boundary. (10 Marks)  
b. Discuss various approaches of boundary description. (10 Marks)

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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.