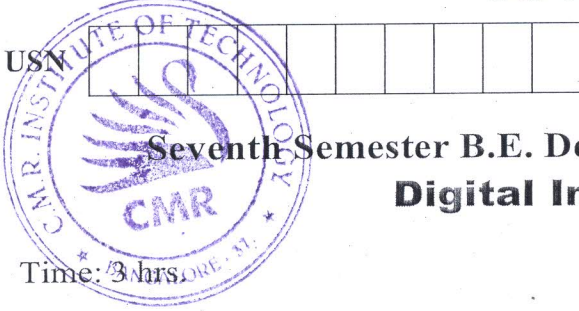# CBCS SCHEME

USN

Seventh Semester B.E. Degree Examination, June/July 2024
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 the following intensity transformation functions:
　　(i)　Image negatives.
　　(ii)　Log transformation.
　　(iii)　Power law transformation. **(12 Marks)**

　b. Explain Bit plane slicing with example. **(08 Marks)**

OR

4　a. With the block diagram, and mathematical equations, explain Homomorphic filtering. **(10 Marks)**

　b. Explain the Butterworth LPF and Gaussian LPF for image smoothing. **(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 RGB color model with diagrams and color equivalent values in binary/HEX. How it can be converted to CMY and HSI models using suitable equations? **(12 Marks)**

　b. Describe the two approaches for pseudo color image processing. **(08 Marks)**

OR

8 a. Explain any six basic morphological algorithms with equations and an example for each.

(12 Marks)

   b. Describe Erosion, Dilation, Opening and Closing operations with equations and an example for each.

(08 Marks)

Module-5

9 a. Explain the following of image segmentation:
   (i) Line detection
   (ii) Edge detection.

(12 Marks)

   b. Explain region Splitting and Merging.

(08 Marks)

OR

10 a. Explain the chain codes used to represent a boundary.

(08 Marks)

   b. Write the Otsu's algorithm used for optimum global thresholding.

(08 Marks)

   c. What is skeletons?

(04 Marks)

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