CBCS SCHEME

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21EC732

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Digital Image Processing

Time: 3 hrs. Max. Marks: 100

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

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-1

1 a. What is Digital Image Processing? Explain the fundamental steps in image processing with neat block diagram. (10 Marks)

b. Explain the components of an Image Processing System. (10 Marks)

OR

2 a. Describe the Image sensing and acquisition process. (10 Marks)

b. Explain 4, 8 and m adjacency with an example. (06 Marks)

c. Discuss Image Sampling and Quantization. (04 Marks)

Module-2

3 a. Define forward and inverse 2D fourier transform in detail. Prove any two properties. (06 Marks)

b. Check whether the matrix $A = \frac{1}{\sqrt{2}}\begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix}$ is unitary or not. (04 Marks)

c. Compute Discrete Cosine Transform for N = 4. (10 Marks)

OR

4 a. Derive the algorithmic steps for Haar Transform. (10 Marks)

b. Explain KL transform with necessary equations. (10 Marks)

Module-3

5 a. Define Histogram. Discuss histogram equalization used in image enhancement. (10 Marks)

b. Perform histogram equalization for the given image.

Gray level	0	1	2	3	4	5	6	7
No. of pixels	790	1023	850	656	329	245	122	81

(10 Marks)

OR

6 a. Discuss the basic intensity transformation functions. (10 Marks)

b. Explain the smoothing filters in the spatial domain. (10 Marks)

Module-4

7 a. Discuss the filters used to sharpen an image in frequency domain. (10 Marks)

b. What is the function of a color model? How the HSI model is converted to RGB model? Explain. (10 Marks)

OR

8 a. What is Pseudocolor Image Processing? Explain intensity slicing in pseudocolor image processing. (10 Marks)

b. Write a short note on Homomorphic Filtering. (10 Marks)

Module-5

9 a. Draw the Image Degradation Model. (04 Marks)

b. Explain the concept of inverse filtering. (06 Marks)

c. Explain the following :
(i) Median filter
(ii) Alpha trimmed mean filter
(iii) Max and min filters
(10 Marks)

OR

10 a. Derive the expression for mean square error using Wiener filter. (10 Marks)

b. Discuss the different types of noise models with their probability density functions. (10 Marks)

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