BE8-R3: DIGITAL IMAGE PROCESSING

NOTE:

1. **Answer question 1 and any FOUR questions from 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) Describe the main features of CCD camera.
b) Distinguish between RGB and HIS color models?
c) Explain Order-Statistics Filter.
d) Explain the term Connectivity and Adjacency with example.
e) Explain, how the Haar transform is useful in Image Processing.
f) Describe the Inter-Pixel Redundancy and explain, how it is useful in image compression.
g) Describe the special features of Document Image Processing as compared to Normal Image Processing

(7x4)

2.

a) Explain the Histogram Equalization technique and Histogram Matching technique, also explain their applications in the field of Digital image processing.
b) Explain the correspondence between spatial and frequency domain filters by taking the example of the high pass filter.

(10+8)

3.

a) If the two functions f(x) and g(x):

$$f(x) = \begin{cases} 1, & 0<x<1 \\ 0 & \text{otherwise} \end{cases}$$

$$g(x) = \begin{cases} ¼ & 0<x<1 \\ 0 & \text{otherwise} \end{cases}$$

.

find the convolution of f(x) and g(x)

b) Explain the Median filter technique and the advantages and disadvantages of Median filter over the Mean/Average filter technique.

(9+9)

4.

a) Discuss the role of the Laplacian operator as an edge detector. What is the major shortcoming of the Laplacian operator?
b) Discuss various menus in colour image smoothing.
c) Discuss Hough transform algorithm for line detection.

(6+6+6)

5.

a) Explain the Opening and Closing in context of the Morphology with the help of the example.
b) Explain Statistical Texture Description.
c) Explain the Document Image Processing.

(6+6+6)

6.

a) Compare the lossy and lossless compression with example.
b) How can we speed up JPEG compression?
c) Explain LZW compression technique.

(4+7+7)

7. Write short notes on any **three** of the following:

a) Remote Switching
b) Image Restoration
c) Colour Texture Description
d) Overview of MPEG-4

(3x6)