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) How is run length coding used in image compression?

b) Explain the operation of 3X3 Laplacian mask.

c) Give a procedure to convert an image in RGB color model into gray scale image with 256 levels.

d) What is the basic difference between image processing and audio signal processing?

e) What do you mean by resolution of an image? Relate resolution with processing time and communication cost.

f) How can be the lines oriented around 45° detected?

g) Compare Huffman coding and arithmetic coding.

(7×4)

2.

a) Explain the concept of Karhunen-Loeve (K-L) transform.

b) Why is the Karhunen-Loeve (K-L) transform useful? Give examples.

(10+8)

3.

a) Why do we require image compression?

b) What are the different classes of compression techniques?

c) What does a typical image coder look like? Explain with block diagram.

d) Discuss JPEG as DCT-based image compression standard.

(2+3+5+8)

4.

a) Give reasons for storing gray scale images using 256 levels.

b) Explain CIE chromaticity coordinates.

c) What do you mean by motion detection? Discuss static background motion detection.

(4+4+10)

5.

a) Why do we perform image processing in frequency domain although images are generally represented in spatial domain?

b) Give a general procedure to implement filtering in frequency domain.

c) Discuss the usefulness of FFT in digital image processing.

d) Discuss different strategies to reduce the execution time for computation of matrix convolutions.

(4+6+4+4)

6.

a) What is the result of applying thresholding to an image? How do we choose thresholding level(s)? Give a specific application of thresholding.

b) What do you mean by registration of an image? Give its applications.

c) Discuss Quadtree Decomposition of an image.

(6+6+6)

7.

a) What is binary morphology?

b) Using appropriate examples, discuss dilation, erosion, opening and closing operations.

c) How can morphological operations be used in boundary extraction.

(3+8+7)