C7-R4: DIGITAL IMAGE PROCESSING & COMPUTER VISION

NOTE:

1. **Answer question 1 and any FOUR from questions 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) Explain Sampling Process and how to reduce Aliasing?

b) Define brightness, hue and saturation.

c) Write the difference between image restoration and image enhancement.

d) What is Huffman coding? Explain.

e) What is edge detection? How do we measure its performance?

f) What is regularisation theory? What are its applications in motion estimation, detection and tracking?

g) Explain about Spatial and Gray – Level Resolution.

(7x4)

2.

a) Explain about the Convolution and Correlation Theorems.

b) Explain about Difference between Filtering in the Spatial and Frequency domains.

c) Explain image degradation/ restoration process with the help of example.

(6+6+6)

3.

a) What is meant by image interpolation? Discuss about various interpolation Methods.

b) Explain various contour models. What are the advantages of using snake contour over other methods?

c) Explain the principle of K-NN based pattern classification.

(6+6+6)

4.

a) Discuss about noise in color images.

b) Why high pass filtering is used to enhance an image? Explain ideal filter and Butterworth filter.

c) Write steps for 4-neighbourhood and 8-neighbourhood region identification algorithm.

(6+6+6)

5.

a) Explain about the Fast Wavelet Transform.

b) Write short notes on Haar Transforms.

(9+9)

6.

a) Write short note on boundary Extraction and Region Filling.

b) Explain Canny edge detector algorithm.

c) What do you understand by Erosion? Explain.

(6+6+6)

7.

a) Explain about morphological hit-or-miss transform.

b) Explain the HSV color model compare with RGB and CMY color model and also discuss the advantage and disadvantage.

c) What are the various ways of motion feature extraction? Explain.

(6+6+6)