CE5-R3: IMAGE PROCESSING AND COMPUTER VISION

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) What is a Wavelet Transform?
b) What are the different types of operations that are generally performed in image processing?
c) What is BLOB (Binary Large OBject) analysis?
d) How can shape of a surface be determined from shading?
e) What do you mean by resolution of an image? Relate the resolution with processing time and communication cost.
f) Describe the linear filtering as a convolution operation.
g) Compare and contrast Huffman coding and arithmetic coding.

(7x4)

2.
a) What do you mean by depth imaging? Discuss three basic principles of depth imaging.
b) What is tomography? Why do we use tomographic methods? Give the basic principle of tomographic methods.
c) What do you mean by motion detection? Discuss static background motion detection.

(6+6+6)

3.
a) What is the use of image compression? What are the different classes of compression techniques?
b) What does a typical image coder look like? Explain with block diagram. Describe Huffman Coding technique.
c) Discuss JPEG as DCT-based image compression standard.

(6+6+6)

4.
a) Give reasons for storing gray scale images using 256 levels.
b) Explain why different neighborhoods are used in neighborhood operations.
c) Give any one procedure to convert a Color image in RGB into grayscale image.
d) What do you mean by "Intensity Measurements"? Where do we use it?
e) When does the technique "shape from shading" fail? Discuss shape from refraction as remedy to it.

(2+4+3+4+5)

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. What are its advantages?

(6+6+6)

7.
a)   What do you mean by grayscale morphology?
b)   What is binary morphology? Discuss primary binary morphology and advanced binary morphology.
c)   Discuss dilation and erosion operations.
d)   Explain opening and closing operations.

(4+4+6+4)