Sl. No.

C7-R4 : DIGITAL 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. (i) What are the components of Image Processing System ?

(ii) What do you mean by Computer Vision ? Give its elements.

(iii) Define 4 neighbourhood and 8 neighbourhood in Image processing.

(iv) What does Stereo imaging system comprise ?

(v) What do you mean by noise in a digital image ? How is noise introduced ?

(vi) What are the differences between restoration and image enhancement ?

(vii) What do you mean by tristimulus values and trichromatic coefficients of a colour ? What are the characteristics generally used to distinguish one colour from other colour ?

(7x4)

2. (a) Describe monochromatic image formation model.

(b) Define the various distance measures for a digital image.

(c) Define orthographic and perspective projection. What are various types of both the projections ?

(6+6+6)

3. (a) Define dilation and erosion.

(b) What do you mean by histogram equalization and histogram matching ? Give the formulation for implementing histogram matching for digital images.

(9+9)

4. (a) Define digital Laplacian. Explain the filter mask used to implement it.

(b) Explain Median, Max and Min filters for digital images and give usefulness of each filter.

(c) Using Huffman coding, find the binary codes for the following data :

Symbol	Probability
X1	0.1
X2	0.4
X3	0.06
X4	0.1
X5	0.04
X6	0.3

(6+6+6)

5. (a) Explain HSI colour model.

(b) How do we convert an image in RGB colour model into the corresponding image in HSI colour model and vice versa ?

(c) Explain motion estimation and optical flow .

(6+6+6)

6. (a) Explain HAAR transform multiresolution analysis.

(b) Explain JPEG standard for image compression. What type of compression is it,justify ?

(c) Give boundary extraction technique using morphologic operations.

(6+6+6)

7. (a) What do you mean by snake in computer vision ? What is general form of energy function for a snake ?

(b) How we can detect edges and boundaries in an image ?

(9+9)

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