Seat No. : _____

DB-118

December-2013

5 Years M.Sc. (CA & IT)

Integrated (K.S.) 5th Year M.Sc.

Image Processing

Time : 3 Hours] **[Max. Marks : 100**

1. Answer **all** : **20**

   (1) Explain the different types of computerized processes on images with proper examples. Also draw the block diagram depicting fundamental steps in Digital Image Processing.

   (2) Briefly explain the characteristics and functions of following :

   (a) Lens

   (b) Iris

   (c) Cornea

   (3) Explain the EM Spectrum. Explain the relationship between frequency, wavelength and energy in terms of EM spectrum.

   (4) Briefly explain the attributes of chromatic and achromatic light. Justify the statement "Sometimes achromatic light may have radiance but luminance is zero".

2. Answer any **four :** **20**

   (1) Write a short note on Image Formation Model by explaining how an image is generated ?

   (2) Explain the changes in quality of image by performing spatial and gray level resolution. Also explain the conclusions based on iso-preference curve.

   (3) Write a short note on Histogram Equalization.

   (4) Write a note on sharpening spatial filters. List down the observations of 1^{st} and 2^{nd} order derivative.

   (5) Answer in short :

   (a) Write the formula of 2-DFT.

   (b) Draw the block diagram representing the steps for filtering in frequency domain.

   (c) What are low pass filters ?

   (d) Define : Fourier Transform.

   (e) What areas of images are depicted by high frequencies ?

3. (A) Explain in detail adaptive median filter alongwith the algorithm. **10**

(B) Answer the following : (any **two**) **10**

(1) Write down the sources and characteristics of Noise. What do you mean by White Noise & Periodic Noise ?

(2) Write the formula for following :

(a) Midpoint Filter

(b) Butterworth Band Reject Filter

(c) Wiener filtering

(d) Alphatrimmed mean filter

(e) Geometric mean filter

(3) Explain Adaptive Local Noise Reduction Filter.

4. Answer **all** : **20**

(1) Write the formula to calculate Hue (H), Saturation (S) & Intensity (I) while converting from RGB to HSI model.

(2) Write a brief note on Intensity Slicing.

(3) Write a short note on Color Transformation.

(4) Answer in short :

(a) What do you mean by Pseudocolor processing ?

(b) What is chromaticity ?

(c) What is four color printing ?

(d) By combining which colors you will get yellow ?

(e) What is the wavelength of color “Red” ?

5. Answer **all** : **20**

(1) Write a short note on Machine Vision.

(2) Define : Data Redundancy. Write the formula to find redundancy & compression ratio. Explain the different cases (n1 = = n2, n2 << n1, n2 >> n1)

(3) Explain Inter pixel and Psycho-visual Redundancy.

(4) Answer in short :

(a) Draw the block diagram of source encoder-decoder model.

(b) List the different Bitmap file formats.

(c) What do you mean by passive remote sensing ?

(d) List some application areas of Remote Sensing.

(e) List application areas of Image Compression.

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