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Reg. No. : .....

Name : .....

Sixth Semester B.Tech. Degree Examination, May 2016
(2008 Scheme)
08.626 : DIGITAL IMAGE PROCESSING (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions :

1. List out the practical limitations in sampling and reconstruction of a digital image.
2. Give the need for transforms in Image processing.
3. Prove the separable property of Fourier transform.
4. Define scotopic and photopic vision.
5. What is unsharp masking ? Give the steps for performing unsharp masking.
6. Define the Image Degradation model. Give the various methods of restoring it.
7. Compare spatial and frequency domain methods.
8. Give the basic iterative algorithm for basic global thresholding.
9. Give the filters for horizontal, diagonal and vertical edge detection.
10. A 512 × 512 image has 16 distinct intensity levels. What is the minimum number of bits required to code the image in a lossless memory ? **(10×4=40 Marks)**

PART – B

Answer **any two** questions from **each** Module.

Module – I

11. Explain the following :
    a) Brightness adaptation
    b) Mach Band Effect
    c) Blind Spot
    d) Simultaneous Contrast.

12. a) Compute the inverse 2D FFT of the transform coefficients for the following matrix

$$F(k, l) = \begin{bmatrix} 64 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

b) State the K.L. transform and its applications.

13. State and prove any two properties of 2-dimensional DFT.

Module – II

14. Apply Histogram Equalization to the following image segment $\begin{bmatrix} 3 & 3 & 3 & 3 & 3 \\ 4 & 3 & 5 & 3 & 4 \\ 4 & 5 & 5 & 3 & 4 \\ 4 & 3 & 5 & 3 & 4 \\ 5 & 5 & 5 & 5 & 5 \end{bmatrix}$.

15. Discuss about Wiener filtering in detail.

16. Explain in detail about homomorphic filtering.

Module – III

17. For the symbols a, b, c, d, e, f the probabilities are p(a) = 0.1, p(b) = 0.4, p(c) = 0.06, p(d) = 0.1, p(e) = 0.04, p(f) = 0.3

a) What is the average length of the code ?

b) Determine the Huffman code efficiency.

18. Explain Edge Detection processing using Gradient and Laplacian operators.

19. The input and structuring elements are shown below. Perform erosion and dilation of the input picture

			1	1	
				1	
	1	1			
	1	1			
		1	1		

Input

0	1	0
0	1	0
0	1	1

Structuring Element

(6×10=60 Marks)