



B.Tech. Degree VII Semester Examination December 2002

IT/CS/EC/EB 705 (A) DIGITAL IMAGE PROCESSING (1999 Admissions)

Time: 3 Hours

Maximum Marks: 100

- I. (a) What is meant by a digital image?
How do you characterize a digital image? (10)
- (b) Explain the basic differences between image enhancement and image restoration. (10)
- OR**
- II. (a) Define 2D Fourier Transform. Explain the separability property of the 2D Fourier Transform. (10)
- (b) What are block matrices? Mention some of their important applications. (10)
- III. (a) State and explain the 2D sampling theorem. (10)
- (b) What is image quantisation? Differentiate between scalar and vector quantisation. (10)
- OR**
- IV. (a) Explain the psychophysical properties of human vision. (12)
- (b) Explain brightness adaptation and contrast sensitivity. (8)
- V. (a) What are unitary transforms? Explain the properties of unitary transforms which make them suitable for image processing applications. (10)
- (b) Define DCT. Explain some of the important properties of a DCT. (10)
- OR**
- VI. (a) Define a Hadamard Transform. Obtain a Hadamard Matrix of order 4. (10)
- (b) Compare the properties of Hadamard and Haar Transform for image processing applications. (10)
- VII. (a) What is an image histogram? Explain how histogram equalization methods can be used for image enhancement. (10)
- (b) How do you obtain image contrast from its histogram? Explain how contrast stretching operations are carried out. (10)
- OR**
- VIII. Explain the various methods in the frequency and spatial domains for performing the following operations on an image:
- (i) Smoothing or blurring
- (ii) Fine detailing or sharpening (20)
- IX. (a) Explain the various building blocks of a computer vision system. (10)
- (b) What are gradient operators? How can they be used for edge detection? (10)
- OR**
- X. (a) Differentiate between image analysis and image processing techniques. (10)
- (b) Explain the various methods of line and spot detection. (10)