B.E. sem 7 (Rev.) Comp. Elective-I – Image Processing. 09/6/08

666 : E-1stHf08

Con. 3499-08. **(REVISED COURSE)** **CO-3406**

(3 Hours) **[Total Marks : 100**

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** from the remaining **six** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume **suitable** data if **necessary**.

1. Justify/Contradict the following statements :— **20**
   (a) Lossy compression of the image makes the image loose smooth information.
   (b) Shape number uniquely describes an object.
   (c) The zeroth (LSB) plane of the bit plane slicing contains high frequency information of the image.
   (d) Image subtraction is used for scene matching and detection.
   (e) Convolution in spatial domain is multiplication in Fourier domain.

2. (a) Explain what is ringing effect. Explain how butterworth filters remove the ringing effect. **8**
   (b) Explain the following geometrical measurement features for shape representation : **12**
   (i) Perimeter (iii) Euler number
   (ii) Holes (iv) Eccentricity.

3. (a) Explain the behaviour of the first order derivative and second order derivative functions at the point, ramp, smooth and step changes of the gray values. **8**
   (b) Explain and derive the successive doubling method used in FFT. Find and compare its computational complexity with DFT. **12**

4. (a) Explain the use of finding connectivity of pixels. Explain the methods to find the connectivity of pixels and the distance between the two pixels. **8**
   (b) Explain Hough transform. Using it, detect the line for the following Image :— **12**

1	0	0	0	0
0	0	1	0	1
0	0	1	0	0
1	0	0	1	0
0	0	1	0	1

5. (a) Explain the different operators used for segmentation of an image. **8**
   (b) Define and perform opening, closing, boundary detection operation on the following image using  as the structuring element :— **12**

	1	1			1	1	
	1	1	1	1	1	1	
	1	1			1	1	

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6. (a) What is the skeleton of an image ? Explain the methods to find the skeleton of an image. **8**

   (b) What are moments ? Why are they used in image processing ? Explain. **12**
   Using moments find the centroid of the following image :—

0	0	0	0	0
0	1	1	1	0
0	1	1	1	0
0	1	1	1	0
0	0	0	0	0

7. (a) Explain DCT and its properties. Find the DCT for the following image :— **10**

2	4	4	2
4	6	8	3
2	8	10	4
3	8	6	2

   (b) Explain JPEG and compress the above image using JPEG. **10**
