



Name : .....  
Roll No. : .....  
Invigilator's Signature : .....

**CS / BCA / SEM-6 / BCAE-601C / 2011**

**2011**

**IMAGE PROCESSING**

*Time Allotted : 3 Hours*

*Full Marks : 70*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**GROUP – A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for the following :  $10 \times 1 = 10$ 
  - i) If maximum possible gray value of image is 31 then number of bits used to represent a pixel is
    - a) 4
    - b) 8
    - c) cannot be determined
    - d) none of these.
  - ii) Larger the gray level variation of the image
    - a) higher the perceived brightness
    - b) higher the perceived contrast
    - c) lower the perceived brightness
    - d) lower the perceived contrast.



iii) The following mask detects

- 1	- 1	- 1
- 1	8	- 1
- 1	- 1	- 1

- a) an isolated point
  - b) a straight line
  - c) centre pixel of an image
  - d) none of these.
- iv) One of the invalid image format is
- a) ppm
  - b) pgm
  - c) rmvb
  - d) bmp.
- v) Information gained by traversing an image counter is called
- a) entropy
  - b) erosion
  - c) convolution
  - d) masking.
- vi) An invalid colour component is
- a) RGB
  - b) YCbCr
  - c) HSV
  - d) BMP.



vii) Identify the image conversion which is not possible

- a) colour to gray
- b) gray to colour
- c) colour to binary
- d) gray to binary.

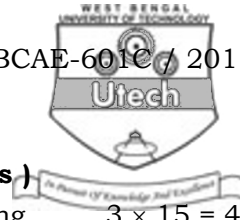
viii) One of the basic differences between edge and boundary is

- a) edge is local concept, boundary is global concept
- b) edge is global concept, boundary is local concept
- c) edge is determined by gray level difference but boundary is not
- d) edge is a subset of boundary and boundary is a superset of edge.

ix) If the minimum and maximum gray level of an image is respectively 5 and 40 then after contrast stretching their values will be respectively

- a) 5 and 255
- b) 0 and 40
- c) 0 and 255
- d) 45 and 35.





**GROUP - C**

**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

7. a) Explain
- i) sampling
  - ii) quantization
  - iii) resolution

Explain how are they related.

- b) Write an algorithm to convert a colour image to a grey level image.  $\{ ( 2 \times 3 ) + 3 \} + 6$

8. a) Define brightness and contrast of an image.
- b) What is contrast stretching ?
- c) Consider a 2X2 gray level image having the following gray values :

8	10
5	20

If the gray level range is [ 0 , 255 ], what will be the gray value of the image after performing contrast stretching ?

- d) Draw histograms of the following image types :
- i) Dark image
  - ii) High contrast image.  $3 + 1 + 6 + 5$



9. a) The normalized frequency or probabilities ( $P_i$ ) of each gray-level of an image having 6 different gray-levels are depicted below :

1	2	3	4	5	6
0.4	0.3	0.1	0.1	0.06	0.04

Use binary Huffman coding to construct the probability tree and assign Huffman code to each gray-level accordingly.

- b) What do you mean by contour tracing and coding ?

10 + 5

10. a) Suppose a binary image contains some black horizontal lines on white background. Write an algorithm to find number of such lines the image has got.

- b) Suppose a binary image of white background contains a black irregular shaped object. Write algorithms to

i) find the centre location of that object

ii) change the background to black and the object to white.

7 + ( 5 + 3 )



11. Write a short notes on any *three* of the following : 3 × 5

- a) Region splitting and merging
- b) Frequency domain filtering
- c) Runlength encoding
- d) Roberts and Sobels operators
- e) Fourier transform.

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