BRAINWARE UNIVERSITY

Term End Examination 2018 - 19

Programme – Bachelor of Science (Honours) in Computer Science

Course Name - Image Processing

Course Code - BCS501B

(Semester – 5)

Time allotted: 3 Hours **Full Marks : 70**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Question) 10 x 1 = 10

1. *Choose the correct alternative from the following*

(i) The histogram of a digital image with gray levels in the range [0, L-1] is represented by a discrete function.

a. $h(r_k)=n_k$ b. $h(r_k)=n/n_k$

c. $h(r_k)=n.n_k$ d. $h(r_k)=1/n_k$

(ii) A filter that passes low frequencies is known as which of the following?

a. High pass filter b. Low pass filter

c. Band pass filter d. None of the above

(iii) In a dark image, the components of histogram are concentrated on which side of the grey scale?

a. High b. Medium

c. Low d. Evenly distributed

(iv) What is the process of moving a filter mask over the image and computing the sum of products at each location called as?

a. Convolution
b. Correlation
c. Linear spatial filtering
d. Non linear spatial filtering

(v) The maximum number of points that can be displayed without overlap on a CRT is called

a. Aspect Ratio
b. Resolution
c. Brightness
d. Pixel

(vi) Reflection of a point about x-axis, followed by a counter clockwise rotation of 90^0 , is equivalent to reflection about the line

a. x= -y
b. x=0
c. x=y
d. x+y=1

(vii) The number of grey values are integer powers of

a. 2
b. 4
c. 3
d. 1

(viii) Digitization of a continuous signal is obtained by

a. Random
b. Vertex
c. Contour
d. Sampling

(ix) What is the tool used in tasks such as zooming?

a. Sampling
b. Interpolation
c. Filters
d. Sharp edges

(x) Oblique projection with an angle of 45^0 to the horizontal plane is called

a. Cabinet projection
b. Isometric Projection
c. Cavalier projection
d. none of these

Group – B

(Short Answer Type Questions) 3 x 5 = 15

Answer any *three* from the following

2. An image of dimension 100 x 100 is stored in 8 bit Grayscale mode. Compute the memory requirement to store this image. 5
3. Discuss about gradient filters. 5
4. Explain gaussian smoothing operation. 5
5. Discuss about correlation operation. 5
6. Explain the term connectivity, path, region and boundary. 5

Group – C

(Long Answer Type Questions) 3 x 15 = 45

Answer any *three* from the following

7. (a) What are the different applications of image segmentation? 5
   (b) Explain different image segmentation techniques. 10
8. (a) Derive 2D transformation matrix for rotation about origin. 5
   (b) A line defined by two end points p1(20,30) and p2(40,50) is rotated anticlockwise about p1 by an angle 90 degree. Compute the new coordinate position of the line in 2 dimensional space. 10
9. (a) Define histogram of an image. 5

(b) Perform histogram equalization of the following image.

4	4	4	4	4
3	4	5	4	3
3	5	5	5	3
3	4	5	4	3
4	4	4	4	4

10

10. (a) What is the need of image compression? 3

(b) Explain how RLE helps in image data compression. 10

(c) What are the disadvantages of lossy image compression? 2

11. (a) Explain region growing and region splitting technique for image segmentation. 5

(b) Explain the properties of Fourier transform. 8

(c) Define salt and pepper noise. 2
