GANPAT UNIVERSITY

B. Tech. Semester V (Information Technology)

Regular Examination November – December 2014

2IT503: Computer Graphics

Time: 3 Hours   Total Marks: 70

Instruction:

1. Figures to the right indicate full marks.
2. Each section should be written in a separate answer book.
3. Be precise and to the point in your answer.

Section I

Que.-1

A Explain Refresh CRT in detail with diagram.   3

B Show that transformation matrix for a reflection about the line $y = x$, is equivalent to a   4
reflection relative to the x axis followed by a counterclockwise rotation of 90°.

C Simulate the points for an ellipse having $r_x = 12$ and $r_y = 15$ with center point $(x_c, y_c) =$ 5
(0,0) using midpoint ellipse algorithm.

OR

Que.-1

A Write application of computer graphics in various fields.   4

B Explain and state the color filling algorithm, which is used to fill an area bordered by   4
several different color regions.

C Show that the reflection of an object about the origin is equivalent to a single rotation   4
about the coordinate origin with $\Theta = 180°$.

Que.-2

A If the triangle A(1,1), B(2,1), C(1,3) is scaled by $s_x = s_y = 2$, find the new coordinates   5
of the triangle and then apply 45° rotation on scaled triangle about origin and find final
position of the triangle.

B Explain Cohen-Sutherland line clipping algorithm and find clipped line (Interior) for the line 6
P1(X_1, Y_1) → (1, 20)   P2(X_2, Y_2) → (40, 38)
Window size: (XWmin, YWmin) = (4, 12) and (XWmax, YWmax) = (35, 40)

OR

Que.-2

A Perform 30° rotation on the rectangle (0,0), (2,0), (2, 2), (0, 2) about centroid of rectangle 5
and find the new coordinates of the rectangle.

B Explain Liang-Barsky line clipping algorithm and find clipped line (Interior) for the line   6
P1(X_1, Y_1) → (8, 8)   P2(X_2, Y_2) → (14, 2)
Window size: (XWmin, YWmin) = (10, 4) and (XWmax, YWmax) = (20, 9)

Que.-3

A Define following terms: 7

1. Aspect Ratio   4. Morphing   7. Viewing-
2. Vertical Retrace   5. Diffuse reflection   transformation
3. Resolution   6. Persistence

B Answer the following: 3

1. The _____ method has been used for displaying color pictures with random-scan
   monitors.
2. We can control the location of a scaled object by choosing a position, called _____.
3. What is the size of frame buffer for the raster system with resolution 512 x 512 to store
   3 bits per pixel?

C Explain loading of frame buffer and derive the equation to calculate the address of pixels   2
(x, y), (x+1, y) and (x+1, y+1).

Que.-4

   A   Explain Point clipping and exterior clipping in detail with diagram.   6

   B   What is halftone? Explain halftone approximations in detail.   6

OR

Que.-4

   A   Explain different techniques used to perform text clipping with diagram.   4

   B   What is Rigid body transformation? Explain any two rigid body transformations in detail.   4

   C   Write the short note on following: 4

       1) Specular Reflection

       2) Ambient Light

Que.-5

   A   Explain RGB color model with diagram.   5

   B   Explain three-dimensional rotation about an axis that is not parallel to any of the coordinate axes.   6

OR

Que.-5

   A   Explain CMY color model with diagram.   5

   B   Explain three dimensional scaling relative to the coordinate origin and derive the matrix for scaling relative to fixed position (x_f, y_f, z_f).   6

Que.-6

   A   Explain two-dimensional viewing-transformation pipeline and draw block diagram.   3

   B   Differentiate: Random scan system Vs. Raster scan system   3

   C   Write short note on following: 6

       1. Visible Line and Surface Identification

       2. Surface Rendering

END OF PAPER