Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/M.TECH(IT)/SEM-3/ITM-302/2012-13

2012

COMPUTER GRAPHICS

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) Which of the following is a type of any projection ?

   a) Perpendicular b) View

   c) Oblique d) Orthogonal.

   ii) In mid-point circle drawing algorithm, if (x, y) is the current pixel position and decision of parameter $P_k > 0$ then next pixel position is

   a) $(x, y+1)$ b) $(x+1, y)$

   c) $(x+1, y+1)$ d) $(x+1, y-1)$.

   iii) Which of the following methods is used as an area filling method ?

   a) Cohen-Sutherland line clipping

   b) Sutherland-Hodegman polygon clipping

   c) Scan line polygon fill

   d) DDA.

iv) The matrix representation of reflection with respect to $y = -x$ line is

a) $\begin{pmatrix} 1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$ b) $\begin{pmatrix} -1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$

c) $\begin{pmatrix} 0 & -1 & 0 \\ -1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}$ d) $\begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}$.

v) Hue of a color is related to its

a) luminance b) saturation

c) incandescence d) wavelength.

vi) Bressenham's algorithm seeks to select the optimum raster location that represents a

a) straight line b) curve line

c) polygon d) none of these.

vii) z-buffer algorithm is used for

a) frame buffer removal b) hidden line removal

c) rendering d) animation.

viii) ..... acts as anode in CRT.

a) The phosphorous coating

b) The glass panel

c) The deflectors

d) None of these.

ix) A line with end point codes as 0100 and 0000 is

a) partially visible b) completely visible

c) trivially visible d) completely invisible.

x) If (x, y, h), $h \neq 0$ is a point in the homogeneous coordinate system then its equivalent in the two-dimensional system is

a) $(x, y, 1)$ b) $(x, y, 0)$

c) $(x/h,\ y/h)$ d) $(x, y, x/h)$.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following $3 \times 5 = 15$

2. What are the differences between raster and vector scan techniques ?

3. How does *Z*-buffer algorithm derives which surfaces are hidden ?

4. Write down Boundary Fill and Flood Fill Algorithms.

5. Explain working principle of a Monochrome Cathode Ray Tube based monitor.

6. What is Vanishing point ?

GROUP – C

(Long Answer Type Questions)

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

7. a) Write down the Bresenham's line drawing algorithm with proper explanation. Explain how Bresenham's line drawing algorithm advantageous over DDA algorithm.

   b) What do you mean by projection ? Explain about different types of projection. 8 + 3 + 4

8. a) Write down the Midpoint Ellipse drawing algorithm.

   b) Using Mid-point Circle Drawing Algorithm, find the pixels in first octant of a circle with radius $r = 10$ having centre at origin. 8 + 7

9. a) Explain the necessity of homogeneous coordinate system in composite transformation.

   b) Reflect a triangle *ABC* where *A* (10,10), *B* (20,20) and *C* (10,20) with respect to a line whose equation is $y = x - 1$. Find out the coordinates of the reflected triangle and illustrate the situation properly.

   c) Scale the triangle with axis points at (100, 100), (100, 200) and (200, 100) of half of its present size with respect to the point (100, 100). 3 + 7 + 5

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

   a) General parallel-projection transformation

   b) Bezier curve

   c) Hidden surface

   d) Anti-aliasing.

11. a) What is clipping ?

   b) Describe window port to view port transformation.

   c) Explain Liang-Barsky Line Clipping Algorithm with proper illustration and example. 3 + 4 + 8

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