Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(IT)/SEM-7/IT-703A/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 from the following : 10 × 1 = 10

   i) Which of the following is/are true ragarding vector devices or raster devices ?

      a) Vector devices position the input/output mechanism by scanning the whole input/output area.

      b) Raster devices scan the whole input/output area row by row moving from top to bottom to produce the input/output.

      c) A raster display device uses rectangular arrays of dots (pixels) to display an image.

      d) Examples of raster devices are Plotter and Plasma Display.

ii) Which of the following is not a modern application for Computer Graphics ?

a) Scientific Visualization

b) Computer Aided Geometric Design

c) Video Games

d) Stop-motion animation

e) Geographical Information Systems.

iii) Which of the following affine transforms does not affect vectors ?

a) Translation b) Scale

c) Rotation d) Shear

e) Reflection.

iv) Which of the following affine transforms is not used in rotation around a specific axis and point ?

a) Translation b) Scale

c) Rotation d) Shear

e) Reflection.

v) Homogeneous form of the point (9, 6, 3, 3) is

a) (1, 2, 3) b) (3, 2, 1)

c) (3, 2, 1, 1) d) (9, 6, 3)

e) (9, 6, 3, 1).

vi) With the DDA (Digital Differential analyzer) algorithm, what will be the amount added to the secondary component each time through the loop (incrementing value ?

a) $\frac{-1}{2}$ b) $\frac{3}{4}$

c) $\frac{1}{2}$ d) $\frac{-4}{3}$.

vii) The region of memory sufficiently large to hold all pixels of the display is called a

a) frame buffer b) RAM

c) ROM d) Cache Memory.

viii) Consider the two points A (1, 1) and B (4, 7).

Let P (u) = (x (u), y (u) be a parametric line function.

What is a parametric equation of the line segment joining the points A and B ?

a) x (u) = $3u$, y (u) = $u + 1$

b) x (u) = $3u + 1$, y (u) = $6u + 1$

c) x (u) = $4u$, y (u) = $7u$

d) x (u) = u, y (u) = $2u + 1$.

ix) What are the window to viewport mappings for W = (0, 100, 50, 200) and V = (10, 50, 0, 60) ?

a) $sx = 0.4\ x + 10$ and $sy = 0.4y - 20$

b) $sx = 0.4\ x + 10$ and $sy = 0.4y + 20$

c) $sx = 0.4\ x - 10$ and $sy = 0.4y - 20$

d) $sx = 0.4\ x + 20$ and $sy = 0.4y - 20$

e) $sx = 0.4\ x + 20$ and $sy = 0.4y - 10$

x) If you rotate the point (20, 30) by 90 degrees anticlockwise and then translate it by (– 20, 0) and then scale it by (2, 1), where will the point be ?

a) (100, – 20) b) (100, 10)

c) (– 100, 20) d) (100, 20).

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. What is the difference between raster scan and random scan ?
3. What is aspect ratio ? Define persistence. 2 + 3
4. Write down DDA algorithm.
5. State the drawback of mid-point circle drawing algorithm.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

6. a) Write the homogeneous co-ordinate transformation matrices for the basic transformation.
   b) Given the final transformation matrix that scales the given triangle (A (2, 2), B (4, 2), C (4, 4)) twice to its size about point A.
   c) Explain the conceptual model of the 3D viewing process. 5 + 5 + 5
7. a) Discuss DDA line drawing algorithm. Highlighted advantage and disadvantage of this algorithm.
   b) Indicate which pixel positions would be chosen by DDA algorithm when scan converting a line from pixel coordinate (1, 2) to pixel coordinate (7, 9). (7 + 3) + 5
8. a) Explain mid-value sub-division line clipping.
   b) State the inequities for line and point clipping.
   c) Explain Flood fill and Boundary fill algorithm. 5 + 4 + 6
9. Write short notes on any *three* of the following : 3 × 5
   a) Polygon Fill Algorithm
   b) Clipping (2 D)
   c) 3D parallel Projection
   d) Scan line Algorithm
   e) Color Model.