MCA/IVS/401/13

MCA 4th Semester Examination, 2013

GRAPHICS AND MULTIMEDIA

PAPER—401

Full Marks : 100

Time : 3 hours

Answer any **five** questions

The figures in the right-hand margin indicate marks

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

Illustrate the answers wherever necessary

1. (*a*) Write Generalised Bresenham's algorithm to generate a line and also find out the pixel location approximating a line between the points (0, 0) and (−4, −8) using generalised Bresenham's algorithm.

   (*b*) State the reason why are prefer unit X interval or unit Y interval for corresponding slopes $m \leq 1$ and $m \geq 1$ in line drawing algorithms. (5 + 7) + 2

2. (*a*) With a neat diagram, explain the fundamental operation of a simple LCD.

   (*b*) It is desired that the circle with center at the origin and radius 8 in the first quadrant is to be drawn. Using Bresenham circle generation algorithm determine the pixels which would approximate the desired portion of the circle. 7 + 7

3. (*a*) What is homogeneous co-ordinate ? Why are homogeneous co-ordinates used for transformation computations in Computer Graphics.

   (*b*) Mention the different standards of 3D rotation along with proper diagram.

   (*c*) The reflection along the line $y = x$ is equivalent to the reflection along the X axis followed by counter clockwise rotation by θ degrees. Find the value of θ. (All the transformation are in 2D) (2 + 2) + 6 + 4

4. (*a*) A polygon has 4 vertics located at A(20, 10), B(60, 10), C(60, 30), D(20, 30). Indicate a transformation matrix to double the size of the polygon with point A located at the same place.

   (*b*) Applying a 2D rotation followed by a scaling transformation is same as applying first the scaling transformation and then rotation – Justify.

   (*c*) What do you mean by "Persistence of Phospher". 5 + 7 + 2

5. (*a*) What is projection ? Why is it needed ?

   (*b*) Mention the different types of projections in Computer Graphics. (2 + 2) + 10

6. (*a*) Differentiate between (any *two*) :

   (*i*) Raster scan display system and Random scan display system.

(*ii*) Shadow mask method and Beam penetration method.

(*iii*) Flood fill and Boundary fill algorithm.

(*iv*) Hyper text and Hypermedia.

(*b*) Prove that if rotation angle is θ the transformation matrix formed when multiplied by the transformation matrix formed when angle is $-\theta$ is equal to identify matrix i.e. $(5 \times 2) + 4$

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

7. (*a*) Write short notes on (any *four*) : 2×4

(*i*) Window and viewport

(*ii*) Animation

(*iii*) Touch panel

(*iv*) Morphing

(*v*) Object Editing

(*vi*) Trackball.

(*b*) What is shear in 2D transformation ? Mention the different standards of shear transformation. 2 + 4

[*Internal Assessment* : 30 Marks]
