|MCS-053|

MCA (Revised)

Term-End Examination

June, 2013

MCS-053 : COMPUTER GRAPHICS AND MULTIMEDIA

04794

Time : 3 hours   *Maximum Marks : 100*

Note :   *Question number 1 is* **compulsory**. *Attempt* **any three** *questions from the rest.*

1. (a)   Define the following   5

    (i)   Interactive Computer Graphics

    (ii)   Image processing

    (iii) Animation

    (iv)   Refresh cycle

    (v)   Display Controller

    (b)   What are the shortcoming of DDA line   5
          drawing algorithm? How are they removed
          in Bresenham's algorithm?

    (c)   What is 2D shearing? Write down the   5
          matrix for x shear, y shear and xy shear
          about the origin.

    (d)   What is orthographic projection? Explain   5
          various categories of orthographics
          projection.

(e) State and explain the four properties of   5
Bezier curve.

(f) Explain scan line method for visible surface   5
detection.

(g) What is cel animation? Differentiate it with   5
key frame animation.

(h) Explain various types or categories of   5
authoring tools.

2. (a) Discuss all the four cases of Suduland   5
Hodgemen polygon clipping algorithm with
the help of a suitable diagram.

(b) Draw a circle having centre (0,0) and radius   5
5 by midpoint circle generation algorithm.

(c) What are the major limitations of Cohen   5
Sutherland line clipping algorithm?
Compare it with Cyrus Beck line clipping
algorithm.

(d) Draw a line having end points (25,15) and   5
(35,23) using Bresenham's line drawing
algorithm.

3. (a) Calculate the matrix for three views (front, **10** right-side and top) of a given object, shown in the figure.

The vertices of the object are $A(4,0,0)$ $B(4,4,0)$, $C(4,4,8)$, $D(4,0,4)$, $E(0,0,0)$, $F(0,4,0)$, $G(0,4,8)$, $H(0,0,4)$
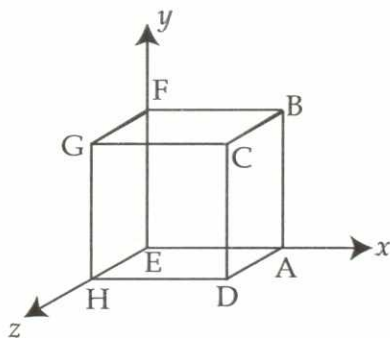
(b) Determine the vanishing points for the **5** following perspective transformation matrix

$$\begin{bmatrix} 8.68 & 5.6 & 0 & 2.8 \\ 0 & 20.5 & 0 & 4.5 \\ 7.0 & 8.0 & 0 & 2.0 \\ 5.3 & 7.3 & 0 & 3.0 \end{bmatrix}$$

(c) Vertices of a triangle are $A(5,3)$, $B(7,2)$, **5** $C(9,4)$. Rotate the triangle by $30°$ about the point A of the triangle.

4. (a) Derive the equation of the 3 point Bezier **5** curve defined by the following control points $(-1,0)$, $(0,2)$ and $(1,0)$.

(b) What are the relative merits of object space 5 method and image space methods of visible surface detection?

(c) Derive a mathematical expression for 10 Phory's specular reflection model. Explain how ambient, diffused and specular reflection contribute to the resulting intensity of reflected ray of light in the Phory's model.

5. (a) What are the various types of Bitmap 4 Images?

(b) Define the following : 1x6=6
   (i) CDR   (ii) JPEG   (iii) TIFF
   (iv) GIF   (v) PNG   (vi) PDF

(c) How many frames does a 40 second 5 animation film sequence require with no duplication? What will be answer if duplication is there?

(d) Differentiate between the following : 5
   (i) Printer versus Plotter
   (ii) Drawing versus Painting.