**Printed Pages—3**                                                  **MCAE21**

(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 2146**   **Roll No.** [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

## M.C.A.

## (SEM. V) ODD SEMESTER THEORY EXAMINATION 2010-11

### COMPUTER GRAPHICS AND ANIMATION

*Time : 3 Hours*                                          *Total Marks : 100*

Note :— Attempt *all* questions.

1.  Attempt any *four* of the following :—                    **(5×4=20)**

    (a)  Discuss the major application areas of computer graphics.

    (b)  Explain the architecture of raster display.

    (c)  What is Frame buffer ? Find the amount of memory required by an 8 plane frame buffer each of Red, Green and Blue, having $1024 \times 768$ resolution.

    (d)  Digitize a line from (20, 10) to (30, 18) on a raster screen using Bresenham's straight line algorithm.

    (e)  Write an algorithm for midpoint circle generation.

    (f)  Write Bresenham's line algorithm for slopes in the range $0 < m < 1$.

2.  Attempt any *four* of the following :—                    **(5×4=20)**

    (a)  What is homogenous coordinates system ? Give the matrix form expression of the basic transformation.

    (b)  Show that two successive reflections about either of the coordinate axes is equivalent to a single rotation about the coordinate origin.

    (c)  Define viewing transformation. Also obtain the viewing transformation matrix.

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(d) Among various line clipping algorithms in your view, which algorithm is more efficient ? Why ?

(e) Can a line clipping algorithm be used for clipping a polygon ? Justify your answer.

(f) Describe using example Sutherland-Hodgeman polygon clipping method.

3. Attempt any *two* of the following :— (10×2=20)

(a) Derive rotation transformation matrix to rotate a 3-dimensional object about an arbitrary axis in space with angle θ.

(b) Define the following terms with reference to 3-D :
   (i) Projection
   (ii) View Plane
   (iii) Vanishing Point
   (iv) Isometric Projection
   (v) Perspective Projection.

(c) Define clipping volume. What is the importance of projection in 3-dimensional clipping ? Explain the process of deciding whether a point belongs to the clip volume or not.

4. Attempt any *two* of the following :— (10×2=20)

(a) (i) Explain the advantages and disadvantages of B-spline surface over Bezier surface.

   (ii) State the characteristics of Bezier Curves.

(b) Explain in detail the Back Face Detection Method with the help of an example.

(c) (i) How does ambient light source differ from a parallel beam of light source ?

   (ii) Explain the RGB colour model.

5. Write short notes on any *four* of the following :— **(5×4=20)**

   (a) Motion specification.

   (b) Computer-assisted animation.

   (c) Various devices for producing animation.

   (d) Animation languages.

   (e) Design of animation sequences.

   (f) Methods of controlling animation.