

Roll No.

Total Pages : 03

MCA/M-17

10014

COMPUTER GRAPHICS

MCA-14-44

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt *Five* questions in all. Q. No. 1 is compulsory.
Attempt *four* more questions selecting *one* question
from each Unit. All questions carry equal marks.

1. Answer the following questions in brief :

- (a) How many bits will be used to represent a pixel in the frame buffer if 512 colors are to be represented for the pixel ?
- (b) Describe the light polarization phenomena as used in LCD display.
- (c) What will be the x -increment for a line between (4, 7) and (8, 15) when simple DDA line drawing algorithm is used.
- (d) What is the parametric representation of cubic curves ?
- (e) Define window and viewport.
- (f) Derive the rotation transformation for rotating a point w.r.t. the origin.

- (g) How will a point be interpolated for light intensities using Goraud shading ?
- (h) Write down the general form of equations for obtaining the tweened coordinates between two key frames in animation.

Unit I

- 2. How are pictures created and manipulated ? Describe all the coordinate systems used in graphics for creation and manipulation of pictures. Also mention the type of functionality for which that coordinate system is used.
- 3. (a) Describe the anatomy and working of any *two* input devices along with the kind of applications for which they may be used.
(b) What is the advantage of using lookup tables and display processor in graphics ?

Unit II

- 4. (a) How can a circle be drawn using a coordinate system other than Cartesian coordinates ?
(b) Derive the Bresenham's algorithm for drawing lines.
- 5. How are objects filled using stack based seed fill and scan line seed fill algorithms.

Unit III

6. Show that effect of scaling a triangle with vertices A(2, 3), B(8, 4), C(5, 7) to twice its size and keeping the center of the triangle fixed. What will be the mirror reflection of the vertex C w.r.t. the line $y = 4$.
7. Describe, how a point on a line is described using parametric equations. Use these equations to describe how a line will be clipped as per Liang-Barsky line clipping algorithm. Use this algorithm to clip a line with end points A(5, 6) and B(9, 10) against a viewport with $x_{\min} = 2$, $x_{\max} = 10$, $y_{\min} = 3$ and $y_{\max} = 9$.

Unit IV

8. What is the difference between oblique parallel projection and perspective projection ? How is an object modeled before projection ?
9. How are depth comparisons made for identifying hidden surfaces in Depth buffer, Ray casting and Depth sort algorithms ?