

Roll No.

Total Pages : 03

BCA/M-24

1878

COMPUTER GRAPHICS

Paper : BCA-363

Time : Three Hours]

[Maximum Marks : 80

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

Compulsory Question

1. Answer any *four* of the following questions in brief :
 - (i) Distinguish between interactive and passive graphics.
 - (ii) Discuss the concept of color depth and its significance in digital imaging.
 - (iii) Explain the Polynomial Method for scan-converting ellipses.
 - (iv) Calculate the result of a point (3, 4) after a translation transformation of 5 units to the left and 2 units up.
 - (v) What are homogeneous coordinates, and how are they used in two-dimensional graphics transformations ?

- (vi) Describe any one 3D display method commonly used in computer graphics.

Unit I

2. (a) Define computer graphics and explain any *four* of its applications.
(b) Define refresh rate and interlacing in the context of display technology and describe any *one* display device along with its working.
3. Give examples of interactive input devices used in computer graphics and explain the working of any *two* of them.

Unit II

4. Compare the DDA algorithm with the Bresenham's line drawing algorithm. Calculate the coordinates of pixels drawn using Bresenham's line algorithm to draw a line from (3,3) to (9,6).
5. Explain how the scan-line fill algorithm determines the interior pixels of a polygon. What data structures are used to efficiently store polygon edges ?

Unit III

6. Explain the basic transformations in two-dimensional graphics and provide examples illustrating each transformation.
7. (a) Shear a rectangle defined by vertices $(1, 1)$, $(3, 1)$, $(3, 3)$, and $(1, 3)$ with a shear factor of 2 along the x-axis.
(b) Give an overview of any one pointing technique in brief.

Unit IV

8. Explain the concept of a viewing transformation in two-dimensional graphics. Given a window defined by $(x_{\min}, y_{\min}) = (1, 1)$ and $(x_{\max}, y_{\max}) = (5, 5)$, and a viewport defined by $(x_{v\min}, y_{v\min}) = (0, 0)$ and $(x_{v\max}, y_{v\max}) = (1, 1)$, determine the normalized device coordinates for a point $(3, 3)$ within the window.
9. Describe the Cohen-Sutherland line clipping algorithm. How does it determine if a line lies within the clipping window ?