

(Please write your Exam Roll No. Immediately)

Exam Roll No. _____

END-TERM EXAMINATION

DECEMBER-2006

Paper Code: BCA-301

Exam Series Code: 100907DEC06200951

Subject: Computer Graphics

Time : 3 Hours

Maximum Marks : 75

Note: Attempt any five questions. All questions carry equal marks.

- Q.1 (a) How does 'Cognitive Graphics' differ from 'Generative Graphics' and 'Interactive Graphics'? Illustrate the difference with suitable examples.
(b) Give the advantages and disadvantages of hard copy displays, DVST displays, vector refresh displays, and raster displays. Suggest an application area for which each device is best suited.
- Q.2 (a) Differentiate the steps required to scan-convert a circle using the trigonometric and Bresenham's algorithm.
(b) Perform a 45° rotation of triangle A (0, 0), B (1, 1), C (5, 2).
(i) About the origin
(ii) About P (-1, -1)
- Q.3 (a) What is the general form of a scaling matrix with respect to a fixed point P (h, k)? Magnify the triangle with vertices A (0, 0), B (1, 2), and C (4, 3) to twice its size while keeping C (5, 2) fixed.
(b) What is clipping? Illustrate one important clipping algorithm of your choice.
- Q.4 (a) Prove that two scaling transformations commute i.e. $S_1, S_2 = S_2, S_1$.
(b) Describe the transformations used in magnifications and reduction with respect to the origin. Find the new coordinates of the triangle A (0, 0), B (2, 2), C (5, 4) after it has been:-
(i) Magnified twice its size and
(ii) Reduced to half its size.
- Q.5 (a) Find the normalization transformation that maps a window whose lower left corner is at (1, 1) and upper right corner is at (3, 5) onto:-
(i) A viewport that is the entire normalized device screen and
(ii) A viewport that has lower left corner at (0, 0) and upper right corner ($\frac{1}{2}, \frac{1}{2}$).
(b) What is Depth Buffer Algorithm? How does it differ from Scan-Line Coherence Algorithm? Illustrate both by giving suitable examples.
- Q.6 (a) What are hidden surfaces? Why are hidden-surface algorithms needed?
(b) What is 3D viewing? What are planar geometric projections? How are these implemented? Illustrate.
- Q.7 (a) What two steps are required to determine whether any given point $P(x_1, y_1, z_1)$ obscures another point $P_2(x_2, y_2, z_2)$?
(b) What is Hidden-Surface Removal? Differentiate the two major approaches of hidden-surface removal.
(c) What is shading? What are various surface shading methods? Explain.
- Q.8 Explain the following:-
(a) Animation
(b) Fractal models
