Code No. : D 467 **Sub. Code : DNA 3 B**

B.C.A. DEGREE EXAMINATION, APRIL 2012.

Third Year — Non-Semester

Computer Application – Main

Paper XI — COMPUTER GRAPHICS AND MULTIMEDIA

(For those who joined in 2008 onwards)

Time : Three hours Maximum : 100 marks

PART A — (5 × 5 = 25 marks)

Answer any FIVE questions out of Eight.

1. Given a circle radius r = 10, demonstrate the midpoint circle algorithm by determining positions along the circle octants in the first quadrant from x = 0 to x = y.

2. Explain matrix representation of composite scalings.

3. Explain parallel projection and exploded and cut away views methods for three-dimensional display.

4. Explain how an object can be rotated about an axis that is parallel to one of the coordinate axes.

5. What are the classifications for the test to determine surface visibility within an area?

6. A video monitor with a display area that measures 12 inches across and 9.6 inches high is available. If the resolution is 1280 by 1024 and the aspect ratio is 1, what is the diameter of each screen point?

7. Write the matrix representation of translation and explain.

8. Write notes on three-dimensional graphics packages.

PART B — (5 × 15 = 75 marks)

Answer any FIVE questions out of Eight.

9. Extend the Bresenham's line algorithm to generate lines with any slope taking symmetry between quadrants into account.

10. Write a program to continuously rotate an object about a pivot point. Small angles era to be used for each successive rotation, and approximations to the sine and cosine functions are to be used to speed up the calculations. The rotation angle for each step is to be chosen so that the object makes one complete revolution in less than 30 seconds. To avoid accumulation of coordinate errors, reset the original coordinate values for the object at the start of each new revolution.

11. (a) Write a routine to identify concave polygons by calculating cross products of pairs of edge vectors.

(b) Write a routine to split a concave polygon using vector method.

12. One reason that homogeneous coordinates are attractive is that 3D points at infinity in Cartesian coordinates can be represented explicitly in homogeneous coordinates. How can this be done?

13. Write a program to display the visible surfaces of a convex polyhedron using BSP-tree method.

14. Write notes on character generation in computer graphics.

15. Explain composite transformations.

16. Explain the three-dimensional display methods.