Reg. No. :

Code No.: 4367

Sub. Code : DNA 3 B

B.C.A. DEGREE EXAMINATION, NOVEMBER 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 — $(5 \times 5 = 25 \text{ marks})$

Answer any FIVE questions out of Eight.

- 1. Compare the advantages and disadvantages of a three-dimensional monitor using a varifocal mirror with a stereoscopic system.
- 2. Explain matrix representation of composite rotations.
- 3. Explain Surface rendering and visible line and surface identification methods for threedimensional display.

- 4. Explain how an object can be rotated about an axis that is not parallel to one of the coordinate axes.
- 5. Explain octree methods.
- 6. Illustrate the Bresenham line drawing algorithm with end points (20,10) and (30,18) with a slope of 0.8.
- 7. Explain fixed point in scaling.
- 8. Write a routine to split a concave polygon using vector method.

PART B — $(5 \times 15 = 75 \text{ marks})$

Answer any FIVE questions out of Eight.

- 9. Write the parallel version of Bresenham's line algorithm for straight line of any slope.
- 10. Show that the composition of two rotations is additive by concatenating the matrix representation for $R(\theta_1)$ and $R(\theta_2)$ to obtain $R(\theta_1)$. $R(\theta_2) = R(\theta_1 + \theta_2)$.
- 11. Compare the number of arithmetic operations performed in the cohen-sutherland and the liangbarsky line clipping algorithm for several different line orientations relative to a clipping window.

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- 12. Given a unit cube with one corner at (0,0,0) and the opposite corner at (1,1,1) derive the transformations necessary to rotate the cube by θ degrees about the main diagonal from (0,0,0) to (1,1,1) in the counterclockwise direction when looking along the diagonal towards the origin.
- 13. Write a program to display the visible surfaces of a convex polyhedron using BSP-tree method.
- 14. Write and explain the midpoint circle algorithm.
- 15. How is scaling represented using matrix representation. Illustrate with an example.
- 16. Write a routine to split a concave polygon using the
 - (a) Vector method
 - (b) Rotational method.

-15.