

[Total No. of Questions - 9] [Total No. of Printed Pages - 2]  
(2125)

15206

**B. Tech 6th Semester Examination**  
**Computer Graphics (CSE) (OS)**  
**CS-6002**

**Time : 3 Hours**

**Max. Marks : 100**

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**Note :** Attempt five questions in all selecting one question each from section A, B, C, and D. Section E is compulsory

**SECTION - A**

1. (a) Discuss vector and character generation methods. (10)  
(b) What is Raster Scan and how is it different from Random Scan? (10)
2. (a) What are the benefits of Bresenham's line drawing algorithm over DDA algorithm? (10)  
(b) Write Integer Bresenham's line drawing algorithm and show how it draws a line whose starting point is (5,5) and endpoint is (-4,0). (10)

**SECTION - B**

3. (a) Derive a general transformation Matrix for scaling transformation with respect to a fixed point (X,Y). (10)  
(b) What is the significance of 3D clipping? (10)
4. (a) What is viewing transformation? Explain window to viewport transformation. (10)

**[P.T.O.]**

**2**

**15206**

- (b) Explain, the three cases of line visibility in Cohen-Sutherland line clipping algorithm. (10)

**SECTION - C**

5. (a) Derive perspective and parallel projection transformation of a unit cube. (10)  
(b) Given  $P_0(0,40)$ ,  $P_1(50,50)$ ,  $P_2(70,30)$ ,  $P_3(80,0)$  as Vertices of Bezier Curve. Find the general expression to express a cubic Bezier curve. (10)
6. (a) Explain Bspline curve. Compare Bezier and Bspline algorithms. (10)  
(b) Explain three dimensional rotation about z-axis, x-axis and y-axis. (10)

**SECTION - D**

7. What is ray tracing algorithm for hidden surface removal? Explain mathematically how do we find which planes are visible using ray tracing algorithm. (20)
8. What are two spaces in which hidden surface algorithms work? How does sorting and coherence speed up calculation in such algorithm? (20)

**SECTION - E**

9. Write short notes on the following:  
(a) Hermit curve.  
(b) Phong shading model.  
(c) Input device handling algorithm.  
(d) Midpoint subdivision algorithm.  
(e) Pixels. (4×5=20)