

Con. 3335-10.

(REVISED COURSE)

AN-3448

(3 Hours)

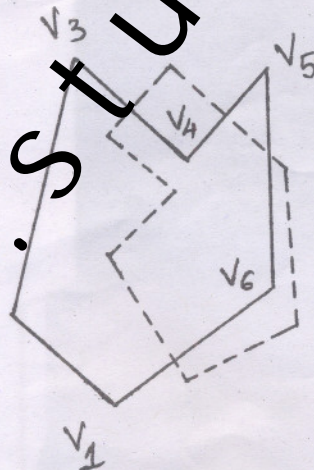
[ Total Marks : 100

N.B. (1) Question No. 1 is compulsory.

(2) Solve any four from remaining i.e. Q.No.2 to Q. No. 7.

(3) Figures to the right indicate full marks.

1. (a) Derive decision parameters for the midpoint ellipse algorithm (Region 1), assuming the starting position is  $(O, r_y)$  and points are to be generated along the curve path in clockwise order and hence solve  $r_x = 4, r_y = 3$ . 10
- (b) Draw 3D transformation pipeline from modelling co-ordinates to final device co-ordinates of hence derive transformation from world co-ordinates to viewing co-ordinates. 10
2. (a) Write a boundary fill procedure to fill an 8-connected region. 5
- (b) Show transformation matrix for reflection about line  $y = -x$  is equivalent to reflection relative to  $y$  - axis followed by a counterclockwise pure rotation. 5
- (c) Write about the character generation method. 5
- (d) Show that composition of two rotations is additive by concatenating matrix. 5
3. (a) Explain Cohen-Sutherland line clipping algorithm. 10
- (b) Explain how Weiler-Atherton algorithm works for convex polygons ? Clip the following polygon using the above 10



4. (a) Discuss the segment table alongwith operations on segments. What are the other display file structures used ? 10
  - (b) Solve using Liang Barsky line clipping algorithm, where  $(xw_{min}, xw_{max}) = 1, 9$  and  $(yw_{min}, yw_{max}) = (2, 8)$  for line 10
- Segments  $P_1(3,7)$  to  $P_2(3,10)$   
 $P_3(6,6)$  to  $P_4(8,9)$   
 $P_5(-1,7)$  to  $P_6(11,1)$



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 $P_5(-1,7)$  to  $P_6(11,1)$  10
5. (a) Derive all the necessary matrices required to perform 3D Rotation about arbitrary axis. 10
- (b) Write short note on Text Clipping Methods. 5
- (c) Differentiate Parallel and Perspective Projection. 5
6. (a) What is 3D clipping? Derive equations for all the planes. (left, right, top, bottom, front, back). 10
- (b) Explain Sutherland Hodgeman polygon clipping algorithm. 10
7. Write short notes on :- 20
- (a) Warnock's algorithm (c) Shading algorithms
- (b) Depth Buffer algorithm (d) B-spline and Bezier Curves.