

**QP Code : 1406**

**(3 Hours)**

**[Total Marks : 100**

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

(2) Attempt any four out of the remaining six questions.

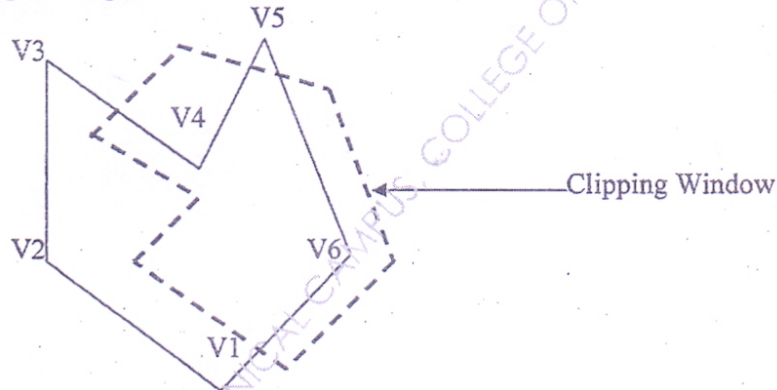
(3) Assume any suitable data wherever required.

- Q.1 a) Prove that two successive rotations are additive.  $R(\theta_1). R(\theta_2) = R(\theta_1 + \theta_2)$  05  
 b) Write Boundary fill procedure to fill an 8 connected region. 05  
 c) Differentiate Parallel and Perspective projection. 05  
 d) Write short note on Text Clipping Methods. 05

- Q 2 a) Write short notes on: - 10  
 I) Phong Shading  
 II) Gouraud Shading  
 b) Explain mid point circle algorithm. In order to support your explanation, show Mathematical derivation. 10

- Q3 a) Discuss the segment table along with operations on segment. What are the other Displays file structures used. 10  
 b) Solve using Liang Barsky line clipping algorithm where  $(X_{wmin}, X_{wmax}) = (1, 9)$  and  $(Y_{wmin}, Y_{wmax}) = (2, 8)$  for line segments P1 (3,7) to P2 (3,10), P3 (6,6) to P4 (8,9) & P5 (-1,7) to P6 (11,1). 10

- Q.4 a) Explain how Weiler Atherton algorithm works for convex polygons? Clip the polygon using the above. 10



- b) What is 3D clipping? Derive equations for all the planes. 10

- Q.5 a) Explain Warnock's algorithm used to remove Hidden surfaces with example. 10  
 b) Explain Cohen Sutherland Line clipping algorithm. 10

- Q.6 a) Explain Sutherland Hodgeman polygon clipping algorithm with example. 10  
 b) Explain Bit map character generation method. 05  
 c) What do you understand by Diffuse Illumination and Point source Illumination? 05

- Q.7 a) Derive 2D transformation matrix, for performing rotation of given point P(x, y) By angle  $\theta$  (theta) in anticlockwise direction about origin. Also explain the steps Required if rotation has to be carried out about Fixed Point  $(X_f, Y_f)$ . 10  
 b) State mathematical equation for Bezier curve & Bezier surfaces. Explain Properties of Bezier curve. 10