

[3 Hours]

[Total Marks: 80]

Please check whether you have got the right question paper.

- N.B: (1) Question No.1 is compulsory  
 (2) Attempt any three of remaining five questions  
 (3) Assume any suitable data if necessary and justify the same

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| Q 1 | a) | Explain CSG method for solid modeling.   | 5  |
|     | b) | What is aliasing and Explain any one antialiasing method.  | 5  |
|     | c) | Compare Raster Scan and Random Scan displays.  | 5  |
|     | d) | Prove that two successive rotations are additive i.e. $R1(o_1) * R2(o_2) = R(o_1 + o_2)$   | 5  |
| Q 2 | a) | Explain Bresenham line drawing algorithm with proper mathematical analysis and identify the pixel positions along a line between A(10,10) and B(18,16) using it.                                       | 10 |
|     | b) | Explain the steps for 2D rotation about arbitrary point and provide a composite transformation for the same.   | 10 |
| Q 3 | a) | Explain Liang Barsky line clipping algorithm. Apply the algorithm to clip the line with coordinates (30,60) and (60,20) against window $(x_{min}, y_{min})=(10,10)$ and $(x_{max}, y_{max})=(50,50)$ . | 10 |
|     | b) | Explain Sutherland Hodgman polygon clipping algorithm with suitable example and comment on its shortcoming.  | 10 |
| Q 4 | a) | What is window and viewport? Derive the window to viewport transformation and also identify the geometric transformation involved.   | 10 |
|     | b) | Explain what is meant by Bezier curve? State the various properties of Bezier curve.   | 10 |
| Q 5 | a) | What is meant by parallel and perspective projection? Derive matrix for oblique projection.  | 10 |
|     | b) | Explain Z Buffer algorithm for hidden surface removal.   | 10 |
| Q 6 |    | Write short notes on (any two)   |    |
|     | a) | Koch curve   |    |
|     | b) | Sweep representation and Octree representation   | 20 |
|     | c) | Gouraud and phong shading  |    |
|     | d) | Halftoning and Dithering.  |    |
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