

Paper Id: **110264**Roll No. 

--	--	--	--	--	--	--	--	--	--

**B.TECH.**  
**(SEM VI) THEORY EXAMINATION, 2018-19**  
**COMPUTER GRAPHICS**

**Time: 3 Hours****Total Marks: 70****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A****1. Attempt all questions in brief. 2 x 7 = 14**

- (a) What are the applications of Computer graphics?
- (b) How many clippers are used by Sutherland Hodgeman for polygon clipping?
- (c) Define aspect ratio and types of retracing?
- (d) What is Tilting Transformation? Does the order of performing the rotation matter?
- (e) What do you understand by match band effect and transparency?
- (f) Explain other transformations that can be applied on 2D objects?
- (g) Define Blobby objects and types of coherence.

**SECTION B****2. Attempt any three of the following: 7 x 3 = 21**

- (a) Why do we need Video Controller? Also define the architecture of Raster Scan System?
- (b) Translate the square ABCD whose co-ordinates are A(0,0), B(3,0), C(3,3) and D(0,3) by 2 units in both directions and then scale it by 1.5 units in x-direction and 0.5 units in y-direction.
- (c) Write rotation matrices about X-axis, Y-axis and Z-axis and prove that for any rotation matrix R:-  $R^{-1}(\theta) = R(-\theta) = R^T(\theta)$
- (d) Discuss RGB and CMY color model in detail.
- (e) Explain the True-Curve Generation algorithm. Also list the problems in this algorithm.

**SECTION C****3. Attempt any one part of the following: 7 x 1 = 7**

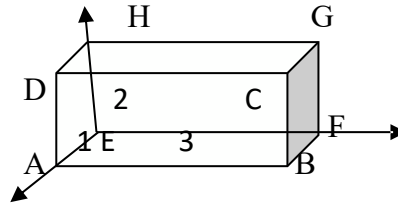
- (a) What are the disadvantages of DDA algorithm? Also write Bresenham's Line Drawing algorithm for negative slope.
- (b) Write Mid-Point Circle algorithm and predict the pixels in any octant of circle for radius =12 pixels with its centre at origin?

**4. Attempt any one part of the following: 7 x 1 = 7**

- (a) Write the Liang Barsky algorithm for Line Clipping. Use Liang Barsky Line Clipping algorithm to clip the line P1(-1,7) to P2(11,1) against the window having diagonally opposite corners as (1,2) and (9,8).
- (b) Explain Window-to-Viewport transformation in detail.

**5. Attempt any *one* part of the following:****7 x 1 = 7**

- (a) A rectangular parallelepiped is given having length on X-axis, Y-axis and Z-axis as 3, 2 and 1 respectively. First apply a rotation of  $-90^\circ$  about the Y-axis followed by a rotation of  $90^\circ$  about X-axis.



- (b) What do you understand by Projection? Differentiate between Parallel Projection and Perspective Projection.

**6. Attempt any *one* part of the following:****7 x 1 = 7**

- (a) Construct the Bezier Curve of order 3 and with 4 polygon vertices A(1,1), B(2,3), C(4,3), D(6,4).
- (b) Write the properties of B-Spline curves. Also write advantages of B-Spline curves over Bezier curves.

**7. Attempt any *one* part of the following:****7 x 1 = 7**

- (a) Explain Depth buffer method and compare it with A-buffer method.
- (b) Why is Gouraud shading also referred to as interpolation shading? Also discuss its advantages and disadvantages?