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E2

B. Tech. EXAMINATION, 2020

(Fifth Semester)

(B-Scheme) (Re-appear Only)

(Common with IT-VI Sem.)

CSE303B

COMPUTER GRAPHICS

Time : 2½ *Hour*s] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. Write and explain the Bresenham's algorithm for drawing a circle. Also iterate the steps of the algorithm for some example.

2. Define the term "Solid area scan conversion". Develop an algorithm to scan convert a Polygon. Explain the working of this algorithm with suitable example.

3. (a) Find the normalization transform that maps a window whose left corner is at (1, 1) and upper right corner is at (3, 5) onto a viewport that is :

(i) entire normalized device screen

(ii) a viewport that has lower left corner at (0, 0) and upper right corner (1/2, 1/2).

(b) A mirror is placed vertically such that it passes through the points (10, 0) and (0, 10). Find the reflected view of the triangle ABC with Co-ordinates A(5, 50), B(20, 40), C(10, 70).

4. Write and explain the Sutherland-Hodgeman polygon clipping algorithm. Explain, why this algorithm will work for convex clipping regions ?

5. Using the origin as centre of projection, derive the perspective transformation onto a plane passing through the point $R_0(x_0, y_0, z_0)$ and having normal vector $N = n_1I + n_2J + n_3K$.

6. Write and explain the scanline algorithm for hidden surface removal.

7. (a) Why did we say that red, green and blue only roughly coincide with the wavelength values that causes peak response from three types of color sensitive cones ?

(b) Describe the Phong shading model.

8. Compare the Bezier, B-Spline and Lagrange's interpolation techniques.