BCSE 3rd YEAR 1st SEMESTER EXAMINATION, 2024

Time: One Hour **COMPUTER GRAPHICS - CLASS TEST-2** **Full Marks: 30**

Read the Following Instructions Carefully. Answer ALL questions.

Let R_1 and R_2 be the last two digits in your Roll No. For example, If Roll is 103, then, $R_1 = 0$ and $R_2 = 3$

1.	**a)**	Briefly explain the principle of Liang Barsky line clipping algorithm. Let ABCD be the rectangular window with A(0,0), B(15,0), C(15,15), D(0,15). Use Liang Barsky Algorithm to clip the line XY, such that X(-5,R_1) and Y(20,(5+R_2)).	**(5+15) = 20**
2.	**a)**	Derive the formulation for diffuse and specular reflections from multiple light sources.	**5**
	b)	Briefly discuss the A-Buffer algorithm for hidden surface removal	**5**

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Let your roll number be R, comprising of last two digits, R1 and R2 (if R>99, then R=R%99; if R<10, then R1=0).

a) Given input ellipse parameters $r_x = 5 + (R_1 + R_2)$, *and* $r_y = 5$, centred at origin, illustrate the steps in the midpoint ellipse algorithm by determining raster positions along the ellipse path in the first quadrant. **(20 marks)**

b) Check if point (R1, R2) is inside the polygon defined by vertices (1, 1), (6, 3), (4, 6), (1, 5), (2, 3), (1,1). **(5 marks)**

c) Show that the transformation matrix for reflection about the line y=x, is equivalent to a reflection relative to the x-axis followed by a counter-clockwise rotation of 90°. **(5 marks)**