Name: **Enrolment No:**	

UPES
End Semester Examination, December 2023

Course: Computer Graphics **Semester: III**
Program: MCA **Time : 03 hrs.**
Course Code: CSEG8005 **Max. Marks: 100**

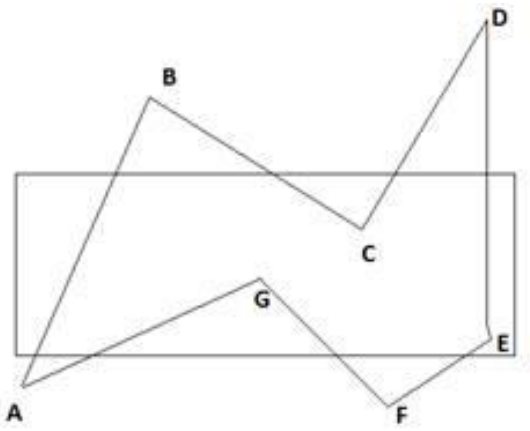
Instructions: Attempt all Questions

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Compare Liang Barsky Algorithm with Cohen Sutherland Algorithm.	**04**	**CO1**
Q 2	Illustrate shadow mask CRT. Give its advantages and disadvantages.	**04**	**CO2**
Q 3	Compare Raster Scan and Random Scan Display.	**04**	**CO3**
Q 4	State the names of different color models in Computer Graphics. Illustrate any one of them briefly.	**04**	**CO4**
Q 5	Show that the composition of two rotation is additive by concatenating the matrix representation for R (Θ1) and R (Θ2).	**04**	**CO5**

SECTION B
(4Qx10M= 40 Marks)

Q 6	Illustrate Mid-Point Ellipse Algorithm (Mention the steps). Given an ellipse with r_x =8 and r_y=6. Calculate the next points of region 1.	**10**	**CO1**
Q 7	Illustrate affine transformations in 2 D Geometry with suitable equations and diagrams. Rotate a triangle A (0,0), B (2,2), C (4,2) about the origin and about P (-2, -2) by an angle of 45^0.	**10**	**CO2**
Q 8	Illustrate the different phases of Cohen-Sutherland Line Clipping Algorithm. Use the Cohen Sutherland algorithm to clip line P1 (70, 20) and P2 (100, 10) against a window lower left-hand corner (50, 10) and upper right-hand corner (80, 40).	**10**	**CO3**

	OR		
Q 8	Illustrate the steps for Sutherland Hodgeman Polygon Clipping Algorithm. Clip the following figure with Sutherland Hodgeman algorithm.  	**10**	**CO3**
Q 9	Derive the parametric equation for Beizer Curve. Construct the Beizer Curve of order 3 with four vertices of control polygon P_0 (0,0), P_1 (1,2), P_2 (3,2) and P_3 (2,0). Generate at least 5 points on the curve.	**10**	**CO4**
SECTION-C (2Qx20M=40 Marks)			
Q 10	A solid tetrahedron is given by position vectors A (1,1,1), B (3,1,1), C (2,1,3) and D (2,2,2) and a point light source is kept at P (2,3,4). Using the Back Face detection method, find the surfaces on which light falls and the surfaces which are to be shadowed.	**20**	**CO5**
Q 11	(a) Demonstrate Z buffer algorithm (do include diagrammatic representation) along-with its advantages and disadvantages. (b) Mention Illumination model with proper equations. Derive the mathematical equation for Gouraud Shading. Compare its advantages and disadvantages over Phong Shading.	**20**	**CO1**
	OR		
	(a) Mention Translation, Rotation, Scaling and Reflection for a 3D Coordinate System with suitable diagrams and matrix representations. (b) Consider a region defined by a position vector P.	**20**	**CO1**

	1 1 2 1 2 1 2 1 2 2 2 1 1 2 2 1 Relative to global axis XYZ system. It is rotated by an angle of 30 degrees about x axis and passed through point (1.5,1.5,1.5). Find the final position of the region.		