Computer Graphics

IAE 1 – Question Bank

PART –A

1. List out the graphics input primitives and devices.
2. Define Raster Scan System.
3. Explain about clipping and its types.
4. Difference between 2D and 3D transformation.
5. Define Matrix representation.
6. What is computer graphics and its application?
7. Difference between windows and viewport.
8. Give the parametric form of a curve.
9. Define Transformation and it types.
10. State the need of homogeneous coordinates.

PART – B

11. Using Bresenham's line algorithm, apply the steps to draw a line between the points (2,3) and (10,7) on a 2D grid. Demonstrate the process by calculating the decision parameters and plotting the intermediate points of the line on the grid.

12. Analyze the process of using OpenGL primitives to render different shapes, such as triangles, quads, and points. Compare how each primitive affects the rendering of a basic graphical object and evaluate the impact of choosing different primitives on the performance and appearance of the final graphical object.

13. Given a polygon with vertices at specific coordinates and a clipping window defined by its boundaries, apply the Sutherland-Hodgeman polygon clipping algorithm to determine the

vertices of the clipped polygon. Demonstrate the process by performing the necessary calculations and transformations to show how the polygon is clipped and what the resulting clipped polygon looks like.

14. Explore how the use of homogeneous coordinates impacts the representation and transformation of 2D and 3D objects in computer graphics. Compare the advantages and disadvantages of using homogeneous coordinates.

15. Calculate the points between the starting point (5, 6) and ending point (8, 12) Using DDA algorithm.

16. Demonstrate how OpenGL primitives are used in rendering different shapes, and apply the appropriate functions to create a basic graphical object using these primitives.

17. Examine how Cohen-Sutherland line clipping algorithm handle lines that partially or completely lie outside the clipping window using a specific example.

18. Compare the effects of translation, rotation, and scaling transformations on a two-dimensional geometric shape, and analyze how these transformations can be combined to achieve a desired positioning and orientation of the shape in a graphical application.

PART – C

19. Using parametric curves, such as Bezier curves or B-splines, apply the appropriate mathematical equations and OpenGL functions to create a smooth, curved path between two given points on a 2D or 3D plane. Demonstrate the process by defining the control points, calculating the curve, and rendering it within a graphical application.

20. Given a 2D shape with vertices at specific coordinates A(0,3),B(3,3),C(3,0) and D(0,0) and apply the scaling parameter 2 towards X axis and 3 towards Y axis and obtain the new coordinates of the object, analyze how scaling affects the shape's dimensions, orientation, and position relative to the origin.

21. In a real-time 3D video game environment with dynamic objects and varying levels of detail, analyze how different visibility algorithms, such as the Z-buffer, painter's algorithm, would impact the performance and visual quality of the game. Discuss the strengths and weaknesses of each algorithm in handling fast-paced scenes with multiple moving objects and complex geometries, and recommend the most appropriate algorithm or combination of algorithms for optimizing both rendering speed and accuracy.

22. Given a 2D object located at specific coordinates on a plane, analyze the effect of rotating the object 30 degrees with starting point as (0,0) and ending point as (4,4). Compare the resulting positions and orientations of the object for each pivot point, and determine how these transformations could be applied in a practical scenario, such as animating an object in a graphical user interface.