Computer Graphics Question Bank for End Term

2 Marks questions

1. What is computer graphics? List the various types of computer graphics applications.
2. List out the merits and demerits of Plasma panel display
3. What do you mean by emissive and non-emissive displays
4. Write General 2D Pivot-Point Scaling
5. What is parallel projection and perspective projection.
6. Define perspective foreshortening and vanishing point.
7. Recall 3D rotation X axis and Y axis matrix.
8. What is cubic spline
9. What are spline curves and B-Spline curve
10. List the various parametric and geometric continuity of curves.
11. State the differences between interactive graphics and non-interactive graphics, focusing on user interaction and control over the content.
12. Define the role of the electron gun in the operation of a Cathode Ray Tube (CRT).
13. Define refresh buffer/frame buffer.
14. Define 2D translation, rotation, and scaling with equations
15. Define vanishing point.
16. Recall 3D rotation Z axis matrix.
17. Write equations for Composite 3D Translations, rotation
18. Define quadric surfaces.
19. List the various parametric and geometric continuity of curves.
20. **Identify** the mathematical representation of a Bezier curve and **list** the role of control points in shaping the curve.
21. Write the parametric equations for a hyperbola centered at the origin.
22. What is the general equation for a conic section in Cartesian form?
23. Name the types of curves classified as conic sections.
24. State one procedure used for analyzing conic sections.

10 Marks questions

25. Explain various steps involved in DDA line drawing algorithm and Bresenham's line drawing algorithm.
26. Describe the main types of display devices and their detailed applications in computer graphics.
27. Describe the Digital Differential Analyzer (DDA) algorithm in detailed steps. Using the same algorithm, draw a line from (1, 1) to (13,7). Perform all intermediate calculations, including slope determination, increment values, and rounding operations. Finally, list all the pixel coordinates plotted. Discuss the limitations of the DDA algorithm observed in this example.
28. Classify the different type of printers and Illustrate cathode Ray tube with neat sketch.
29. (i)Demonstrate that the composition of two rotations is additive by concatenating the matrix representations for R(θ1) and R(θ2) to obtain R(θ1) · R(θ2) = R(θ1 + θ2).
    (ii)Demonstrate that two successive translations are additive i.e T1.T2=T2.T1.
30. (i)Given a circle C with radius 10 and center coordinates (1, 4). Apply the translation with distance 5 towards X axis and 1 towards Y axis. Obtain the new coordinates of C without changing its radius.
    (ii)Given a square object with coordinate points A(0, 3), B(3, 3), C(3, 0), D(0, 0). Apply the scaling parameter 2 towards X axis and 3 towards Y axis and obtain the new coordinates of the object.
31. Illustrate Cohen-Sutherland line clipping algorithm steps. Identify the clipping coordinates for a line P1P2 where P1 =(50,25) and P2=(80,50) against window with (xwmin,ywmin)=(20,10) and (xwmax,ywmax)=(70,60) using Cohen-Sutherland Line clipping algorithm.
32. Explain the four cases of Sutherland-Hodgman polygon clipping. For a polygon and clipping window shown in Figure 1, compute the list of vertices after each boundary clipping.

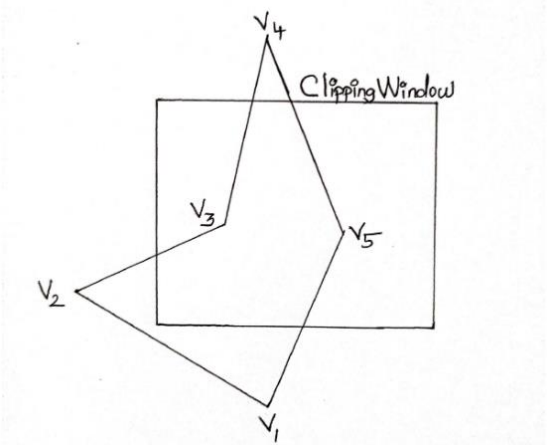


Figure 1

33. (i)Perform 3D translation transformation on the following Figure 2 where the given translation distances are $t_x = 2$, $t_y = 4$, $t_z = 6$ and obtain the new coordinates of the object.

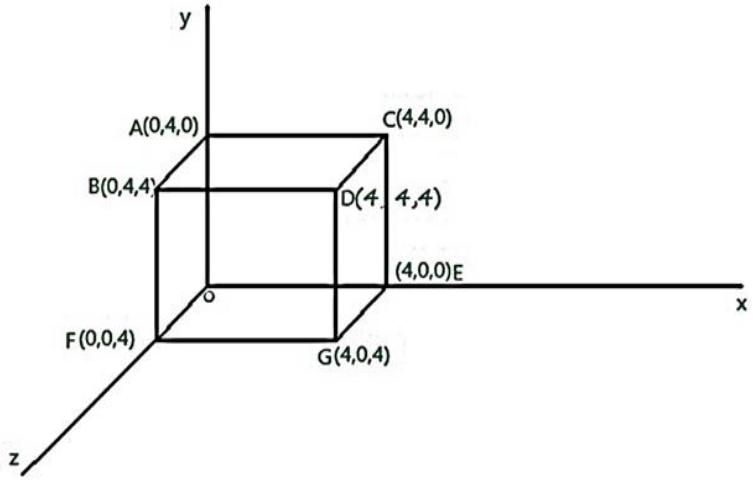


Figure 2

(ii)Perform 3D rotation transformation over a cube 'OABCDEFG' as shown in Figure 2 and rotate it through 450 in the anticlockwise direction about the y-axis and obtain the new coordinates of the object.

(iii)Consider where a cube" OABCDEFG" is given O(0, 0, 0,), A(0, 4, 0), B(0, 4, 4), C(4, 4, 0), D(4, 4, 4), E(4, 0, 0), F(0, 0, 4), G (4, 0, 4) and Scaling factor Sx,=2 Sy=3, Sz=2. Apply Scaling operation over the cube for the above Figure 2 and obtain the new coordinates of the object.

34. (i)Define projection. Explain parallel projection and perspective projection along with its various types. Mention its advantages and disadvantages.

35. (ii)Explain composite 3D translations, composite 3D rotation and composite 3D scaling.

36. Summarize the components of the 3D viewing reference frame in a right-handed coordinate system, including the viewing origin, view-up vector and the view plane orientation i.e. the uvn coordinate system.
37. A 3D object is defined by the vertices A(1,2,3), B(4,5,6), C(7,8,9) and D(2,4,6). Perform the following transformations sequentially and find the final coordinates of the vertices:
    - Translate the object by T(3,−2,1), then ,
    - Scale the object with factors S(2,1,0.5), then,
    - Rotate the object 90° clockwise about the Z-axis.

    Show all intermediate steps, including the transformation matrices used, and provide the final coordinates of the transformed object.

38. Illustrate the non-parametric and parametric representation of curve, circle, ellipse, parabola and hyperbola with appropriate diagram.

39. Define interpolation and approximation spline. Explain Bezier curve with an example. Outline the five properties of Bezier curve.

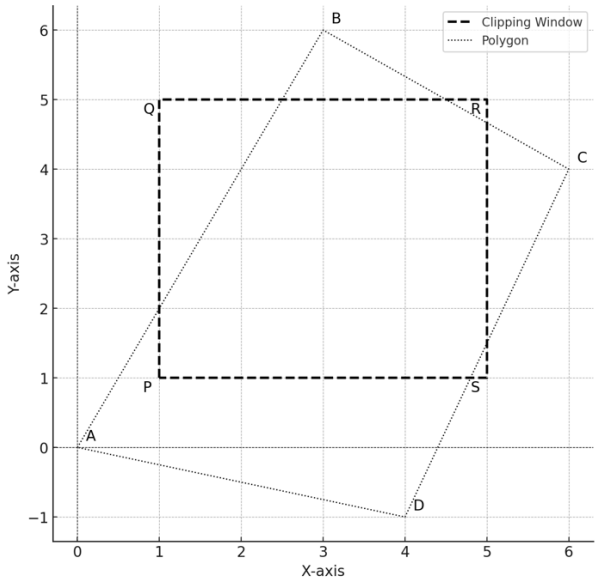
40. Define curve. Explain various representation of curves with appropriate example and its limitations.

41. Explain various steps involved in DDA line drawing algorithm and Bresenham's line drawing algorithm.

42. Given the center point coordinates (-2,2) and radius of 6 units, generate all the points to form a circle using Bresenham's circle drawing algorithm in detail with the algorithm steps. Write the points on the circle in all four quadrants.

43. Explain why rotating a 2D object around a general pivot point requires a combination of translation and rotation transformations. Describe the sequence of operations involved with neat diagrams with the corresponding matrices.

44. Using the Sutherland-Hodgman polygon clipping algorithm, clip the polygon with vertices A,B,C,D against the rectangular clipping window defined by corners P,Q,R,S. Determine the final clipped polygon vertices and explain the step-by-step process of the algorithm.



45. Explain Cohen-Sutherland Line clipping Algorithm. Apply the Cohen Sutherland line clipping algorithm to clip the line segment coordinate (30,60) and (60,25) against the window whose coordinates are (Xwmin,Ywmin)=(10,10) and (xwmax,ywmax)=(50,50).

46. Explain the four cases of Sutherland-Hodgman polygon clipping. For a polygon and clipping window shown in Figure 1, compute the list of vertices after each boundary clipping.

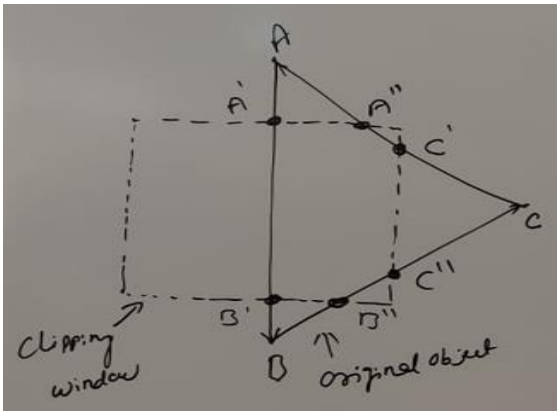
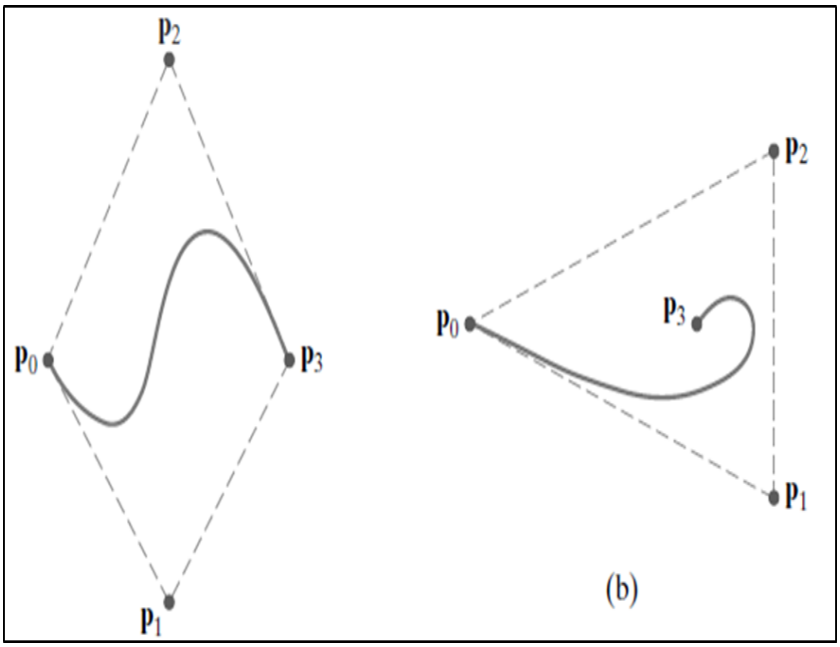


Figure 1

47. Explain different types of Axonometric Projections
48. Explain Bezier and Spline curves for curve representations in computer graphics with suitable diagrams.



49. Describe the concept of a space curve, give its general parametric representation, and explain its geometrical meaning.
50. What are cubic splines? Describe how they are used to create smooth curves in computer graphics or design.
51. Outline the procedure for analyzing or plotting any conic section. Include an example using its parametric representation.