1. (a) Define the following  
   (i) Interactive Computer Graphics  
   (ii) Image processing  
   (iii) Animation  
   (iv) Refresh cycle  
   (v) Display Controller  

(b) What are the shortcoming of DDA line drawing algorithm? How are they removed in Bresenham’s algorithm?  

(c) What is 2D shearing? Write down the matrix for x shear, y shear and xy shear about the origin.  

(d) What is orthographic projection? Explain various categories of orthographic projection.
(e) State and explain the four properties of Bezier curve.

(f) Explain scan line method for visible surface detection.

(g) What is cel animation? Differentiate it with key frame animation.

(h) Explain various types or categories of authoring tools.

2. (a) Discuss all the four cases of Suduland Hodgemen polygon clipping algorithm with the help of a suitable diagram.

(b) Draw a circle having centre (0,0) and radius 5 by midpoint circle generation algorithm.

(c) What are the major limitations of Cohen Sutherland line clipping algorithm? Compare it with Cyrus Beck line clipping algorithm.

(d) Draw a line having end points (25,15) and (35,23) using Bresenham’s line drawing algorithm.
3.  (a) Calculate the matrix for three views (front, right-side and top) of a given object, shown in the figure.

The vertices of the object are A(4,0,0) B(4,4,0), C(4,4,8), D(4,0,4), E(0,0,0), F(0,4,0), G(0,4,8), H(0,0,4)

(b) Determine the vanishing points for the following perspective transformation matrix

\[
\begin{bmatrix}
8.68 & 5.6 & 0 & 2.8 \\
0 & 20.5 & 0 & 4.5 \\
7.0 & 8.0 & 0 & 2.0 \\
5.3 & 7.3 & 0 & 3.0 \\
\end{bmatrix}
\]

(c) Vertices of a triangle are A(5,3), B(7,2), C (9,4). Rotate the triangle by 30° about the point A of the triangle.

4.  (a) Derive the equation of the 3 point Bezier curve defined by the following control points (-1,0), (0,2) and (1,0).
(b) What are the relative merits of object space method and image space methods of visible surface detection?

(c) Derive a mathematical expression for Phory's specular reflection model. Explain how ambient, diffused and specular reflection contribute to the resulting intensity of reflected ray of light in the Phory's model.

5. (a) What are the various types of Bitmap Images?
(b) Define the following: 1x6=6
(i) CDR  (ii) JPEG  (iii) TIFF  
(iv) GIF  (v) PNG  (vi) PDF  
(c) How many frames does a 40 second animation film sequence require with no duplication? What will be answer if duplication is there?
(d) Differentiate between the following: 5
(i) Printer versus Plotter
(ii) Drawing versus Painting.