**Unit 2: 2D and 3D Transformation**

1. Find the matrix that represents the rotation of an object by 30° about origin. What are the new coordinates of the point P (2, -4) after the rotation?
2. Translate a square by 2 units with the following coordinates:

A (0, 0), B (3, 0), C (3, 3), D (0, 3)

1. What will be the transformation matrix for the following rotations about the origin:
2. Counter clockwise by Π.
3. Counter clockwise by Π/2.
4. Rotate a triangle at A (0, 0), B (6, 0), C (3, 3) by 90° about the origin in anticlockwise direction.
5. Perform a 45° rotation of triangle A (0, 0), B (1, 1), C (5, 2)
6. About the origin
7. About point (-1, -1)
8. Compute the composite transformation matrix for the following transformation in the given order:
9. Translate by (-2, 1)
10. Rotate by 70°
11. Translate by (2, 3)
12. Show that two successive reflections about either of the coordinate axis is equivalent to a single rotation about the origin.
13. Prove that any two successive 3D-rotations about a given rotation axis is commutative with example.
14. Find out the transformation matrix for rotation about an arbitrary axis by Ɵ° in 3D.

**Unit 3: Raster Scan Graphics**

1. Consider a line from (0, 0) to (6, 7). Use Bresenham’s algorithm to rasterize the line.
2. Consider a line from (5, 5) to (13, 9). Use Bresenham’s algorithm to rasterize the line.
3. Digitize a line from (10, 12) to (20, 18) using Bresenham’s line algorithm.
4. Plot a circle using Bresenham’s algorithm whose radius is 3 and center coordinates are (0, 0).
5. Plot a circle using Bresenham’s algorithm whose radius is 5 and center coordinates are (0, 0).
6. Describe Edge flag algorithm for polygon with suitable example
7. Describe boundary fill algorithm using stack for polygon with suitable example.