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School of University Polytechnic**Diploma in Computer Science and Engineering
Semester End Examination - Nov 2023****Duration : 180 Minutes
Max Marks : 100****Sem V - N1DF501B - Computer Graphics**General Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- 1) List fundamental steps involved in the Graphics Pipeline for rendering 3D scenes. K1 (2)
- 2) Explain the importance of Depth-Buffer Method K2 (4)
- 3) Describe Output primitives briefly K2 (6)
- 4) Apply the concept of Affine Transformations to rotate and scale a 2D object represented by a set of points. K3 (9)
- 5) A) Carry out one real-world application where the Circle equation algorithm can be applied. Explain how the algorithm is utilized in that application. B) Illustrate the generated circle on a Cartesian coordinate system. Plot the center point (2, 3) and the calculated points from part a) to visually represent the circle. K3 (9)
- 6) Prove or Verify the correctness of the Liang-Barsky line clipping algorithm by applying it to a given line segment and a clipping window. Show step-by-step calculations and explain how the algorithm efficiently determines whether the line segment is inside, outside, or partially inside the clipping window. Discuss any possible edge cases and how the algorithm handles them. K5 (10)
- 7) Create a design or construct a simple shape consisting of closed polygons. Apply the Boundary Fill algorithm to fill one of the polygons with a specific fill color. Explain the design or construction process and compile the step-by-step procedure of applying the algorithm. K4 (12)
- 8) Verify the properties of Nonuniform B-Splines and evaluate their ability to create deformable surfaces in computer graphics K5 (15)

- 9) (a) Verify the correctness of the Liang-Barsky Line Clipping algorithm and evaluate its advantages over other line clipping algorithms (b) Examine the Sutherland-Hodgeman Polygon Clipping algorithm and evaluate its ability to clip concave and convex polygons against a convex clipping window K5 (15)
- 10) Propose various visible face detection methods or hidden surface elimination K6 (18)