

Seat No./Enrollment No.: _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BACHELOR OF ENGINEERING – SEMESTER 5 – EXAMINATION – SUMMER 2026

Subject Code: 3150712

Date: 25/05/2026

Subject Name: Computer Graphics

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Simple and non-programmable scientific calculators are allowed.**

- Q.1**
- (a)** List any three major applications of computer graphics. **03**
 - (b)** Explain the difference between Vector (Random Scan) and Raster Scan display systems. **04**
 - (c)** Explain the working of CRT (Cathode Ray Tube) with a suitable diagram. **07**

- Q.2**
- (a)** Write DDA line drawing algorithm. Also state the limitations of DDA line drawing algorithm. **03**
 - (b)** Explain odd-even, winding number and inside-outside test for polygon filling. **04**
 - (c)** Apply Mid-Point Circle Algorithm to find the coordinates of a circle with radius $r=10$ and center $(0,0)$ for a single octant. **07**

OR

- Q.2**
- (c)** Given end-point $P_1(1,3)$ and $P_2(8,9)$ find the pixels illuminated using Bresenham Line Drawing algorithm. **07**
- Q.3**
- (a)** What is the difference between Window and ViewPort? **03**
 - (b)** What is a need of homogeneous co-ordinates? Give homogeneous co-ordinates for translation, rotation and scaling. **04**
 - (c)** Consider a triangle with vertices $A(1,1)$, $B(3,2)$ and $C(2,4)$. Find out the transformation matrix which rotates given triangle about point $A(1,1)$ by an angle 45° clockwise. **07**

OR

- Q.3**
- (a)** List and Explain various 2D transformation. **03**
 - (b)** Explain reflection and shear with example. **04**
 - (c)** Explain the Cohen - Sutherland line clipping algorithm in details. **07**

- Q.4**
- (a)** Discuss various ways to represent a polygon mesh in brief. **03**
 - (b)** Write a short note on 3D rotation. **04**
 - (c)** List and explain the properties of Bezier curves. **07**

OR

- Q.4**
- (a)** Write a short note on 3D translation. **03**
 - (b)** Compare between interpolation spline and approximate spline. **04**
 - (c)** List and explain the properties of B-spline curves. **07**

Q.5	(a) Differentiate: Parallel projection vs. Perspective projection.	03
	(b) Explain 3D Scaling with example.	04
	(c) Explain Depth-Buffer method (Z-Buffer) for visible surface detection.	07
	OR	
Q.5	(a) Explain ambient light in brief.	03
	(b) Compare parallel and perspective projection.	04
	(c) Explain how RGB to CMY color models with proper diagram.	07
