Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2013**

**Subject code: 710204N** **Date: 06-06-2013**

**Subject Name: Computer Graphics**

**Time: 10.30 am – 01.00 pm** **Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

| | | | |
|---|---|---|---|
| **Q.1** | **(a)** | Derive 3D rotation matrix for rotation about arbitrary line passing from origin. | **07** |
| | **(b)** | Discuss Hermite Curve in detail. Derive relevant matrices. | **07** |
| **Q.2** | **(a)** | 1. Derive transformation matrix for window to viewport transformation<br>2. Derive transformation matrix for 2D scaling about origin and 2D scaling with respect to any fixed point ($x_f$, $y_f$) | **07** |
| | **(b)** | Explain Midpoint line drawing algorithm. Compare it with DDA algorithm. | **07** |
| | | **OR** | |
| | **(b)** | Explain Midpoint ellipse drawing algorithm with proper formulas. | **07** |
| **Q.3** | **(a)** | Differentiate and explain various types of projection. | **07** |
| | **(b)** | What is chromaticity diagram? Explain its properties and applications in detail. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain and differentiate working of raster scan display system and random scan display system | **07** |
| | **(b)** | Explain Z buffer algorithm with suitable example | **07** |
| **Q.4** | **(a)** | Explain ambient and secular light models | **07** |
| | **(b)** | Explain aliasing and anti-aliasing using un-weighted Area Sampling technique | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Explain Cohen Sutherland line clipping algorithm. Use it to clip line P1(70, 20) and P2(100, 10) against a window lower left corner (50, 10) and upper right corner (80, 40). | **07** |
| | **(b)** | A mirror is vertically placed such that it passes through the pointes (10, 0) and (0, 10). Find the reflected coordinates of the triangle with coordinates A(5, 50), B(20, 40) and C(10, 70). | **07** |
| **Q.5** | **(a)** | Explain the rendering techniques for shaded images | **07** |
| | **(b)** | Write a note on a Boundary fill algorithm and flood fill algorithm. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain following terms: Morphing, Facial animation | **07** |
| | **(b)** | Explain RGB and HSV color models | **07** |

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