Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**M.C.A -IV$^{th}$ SEMESTER–EXAMINATION – MAY- 2012**

**Subject code: 640008 Date: 19/05/2012**

**Subject Name: Computer Graphics (CG)**

**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)** Explain the following terms **14**

1) Aspect ratio
2) Scan conversion
3) Geometric primitives
4) Aliasing
5) Homogeneous coordinates
6) Viewport
7) Vanishing Point

**Q.2** **(a)** Write generalized Bresenham's line drawing algorithm for all the cases of slope. **05**

**(b)** Write the short note on following **09**

1) Computer aided design
2) Mouse devices
3) Depth cueing

**OR**

**(b)** Write the short note on following **09**

1) Image Processing
2) Digitizers
3) Exploded and cutaway views

**Q.3** **(a)** Explain basic design and operation of cathode-ray tube. **07**

**(b)** Derive and explain Mid point circle algorithm for decision parameter. **07**

**OR**

**Q.3** **(a)** What is flat panel display? Describe its categories and explain any one. **07**

**(b)** Digitize the Mid point ellipse algorithm for given input $r_x = 8$ and $r_y = 6$ **07**

**Q.4** **(a)** Apply the transformation to square A(0,0), B(1,0), C(1,1) and D(0,1) given below: **05**

a) Shear the original square with shear parameter value of 0.5 relative to the line $y_{ref} = -1$
b) Reflect the original square about the origin

**(b)** 1) Describe antialiasing. Name different antialiasing methods and explain any two. **06**

2) Explain two dimensional scaling **03**

**OR**

**Q.4** **(a)** Find the transformation matrix that transforms the given square ABCD to half its size with respect to selected fixed position (2,2) for the coordinates A (1,1), B(3,1), C(3,3) and D(1,3). Also get the resultant coordinates of the square ABCD. **05**

**(b)** 1) Derive and explain general three dimensional rotation of an object for an arbitrary axis. **06**

2) Explain flood fill algorithm **03**

**Q.5** **(a)** Explain Liang-Barsky line clipping algorithm. **05**

**(b)** Write the short note on following **09**

1) Three dimensional viewing pipeline
2) Orthogonal projections
3) Explain the following functions in OpenGL
    a. glMatrixMode (GL_PROJECTION)
    b. gluOrtho2D (xwmin, xwmax, ywmin, ywmax)
    c. glutInitDisplayMode(mode)

**OR**

**Q.5** **(a)** Explain Sutherland-Hodgman polygon clipping algorithm. **05**

**(b)** Write the short note on following **09**

1) Three dimensional line clipping
2) Oblique parallel projections
3) What is OpenGL? Name its header files and explain any three polygon fill area function for drawing polygon.

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