GUJARAT TECHNOLOGICAL UNIVERSITY
M.C.A -IVth 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   **05**
              slope.
     (b)   Write the short note on following   **09**
              1) Computer aided design
              2) Mouse devices
              3) Depth cueing
<div align="center">OR</div>

     (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**
<div align="center">OR</div>

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   **05**
              below:
              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   **06**
              methods and explain any two.
           2) Explain two dimensional scaling   **03**
<div align="center">OR</div>

Q.4   **(a)**   Find the transformation matrix that transforms the given square ABCD to   **05**
              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.
     (b)   1) Derive and explain general three dimensional rotation of   **06**
              an object for an arbitrary axis.

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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