

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER-IV • EXAMINATION – WINTER • 2014

Subject Code: 2640008

Date: 06-12-2014

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 Attempt the followings. 14**
- 1) Define Data Visualization.
 - 2) What is antialiasing?
 - 3) What is 2D point clipping?
 - 4) Define Rigid Body transformation
 - 5) What is homogenous Coordinates?
 - 6) Explain surface rendering.
 - 7) Vanishing Point.
- Q.2 (a) Explain Random Scan display and Raster Scan display. Which System is better for display and why? 07**
- (b) Write the bresenham line drawing algorithm and specify its advantages over DDA algorithm. 07**
- OR**
- (b) Write detailed note on Computer Graphics. 07**
- Q.3 (a) For a given center at origin and radius 10, digitize the midpoint circle algorithm for first octant. 06**
- (b) Write Short note on following. 08**
- (1) Inside-Outside Test. (2) Non emissive device.
- OR**
- Q.3 (a) Explain General two dimensional pivot point rotation and derive its matrix. 06**
- (b) (1) Explain following functions. 08**
- (i) `glutInitWindowSize()` (ii) `glColor3f()` (iii) `glMatrixMode()` (iv) `glCopyPixels()`
- (2) Describe the difference between 4-connected and 8-connected Boundary fill algorithm.
- Q.4 (a) Explain Cohen-Sutherland line clipping algorithm. 07**
- (b) (1) 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. 04**
- (2) Explain three dimensional viewing pipeline. 03
- OR**
- Q.4 (a) What is polygon clipping? Explain Sutherland Hodgeman polygon clipping algorithm. 07**
- (b) (1) Apply the following transformation to square A(0,0), B(1,0), C(1,1) and D(0,1) . 04**
- Shear the original square with shear parameter value of 0.5 relative to the line $y_{ref} = -1$.
- Reflect the original square about the origin.
- (2) Write down 3 x 3 homogenous matrices for Translation, Rotation and Scaling. 03

- Q.5 (a)** What is projection? Differentiate between parallel and perspective projection. Explain perspective projection in brief. **07**
- (b)** What is Shear? Explain various cases for shear with diagrams and equations. **07**
- OR**
- Q.5 (a)** Explain different types of parallel projection in details. **07**
- (b)** What is window and viewport. Explain two dimensional window to viewport transformation. **07**
