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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – VI (NEW).EXAMINATION – WINTER 2016

Subject Code: 2160703 Date: 26/10/2016

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.**

Q.1 **(a)** (i) Consider a raster system with resolution of 1280 by 1024. What size of frame buffer is needed for given system to store 24bits per pixel? How many colors are possible in given system? What is the access time per pixel if refreshing rate is 60 frames per seconds? **02**

(ii) How much time is required to scan individual pixel during screen refresh on a raster system with resolution 600 x 400 and refresh rate of 60Hz. **02**

(iii) Differentiate between DVST & Refresh CRT. **03**

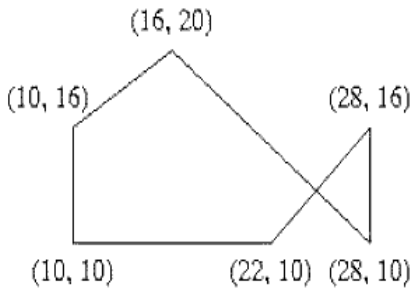
(b) Derive all formulas for Midpoint Ellipse Generating Algorithm. Write pseudo code/algorithm for Midpoint Ellipse Generation. **07**

Q.2 **(a)** Explain Parallel Projection and types of Parallel Projection. **07**

(b) Derive all formulas for Bresenham's Line Drawing Algorithm. Write an algorithm for Bresenham's Line Drawing Algorithm. Draw a line from (2, 2) to (10, 7) using Bresenham's Line Drawing Algorithm. **07**

OR

(b) Explain Scan-Line Polygon Filling Algorithm. Calculate pixel position to Fill following polygon using scan-line polygon filling algorithm. **07**



Q.3 **(a)** Write and Explain Liang Barsky Line Clipping Algorithm. **07**

(b) (i) Write your comments on statement : **04**

" Two dimensional rotation and scaling are cumulative, if $S_x = S_y$ or $\theta = n\pi$ "

(ii) Show that two dimensional reflection through X-axis followed by two dimensional reflection through line y = -x is equivalent to pure rotation about origin by 270^o. **03**

OR

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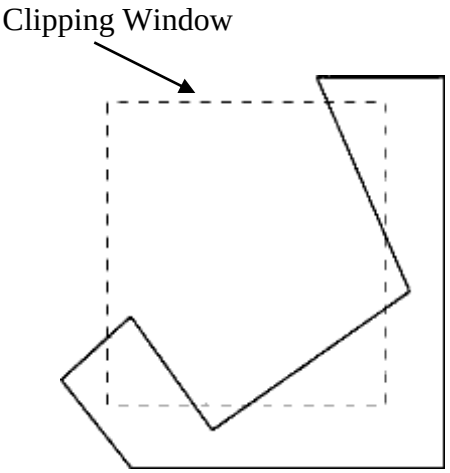
Q.3 **(a)** Write the Sutherland – Hodgeman polygon clipping algorithm. Using it clip the given polygon against the clipping window **07**



(b) Reflect the triangle ABC about the line $3x - 4y + 8 = 0$. The position vector of the coordinate ABC is given as A(4,1), B(5,2) and C(4,3). **07**

Q.4 **(a)** Explain Bezier Curve and properties of Bezier Curve. **07**

(b) (i) Write properties of B-Spline Curve. **07**

(ii) Compare Plasma display with LCD display on the basis of parameters in tabular form.

OR

Q.4 **(a)** List out classification of B-Spline Curves according to Knot Vector. Explain each category. **07**

(b) (i) Explain Cubic Hermite Interpolation method. **07**

(ii) Explain Shadow-mask CRT along with advantages and Disadvantages.

Q.5 **(a)** Define View Reference Point and View Volume. Explain Transformation from World to Viewing Coordinates. **07**

(b) (i) Explain Back-face Detection. **04**

(ii) Explain CMY Color Model. **03**

OR

Q.5 **(a)** Find out the 3D transformation matrix to rotate a given 3D object by an amount 60^o about line passing from point (1,1,1) and the direction vector $V = 2i + 2j + 2k$. **07**

(b) (i) Explain Depth-Buffer Method. **07**

(ii) Write Properties of Light and explain RGB Color Model.

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