Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

SEMESTER– 4 EXAMINATION – WINTER 2012

Subject code: 640008 Date: 11/01/2013

Subject Name: Computer Graphics

Time:10:30 – 13:00 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)** Fill in the following blanks : **07**

i. CAM stands for _____.

ii. Process of transforming one object into another object is called _____.

iii. For Bresenhams's Line drawing algorithm the first decision parameter P_0 = _____.

iv. Circle sections in adjacent octants within one quadrant are symmetric with respect to ____ angle line dividing two octants.

v. _____ are added to adjust the shape of a line ends to give them a better appearance.

vi. RGB system needs _____ storage for the frame buffer in a system with resolution of 1024 by 1024 and 24-bit per pixel.

vii. _____ orthogonal projections display more than one face of an object.

(b) State whether the following statements are TRUE or FALSE. **07**

i. Generally refresh rate of 100 frames per second is required to stop flickering effect.

ii. In active matrix LCD transistors are placed at each pixel location.

iii. A frame buffer with one bit per pixel is known as pixmap.

iv. Rotation of 180^o of a point is equivalent to reflection of that point.

v. Homogeneous coordinate always have one extra coordinate in comparison of regular coordinates.

vi. Sutherland-Cohen line clipping algorithm uses three positions for a line end point.

vii. A section of 2D scene that is selected for display is called clipping window.

Q.2 **(a)** i. What are the special cases of perspective projection? **04**

ii. Draw plan view, front elevation view and side elevation view for any object of your choice. **03**
(Don't use a symmetric object only)

(b) Explain Cohen-Sutherland line clipping algorithm. **07**

OR

(b) Explain Sutherland-Hodgman polygon clipping algorithm. **07**

Q.3	**(a)**	Compare matrix and homogeneous coordinate representation for 2-D translation, rotation and scaling.	**07**
	(b)	i. Explain 2-D window-to-viewport transformation.	**05**
		ii. What is depth queuing?	**02**
		OR	
Q.3	**(a)**	What is shear? Explain various cases for shear with proper diagrams and equations.	**07**
	(b)	i. Explain working of Liang-Barsky line clipping algorithm.	**05**
		ii. What is surface rendering?	**02**
Q.4	**(a)**	Which methods can be applied to fill a color in areas with irregular closed shapes?	**07**
	(b)	i. Explain 3-D reflection.	**05**
		ii. What is pixel phasing?	**02**
		OR	
Q.4	**(a)**	List OpenGL fill area attribute functions. Write their syntax and a routine to demonstrate their use.	**07**
Q.4	**(b)**	i. Derive a composite matrix for a 2-D transformation sequence of rotation then scaling and then translation.	**05**
		ii.What is color table?	**02**
Q.5	**(a)**	Explain DDA line drawing algorithm.	**07**
	(b)	i. Explain inside-outside test.	**05**
		ii. What is pixel mask?	**01**
		iii. Write OpenGL Viewing-Transformation function.	**01**
		OR	
Q.5	**(a)**	Explain mid-point ellipse algorithm.	**07**
	(b)	i. Explain the detection process of front and back face of a polygon.	**05**
		ii. List OpenGL color functions.	**01**
		iii. Write OpenGL Orthogonal-Projection function.	**01**

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