

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 Bresenham'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° 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**
