

GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – VI EXAMINATION – WINTER 2015

Subject Code: 160703

Date: 08/12/ 2015

Subject Name: Computer Graphics

Time: 2:30pm to 5:00pm

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 terms: pixel, aspect ratio, resolution, frame buffer, persistence, horizontal retrace, and scan – conversion. **07**
- (b) Discuss in detail the Bresenham line – drawing algorithm. Provide all derivations. **07**

- Q.2** (a) State the differences between
- (i) 4 – Connected fill and 8 – Connected fill **03**
 - (ii) Raster – scan and Random scan **04**
- (b) Explain the concept of two – dimensional viewing pipeline. And obtain the matrix transformation that converts the world coordinates in to viewing coordinates. **07**

OR

- (b) Obtain the matrix transformations for
- (i) General pivot – point rotation **03**
 - (ii) Reflection about the line $y = x$ in 2 – dimensions. **04**

- Q.3** (a) Explain in details the Cohen – Sutherland line clipping algorithm. **07**
- (b) (i) Write a note on concave polygon and its splitting. **04**
- (ii) What is convex hull? Explain its use in boundary representation. **03**

OR

- Q.3** (a) (i) Explain what a color table is. **04**
- (ii) Explain what are inside – out side tests. **03**
- (b) Write a comparative detailed note on parallel and perspective projections. **07**

- Q.4** (a) What are polygon tables and polygon meshes? Explain how polygon surfaces are represented on computer screen. **07**
- (b) Calculate the positions of points, using the mid – point circle algorithm, on the circle centered at the origin with radius 10 starting with (0,10) up to the line $x = y$. **07**

OR

- Q.4** (a) Obtain the matrix transformation for alignment of a vector (a, b, c) with z – axis. **07**
- (b) What are Bezier Curves and Surfaces? Write their properties. **07**
- Q.5** (a) Explain the term illuminations due to ambient, diffuse reflection, and specular reflection. Obtain an illumination model representing all these. **07**
- (b) Write a comparative note on object space and image space methods. **07**

