

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2160703

Date: 08/05/2017

Subject Name: Computer Graphics

Time: 10:30 AM to 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 Answer the following questions. 14

- 1 What are the various applications of computer graphics?
- 2 Define frame buffer?
- 3 What do you mean by horizontal retrace?
- 4 What is shearing?
- 5 What is aspect ratio?
- 6 What is the need of homogeneous coordinates?
- 7 A line with endpoints codes as 0000 and 0100 is?
 - a. Partially invisible
 - b. Completely invisible
 - c. Completely visible
 - d. Trivially invisible
- 8 Distinguish between convex and concave polygons?
- 9 What is cubic spline?
- 10 Distinguish between window port & view port?
- 11 Define B-Spline curve?
- 12 Primary components of an electron gun in a CRT are heated metal and
- 13 What do you mean by Clipping?
- 14 Define projection?

Q.2 (a) Compare Raster Scan system and Random Scan System. 03

(b) Explain DDA line drawing algorithm. 04

(c) Explain the Bresenham's circle drawing algorithm with all necessary derivations. Consider start position as (0, r) and move in clockwise direction. 07

OR

(c) Explain midpoint ellipse drawing algorithm with necessary decision parameter derivations. 07

Q.3 (a) List and explain various 2D transformations. 03

(b) Explain boundary fill and flood fill algorithm for polygon filling. 04

(c) Perform 45 degree rotation of a triangle A(0,0), B(1,1) and C(5,2). Find transformed coordinates after rotation , 07
(1) About origin.
(2) About point P (-1,-1).

OR

Q.3 (a) Enlist methods of character generation. Explain any one in detail. 03

(b) Use the Bresenham's line drawing algorithm to rasterizing the line with endpoints (1, 3) and (7, 9). Show all the necessary calculations for all the 04

	intermediate points.	
	(c) Explain scan line fill algorithm and also explain all data structures used in algorithm.	07
Q.4	(a) Demonstrate with example inside outside test for polygon.	03
	(b) What are the important properties of Bezier Curve?	04
	(c) Briefly explain NLN line clipping algorithm. What are the advantages of NLN over Cohen Sutherland line clipping algorithm.	07
	OR	
Q.4	(a) Write 2 X 2 transformation matrix for each of the following about the origin: a. Scale the image by twice of the original. b. Shift the image by 2 units to the right. c. The x direction 3 times as large and y direction unchanged.	03
	(b) Explain the properties of B-spline curve.	04
	(c) Explain in details the Cohen – Sutherland line clipping algorithm.	07
Q.5	(a) Explain RGB color model.	03
	(b) Explain parallel projection with the help of diagram.	04
	(c) What is illumination? State and explain different illumination methods.	07
	OR	
Q.5	(a) Briefly explain 3D scaling and rotation.	03
	(b) Briefly explain z-buffer visible surface determination algorithm.	04
	(c) Explain XYZ and CMY color models.	07
