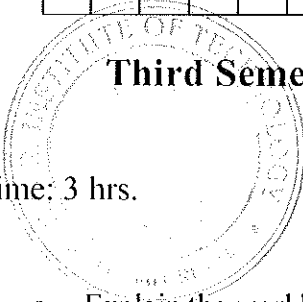


USN

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

13MCA34



Third Semester MCA Degree Examination, June/July 2016
Computer Graphics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

- 1 a. Explain the world coordinate and screen coordinate reference frame with an example. (05 Marks)
b. List the statements needed to setup an OpenGL display window whose top-left corner is at pixel position (100,100). With a window width of 300 pixels and a height 200 pixels. (04 Marks)
c. What is OpenGL display call back routine? Give an example. (03 Marks)
d. List and explain briefly OpenGL point functions and line functions with example. (08 Marks)
- 2 a. Derive the decision parameters by using mid-point method that can be used to generate a straight line segment with any slope. (08 Marks)
b. Write midpoint circle drawing algorithm which exhibits 8-way symmetry. (07 Marks)
c. Explain the boundary-fill algorithm in brief. (05 Marks)
- 3 a. What is inverse transformations? Write two-dimensional inverse matrix for translation, rotation and scaling transformations. (04 Marks)
b. What is composite transformation? Show that the composition of two rotations is additive and two scaling is multiplicative by concatenating the matrix representations for $R(\theta_1)$, $R_2(\theta_2)$ and (Sx_1, Sy_1) (Sx_2, Sy_2) . (08 Marks)
c. Explain general pivot-point rotation and general fixed point scaling transformations in 2-dimensional transformations. (08 Marks)
- 4 a. Explain basic three – dimensional geometric transformations. (08 Marks)
b. Write a program to create a triangle by implementing scaling algorithm by zooming/un-zooming i) x – axis ii) y – axis iii) xy- plane. (08 Marks)
c. List and explain the basic OpenGL geometric transformations. (04 Marks)
- 5 a. Explain briefly the mapping from window-to-viewport coordinate transformations. (08 Marks)
b. Write and explain Cohen-Sutherland line clipping algorithm. (08 Marks)
c. Write OpenGL function for the following : (04 Marks)
i) OpenGL project mode
ii) Current GLUT display window.
- 6 a. Explain 3-dimensional viewing pipeline. (06 Marks)
b. Define projection, depth cueing and surface rendering in 3-dimensional viewing. (06 Marks)
c. Explain the three-dimensional matrices from world to viewing coordinates. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

- 7 a. Explain the following :
- i) Orthogonal projection (10 Marks)
 - ii) Oblique parallel projection. (05 Marks)
- b. Explain perspective projections. (05 Marks)
- c. Explain viewport transformations and three dimensional screen coordinates. (05 Marks)
-
- 8 a. What is Bezier spline curve? Derive an equation for Bezier curve. (08 Marks)
- b. What is computer based animation? Explain the basic approach to design a animation sequence. (06 Marks)
- c. Write short notes on :
- i) Traditional animation technique
 - ii) General-computer animation technique. (06 Marks)

* * * * *