

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

**Sixth Semester B.E. Degree Examination, Dec.2013/Jan.2014**  
**Computer Graphics and Visualization**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART - A**

- 1 a. What is computer graphics? How is it different from photography? Discuss the major categories of applications of computer graphics. (10 Marks)
- b. Explain the different graphics architectures in detail, with the aid of functional schematics. (10 Marks)
- 2 a. Write a typical main function that is common to most non-interactive applications and explain each function call in it. (10 Marks)
- b. Explain the major categories of graphics API functions. (07 Marks)
- c. Explain "Color Cube" in brief. (03 Marks)
- 3 a. What are the major characteristics that describe logical behaviour of an input device? Explain the various classes of logical input devices supported by OpenGL. (08 Marks)
- b. What is double buffering? How does OpenGL support this? Discuss. (06 Marks)
- c. Enlist the features of a good interactive program. (06 Marks)
- 4 a. Explain the mathematical entities – point, scalar and vector with examples for each. (06 Marks)
- b. How do you model a cube? Write a function "Cube" which models and renders a  $2 \times 2 \times 2$  cube. (10 Marks)
- c. Explain Bilinear interpolation method of assigning colors to points inside a quadrilateral. (04 Marks)

**PART - B**

- 5 a. Explain the basic affine transformations in 3D along with their matrix forms. (08 Marks)
- b. How does instance transformation help in generating a scene? Explain. (06 Marks)
- c. Explain OpenGL transformation matrices along with their syntax. (06 Marks)
- 6 a. List the differences between perspective projection and parallel projection. (04 Marks)
- b. Derive the matrices for simple perspective projection and orthogonal projection. (08 Marks)
- c. Explain the perspective projection and parallel projection along with their OpenGL functions. (08 Marks)
- 7 a. Explain Phong lighting model. (08 Marks)
- b. How does OpenGL support different light sources? Discuss. (06 Marks)
- c. How does OpenGL support different material specifications? Discuss. (06 Marks)

- 8 a. What is clipping? Explain Cohen-Sutherland line-clipping algorithm in 2D. (06 Marks)
- b. Clip the following polygon using Sutherland-Hodgeman algorithm shown in Fig. Q8 (b). (06 Marks)

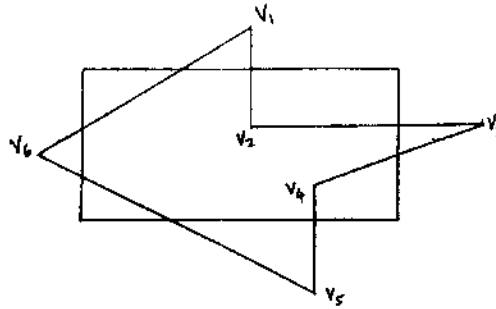


Fig. Q8 (b)

- c. Write short notes on:
  - i) DDA algorithm.
  - ii) Z-buffer algorithm.

(08 Marks)

\*\*\*\*\*

Q. @ 12/12

192, @ 12