

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

**Sixth Semester B.E. Degree Examination, Dec.2016/Jan.2017**  
**Computer Graphics & Visualization**

Time: 3 hrs.

Max. Marks: 100

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

**PART - A**

- 1 a. Discuss the applications of computer graphics. (04 Marks)  
 b. Describe the working of a pen plotter model. Write a code fragment of a simple program in pen plotter that would generate the output shown in Fig. Q1 (b). (06 Marks)

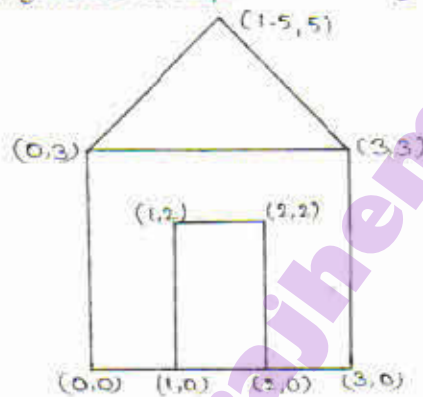


Fig. Q1 (b)

- c. Explain the elements of a graphics system, with a neat diagram. (10 Marks)
- 2 a. Write an OpenGL recursive program for 3D Sierpinski Gasket by subdivision of a tetrahedron. (10 Marks)  
 b. Write the different OpenGL primitives, explain each primitive with an example. (10 Marks)
- 3 a. List the three input modes and discuss them with the figures where ever required. (10 Marks)  
 b. Write an OpenGL program to draw a small box at each location on the screen where the mouse cursor is located at the time, that the left button is pressed and right button to terminate the program. (10 Marks)
- 4 a. Explain the procedure of converting a world object frame into camera or eye frame using model view matrix. (10 Marks)  
 b. Explain the following:  
 i) Affine space.  
 ii) Vector-vector addition. (04 Marks)  
 c. Given a 2D object with the vertices  $\{(1, 1), (3, 1), (2, 3)\}$ . Rotate this object about the origin by  $90^\circ$ . Calculate the new values by using 2D rotation matrix. Draw the original and the rotated object. (06 Marks)

**PART - B**

- 5 a. Define and represent the following 3D transformations in homogeneous co-ordinate system:  
 i) Translation                      ii) Scaling (10 Marks)  
 b. What is concatenation of transformation? Explain 3D rotation about a fixed point. (10 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.

- 6 a. Bringout the differences between perspective and parallel projections. (06 Marks)  
b. Explain the z-buffer algorithm. (04 Marks)  
c. Derive the simple perspective projection matrix. (10 Marks)
- 7 a. List and explain different classification of light material interactions. (10 Marks)  
b. Explain the Phong lighting model. Indicate the advantages and disadvantages of this model. (10 Marks)
- 8 a. Explain Cohen-Sutherland line clipping algorithm with an example. (10 Marks)  
b. Discuss the Bresenham's rasterization algorithm. (06 Marks)  
c. Explain antialiasing. (04 Marks)

\*\*\*\*\*