

## EE4208 Quiz 2

Time allowed: 1 hour

### Qn 1

*gluLookAt* (250, 100, 150, 200, 100, 200, 0, 1, 0)

Derive the  $4 \times 4$  transformation matrix that transforms world coordinates to camera coordinates. Simplify as much as possible. (20 marks)

### Qn 2

- a) A solid sphere with radius 10 and center (50, 50, 50) is to be drawn. Write a function for this object using OpenGL command. (You may assume the grid parameters is (30, 30).) You should include appropriate measures that protects other parts of the program from the transformations within this function.
- b) Will the point (40, 50, 50) on the surface of the sphere be visible to the camera? Why? Give the name of the technique you are using. (20 marks)

### Qn 3

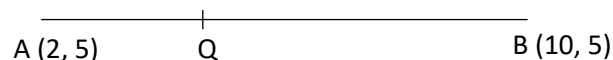
You wish to move the camera to (100, 100, 150) in 2 seconds with an acceleration. Write the code that would enable you to do so. (20 marks)

### Qn 4

You wish to cast a shadow of the sphere on the plane  $Z = 0$ . The plane has painted a texture. The light source is distant with the lighting direction parallel to (1, 1, 2). Write the code that would enable you to do so.

Note that you should set up appropriate measures such that the shadow would not be covered by the texture. (20 marks)

### Qn 5



The figure above shows a scanline AB. Normal at A is (0, 0, 1). Normal at B is (0.6, 0, 0.8). Express the normal at any point Q along the line in incremental form. (20 marks)

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