

**3 Introduction to Graphics (PR)**

Consider the problem of rendering a scene consisting of spheres graphically using ray tracing.

- (a) Give a brief overall description of the mathematics underlying the algorithm. Discuss modelling the geometry of individual spheres, formulating the vector equation of a ray, modelling different lighting effects on the surfaces of the spheres, and considering spheres made of refractive and mirrored material. [10 marks]
- (b) What is meant by *spatial aliasing* and *temporal aliasing* in an image? [3 marks]
- (c) Describe how super-sampling can be used to reduce spatial aliasing. [4 marks]
- (d) What is meant by *distributed ray tracing* and when is it used? [3 marks]