2 A sphere floats in equilibrium on the surface of sea water of density 1050 kg m^{-3}, as shown in Fig. 2.1.

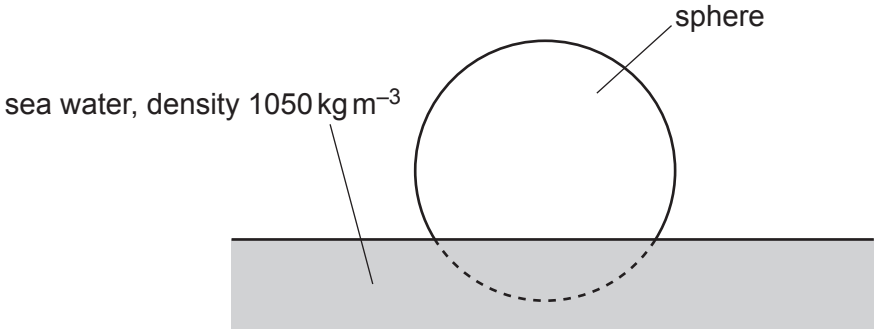

Fig. 2.1

(a) 21% of the volume of the sphere is below the surface of the water.

Calculate the density of the sphere.

density = ... kg m^{-3} [2]

(b) The sphere is now held so that its entire volume is below the surface of the water. The sphere is then released.

(i) Calculate the initial acceleration of the sphere.

acceleration = ... m s^{-2} [3]

(ii) The sphere accelerates upwards but remains entirely below the surface of the water.

State and explain what happens to the acceleration of the sphere as its velocity begins to increase.

.....

.....

.....

..... [3]

[Total: 9]