3 **(a)** Define *electric field strength*.

.....

.....[1]

(b) A sphere S has radius 1.2×10^{-6} m and density 930 kg m^{-3}.

Show that the weight of S is 6.6×10^{-14} N.

[2]

(c) Two horizontal metal plates are 14 mm apart in a vacuum. A potential difference (p.d.) of 1.9 kV is applied across the plates, as shown in Fig. 3.1.

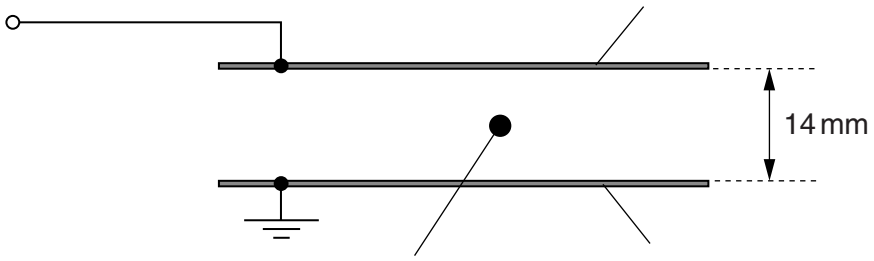

Fig. 3.1

A uniform electric field is produced between the plates.
The sphere S in **(b)** is charged and is held stationary between the plates by the electric field.

(i) Calculate the electric field strength between the plates.

electric field strength = ...V m^{-1} [2]

(ii) Calculate the magnitude of the charge on S.

charge = ... C [2]

(iii) The magnitude of the p.d. applied to the plates is increased.
Explain why S accelerates towards the top plate.

.....

.....[2]