

- 5 (a) State Coulomb's law.

[2]

- (b) Two identical oil droplets are in a vacuum. The centres of the droplets are a distance of 3.8×10^{-6} m apart. The droplets have equal charge and exert an electric force on each other of magnitude 6.3×10^{-17} N.

Determine the magnitude of the charge on each droplet.

charge = C [2]

- (c) One of the oil droplets in (b) is now placed between two horizontal metal plates, as shown in Fig. 5.1.

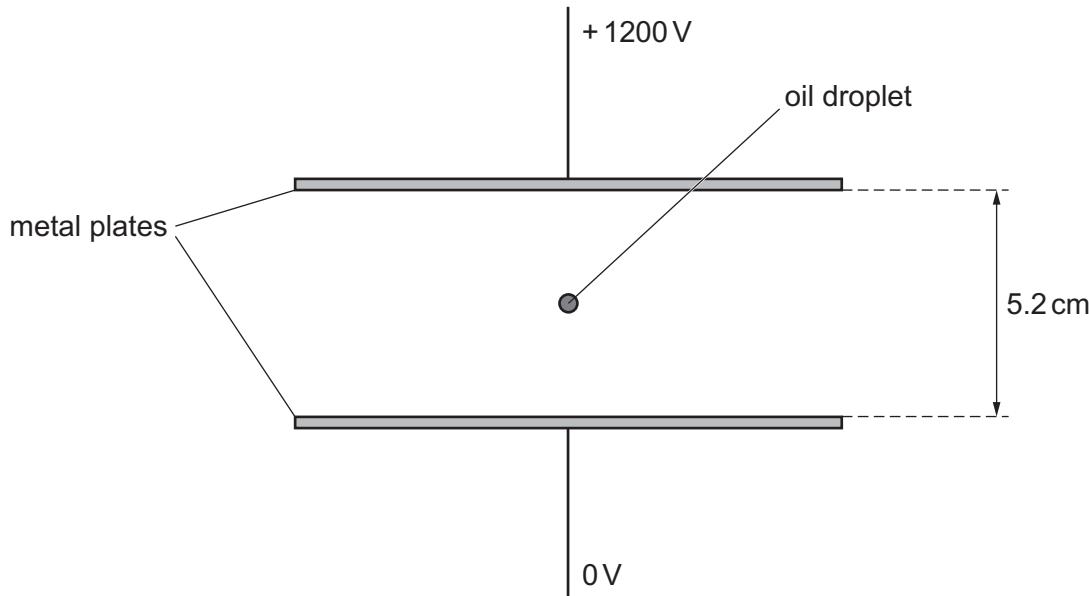


Fig. 5.1 (not to scale)

A potential difference (p.d.) of 1200V is applied between the plates, with the top plate at the higher potential. The oil droplet is stationary and in equilibrium.

- (i) State the sign of the charge on the oil droplet.

..... [1]

- (ii) On Fig. 5.1, draw four lines to represent the electric field between the plates. [3]

- (iii) The distance between the plates is 5.2 cm.

Determine the mass of the oil droplet.

mass = kg [3]