

- 6 Two positively charged identical metal spheres A and B have their centres separated by a distance of 24 cm, as shown in Fig. 6.1.

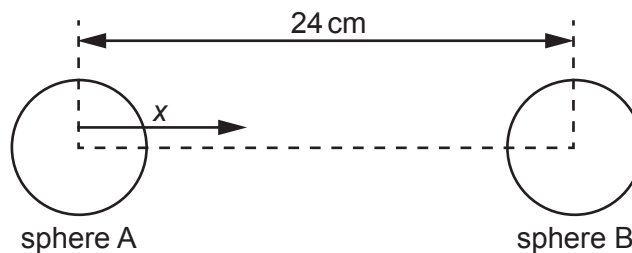


Fig. 6.1 (not to scale)

The variation with distance x from the centre of A of the electric field strength E due to the two spheres, along the line joining their centres, is represented in Fig. 6.2.

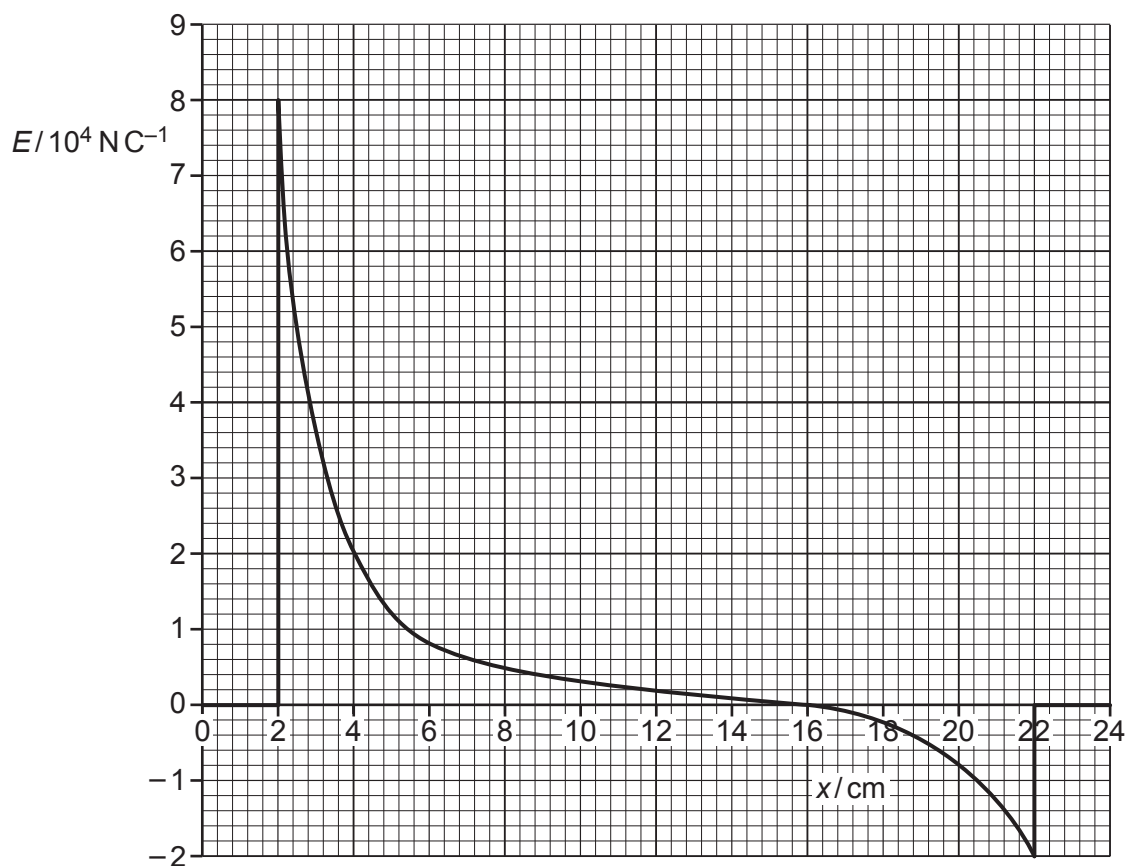


Fig. 6.2

- (a) State the radius of the two spheres.

radius = cm [1]

- (b) The charge on sphere A is $3.6 \times 10^{-9} \text{ C}$. Determine the charge Q_B on sphere B.

Assume that spheres A and B can be treated as point charges at their centres.

Explain your working.

$$Q_B = \dots\dots\dots \text{ C [3]}$$

- (c) (i) Sphere B is removed.

Use information from (b) to determine the electric potential on the surface of sphere A.

$$\text{electric potential} = \dots\dots\dots \text{ V [2]}$$

- (ii) Calculate the capacitance of sphere A.

$$\text{capacitance} = \dots\dots\dots \text{ F [2]}$$