

- 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.

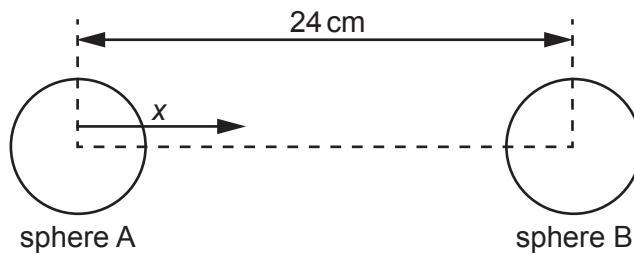


Fig. 6.1 (not to scale)

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.

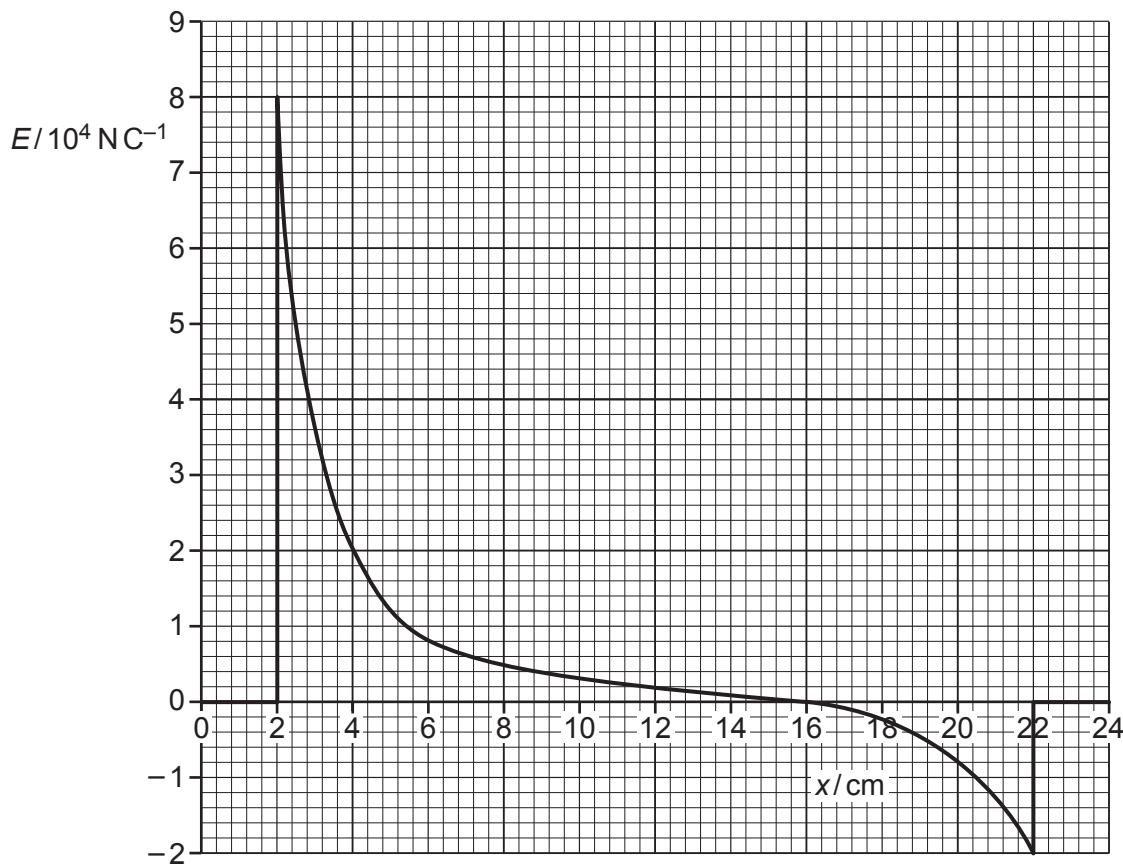


Fig. 6.2

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

$$\text{radius} = \dots \text{cm} \quad [1]$$

- (b) The charge on sphere A is 3.6×10^{-9} 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.

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

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

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

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

- (ii) Calculate the capacitance of sphere A.

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