

- 5 Two small charged metal spheres A and B are situated in a vacuum. The distance between the centres of the spheres is 12.0 cm, as shown in Fig. 5.1.

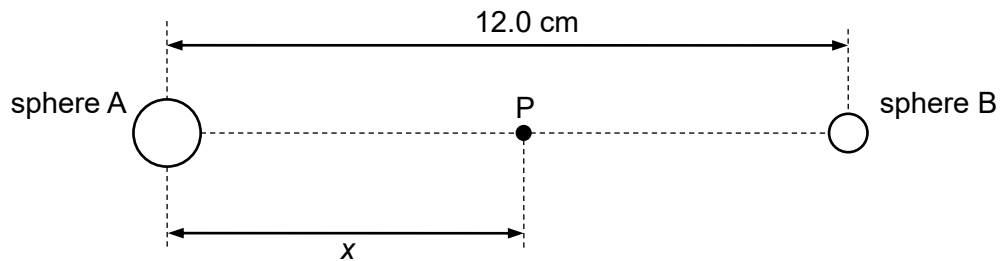


Fig. 5.1

The charge on each sphere may be assumed to be a point charge at the centre of the sphere. Point P is a movable point that lies on the line joining the centres of the spheres and is distance x from the centre of sphere A.

The variation with distance x of the electric field strength E at point P is shown in Fig. 5.2.

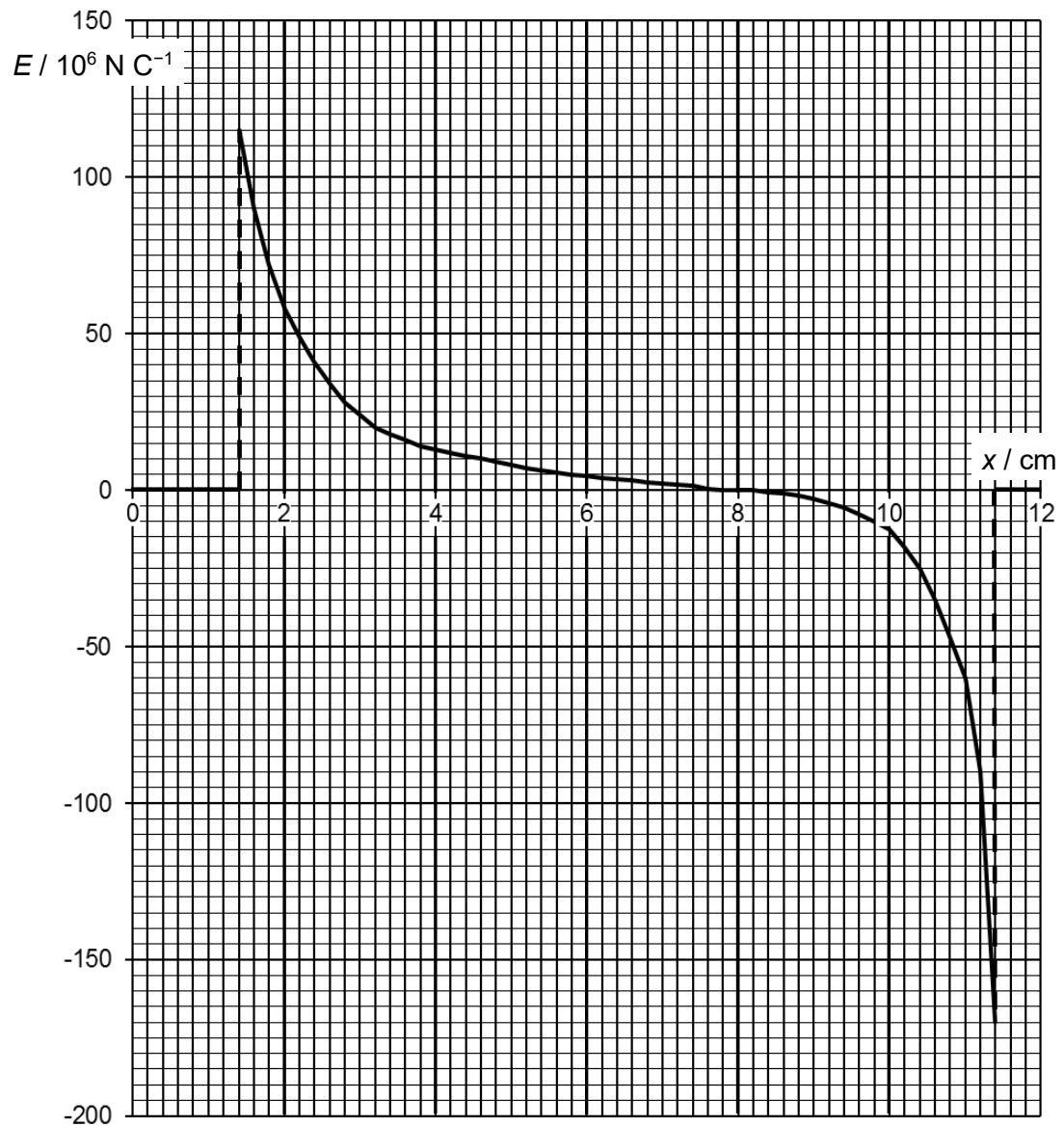


Fig. 5.2

(a) State the evidence provided by Fig. 5.2 that the spheres are conductors.

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.....[1]

- (b) (i) State and explain, whether the polarity of the charges on the spheres are of the same sign.

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..... [2]

- (ii) Use Fig. 5.2 to determine the ratio $\frac{\text{charge on sphere A}}{\text{charge on sphere B}}$.

ratio = [3]

(iii) Hence, on Fig. 5.3, sketch the electric field lines due to these two charges.



Fig. 5.3

[2]

[Total 8]