

- 4 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. 4.1.

For
Examiner's
Use

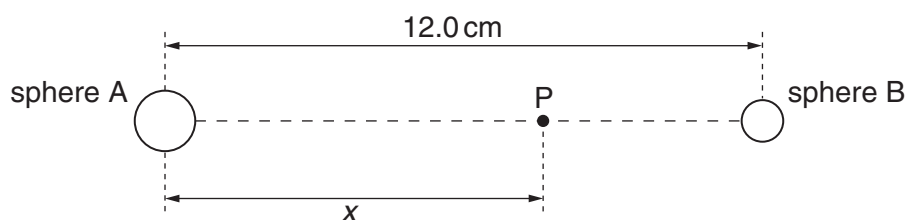


Fig. 4.1 (not to scale)

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. 4.2.

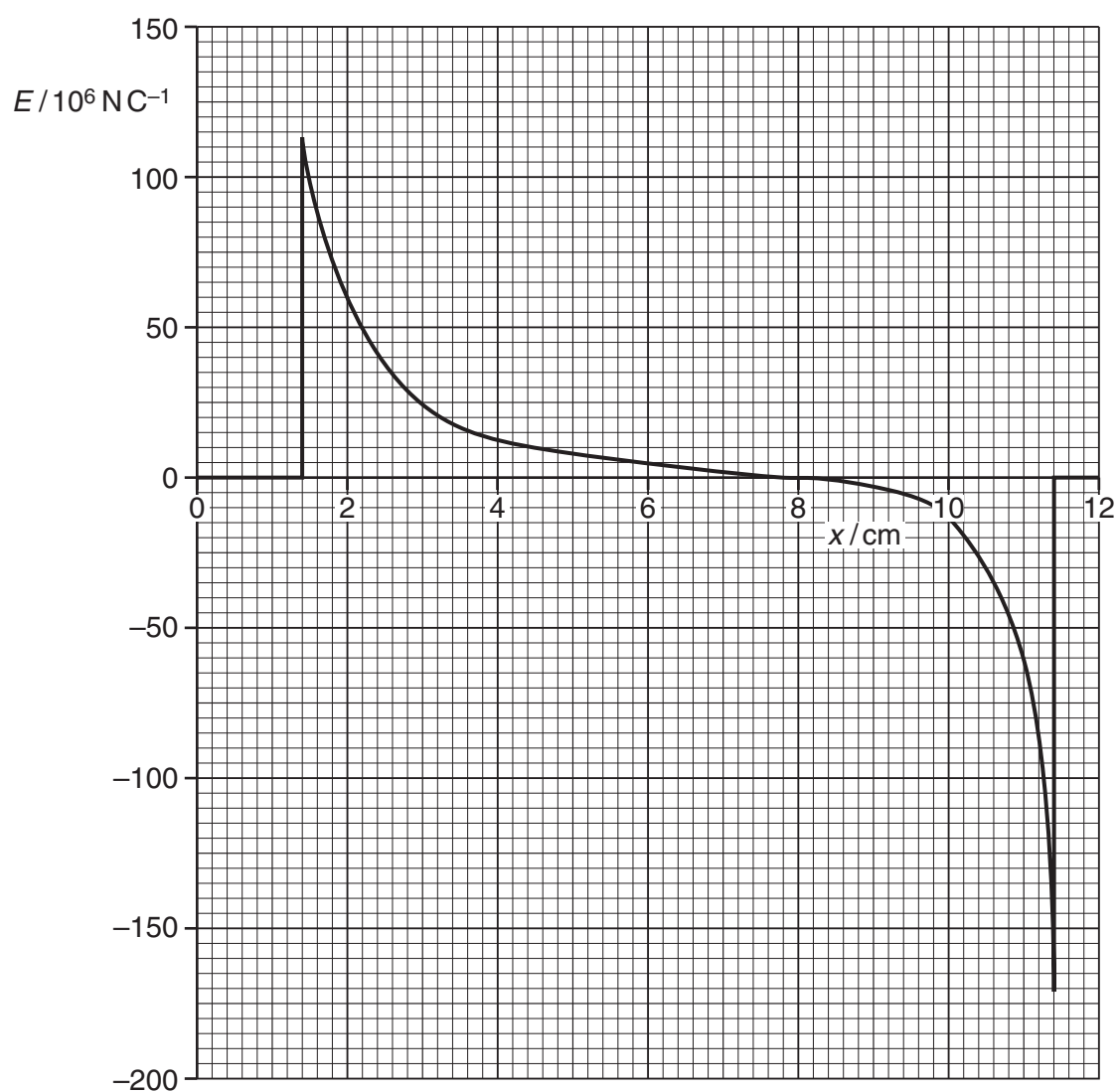


Fig. 4.2

(a) State the evidence provided by Fig. 4.2 for the statements that

(i) the spheres are conductors,

.....
[1]

(ii) the charges on the spheres are either both positive or both negative.

.....

[2]

(b) (i) State the relation between electric field strength E and potential gradient at a point.

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[1]

(ii) Use Fig. 4.2 to state and explain the distance x at which the rate of change of potential with distance is

1. maximum,

.....

[2]

2. minimum.

.....

[2]