

- 5 (a) State **one** similarity and **one** difference between the fields of force produced by an isolated point charge and by an isolated point mass.

similarity:

.....

difference:

.....

[2]

- (b) An isolated solid metal sphere A of radius R has charge $+Q$, as illustrated in Fig. 5.1.

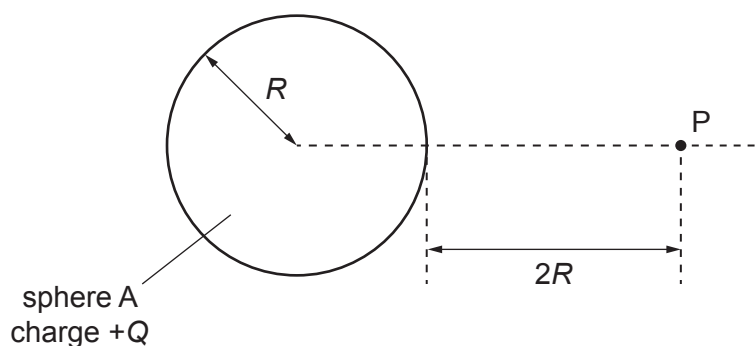


Fig. 5.1

A point P is distance $2R$ from the surface of the sphere.

Determine an expression that includes the terms R and Q for the electric field strength E at point P.

$E =$ [2]

- (c) A second identical solid metal sphere B is now placed near sphere A. The centres of the spheres are separated by a distance $6R$, as shown in Fig. 5.2.

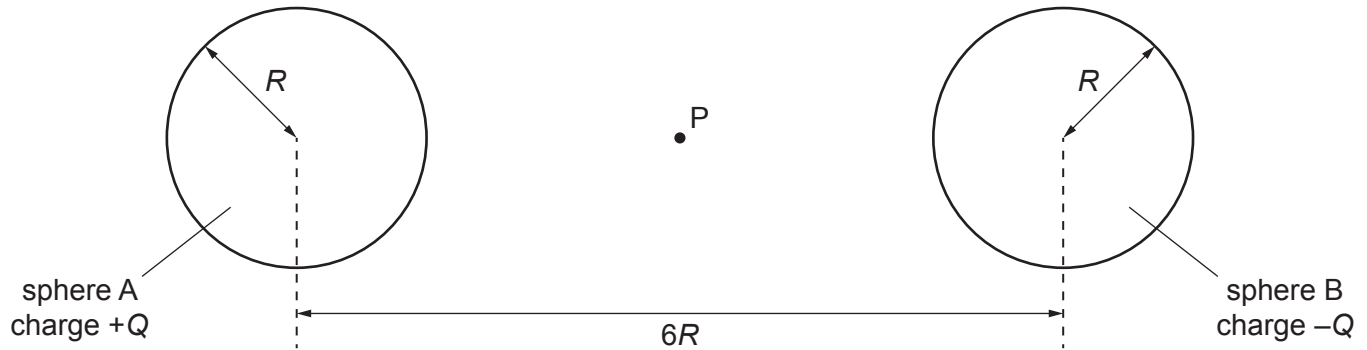


Fig. 5.2

Point P lies midway between spheres A and B.

Sphere B has charge $-Q$.

Explain why:

- (i) the magnitude of the electric field strength at P is given by the sum of the magnitudes of the field strengths due to each sphere

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 [1]

- (ii) the electric field strength at point P due to the charged metal spheres is not, in practice, equal to $2E$, where E is the electric field strength determined in (b).

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 [2]