For Examiner's Use

4 A small metal sphere S is supported by an insulating string that is fixed at point P, as shown in Fig. 4.1.

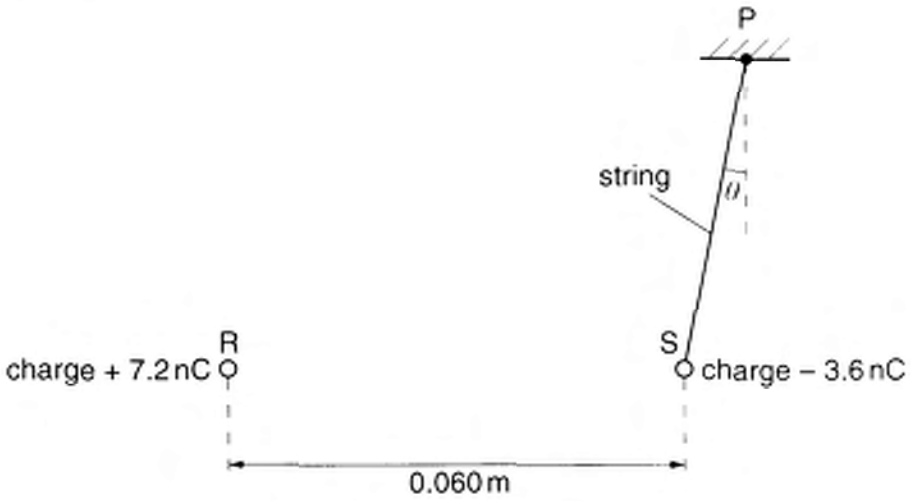

Fig. 4.1 (not to scale)

Sphere S has a weight of 0.49×10^{-3} N and charge – 3.6 nC. Another metal sphere R with a charge of +7.2 nC is placed 0.060 m from S. The diameter of the spheres is negligible compared to the distance between them.

A line joining R and S is horizontal. The string makes an angle θ with the vertical.

(a) (i) On Fig. 4.1, draw electric field lines to represent the electric field in the region between R and S. [3]

(ii) Calculate the magnitude of the electric field strength at the mid-point between R and S.

electric field strength = ... NC^{-1} [2]

(iii) Show that the electric force acting on S is 6.5×10^{-5} N.

[2]

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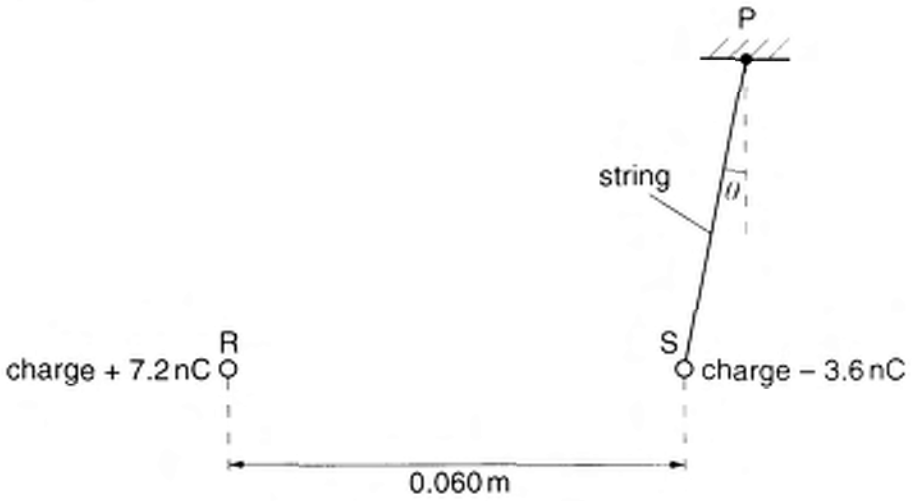

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