5 Two small solid metal spheres A and B have equal radii and are in a vacuum. Their centres are 15 cm apart.
Sphere A has charge +3.0 pC and sphere B has charge +12 pC. The arrangement is illustrated in Fig. 5.1.

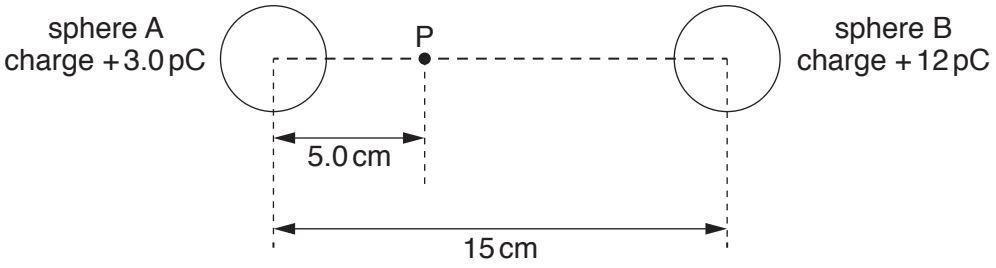

Fig. 5.1

Point P lies on the line joining the centres of the spheres and is a distance of 5.0 cm from the centre of sphere A.

(a) Suggest why the electric field strength in both spheres is zero.

.....

.....

..... [2]

(b) Show that the electric field strength is zero at point P. Explain your working.

[3]

(c) Calculate the electric potential at point P.

electric potential = ... V [2]

(d) A silver-107 nucleus ($^{107}_{47}Ag$) has speed v when it is a long distance from point P.

Use your answer in **(c)** to calculate the minimum value of speed v such that the nucleus can reach point P.

speed = ... $m\,s^{-1}$ [3]

[Total: 10]