5 Two charged metal spheres A and B of diameters 18.0 cm and 12.0 cm respectively, are isolated in space, as shown in Fig. 5.1.

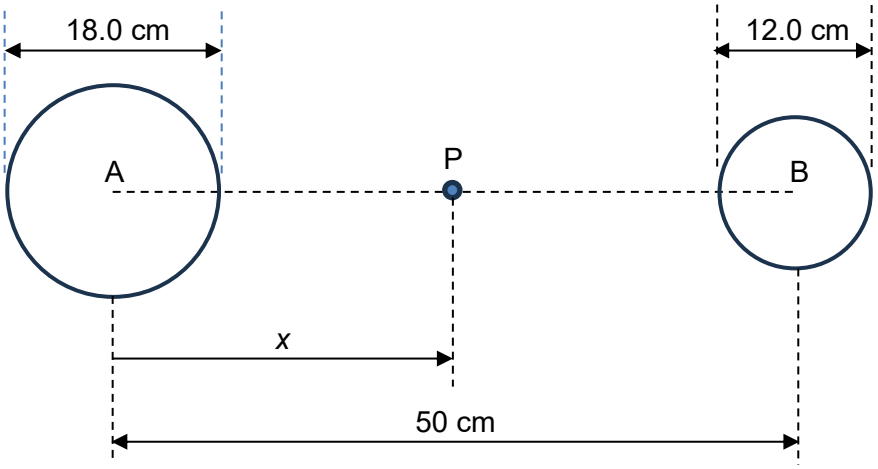

Fig. 5.1

The centres of the spheres are separated by a distance of 50.0 cm. Point P is at a distance *x* from the centre of sphere A along the line joining the centres of the two spheres.

The variation with *x* of the electric potential *V* at P is shown in Fig. 5.2.

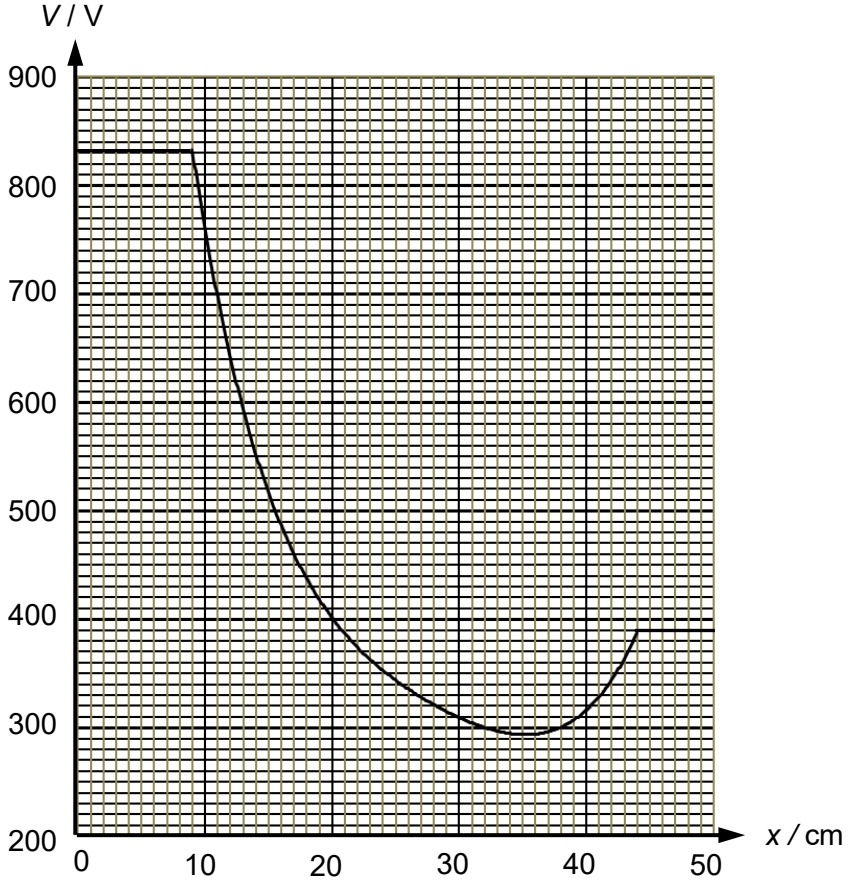

Fig. 5.2

(a) **(i)** State and explain the direction of the electric field at the point P when x = 25.0 cm.

……

……

…… [2]

(ii) Use Fig. 5.2 to determine the magnitude of the electric field strength on an electron placed at point P when x = 25.0 cm

electric field strength = …… V cm^{-1} [3]

(iii) By making reference to electric fields, explain why the potential is constant between x = 0.0 cm and x = 9.0 cm.

……

……

……

…… [2]

(b) A positively-charged ion is released from rest at x = 25.0 cm.

Describe the subsequent motion of the ion.

……

……

……

…… [2]

[Total: 9 marks]