5 **(a)** Define electric potential at a point.

.....

.....

..... [2]

(b) An isolated conducting sphere is charged. Fig. 5.1 shows the variation of the potential V due to the sphere with displacement x from its centre.

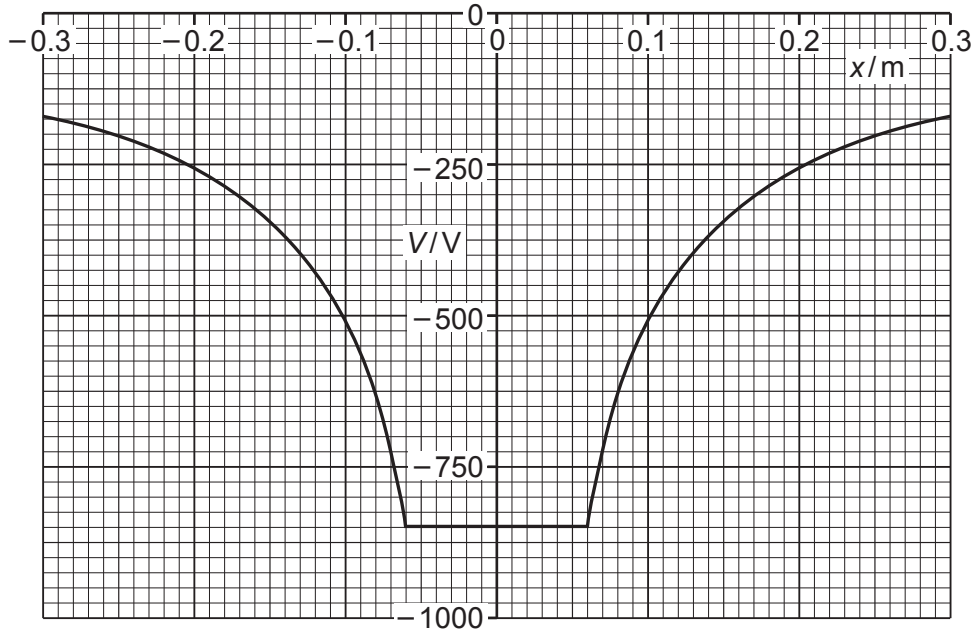

Fig. 5.1

Use Fig. 5.1 to determine:

(i) the radius of the sphere

radius = ... m [1]

(ii) the charge on the sphere.

charge = ... C [2]

(c) Two spheres are identical to the sphere in **(b)**. Each sphere has the same charge as the sphere in **(b)**.

The spheres are held in a vacuum so that their centres are separated by a distance of 0.46 m. Assume that the charge on each sphere is a point charge at the centre of the sphere.

(i) Calculate the electric potential energy E_P of the two spheres.

E_P = ... J [2]

(ii) The two spheres are now released simultaneously so that they are free to move.

Describe and explain the subsequent motion of the spheres.

.....

.....

.....

..... [3]

[Total: 10]