6 **(a)** For any point outside a spherical conductor, the charge on the sphere may be considered to act as a point charge at its centre. By reference to electric field lines, explain this.

.....

.....

.....

.....[2]

(b) An isolated spherical conductor has charge q, as shown in Fig. 6.1.

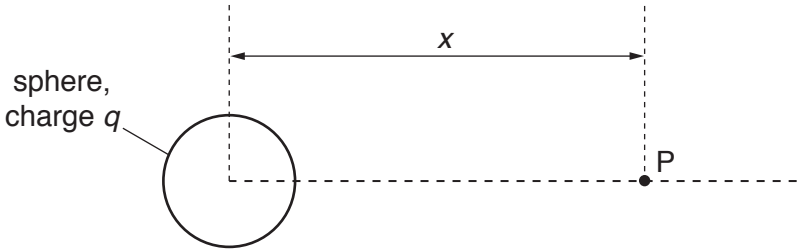

Fig. 6.1

Point P is a movable point that, at any one time, is a distance x from the centre of the sphere.

The variation with distance x of the electric potential V at point P due to the charge on the sphere is shown in Fig. 6.2.

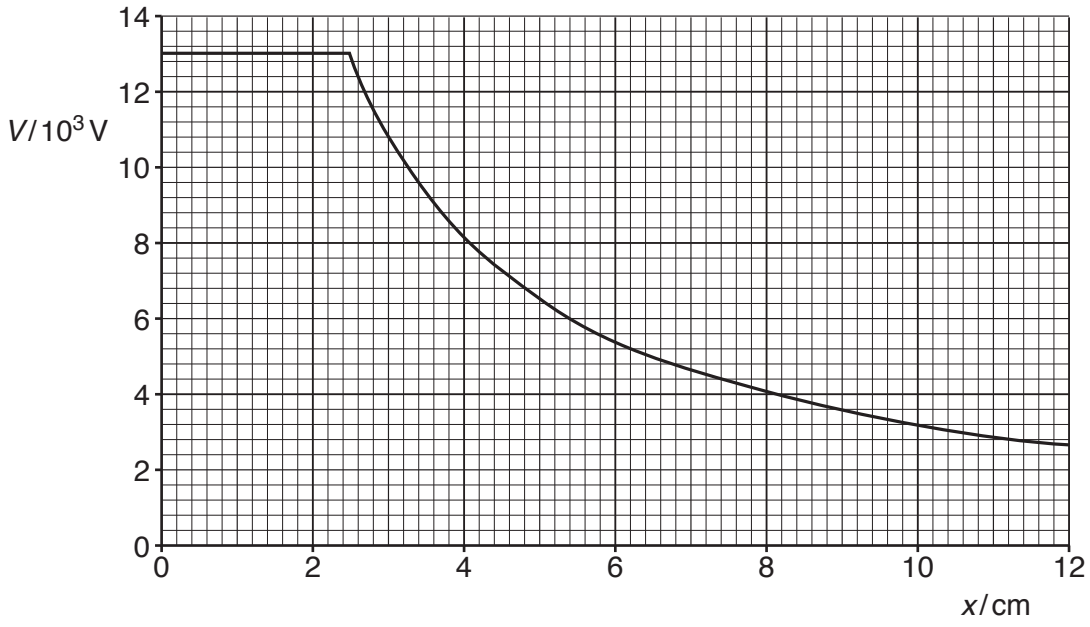

Fig. 6.2

Use Fig. 6.2 to determine

(i) the electric field strength E at point P where $x = 6.0\,\text{cm}$,

$E =$ ..... N C^{-1} [3]

(ii) the radius R of the sphere. Explain your answer.

$R =$ ..... cm [2]

[Total: 7]