

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

[2]

- (b) Two point charges A and B are separated by a distance of 12.0 cm in a vacuum, as illustrated in Fig. 5.1.

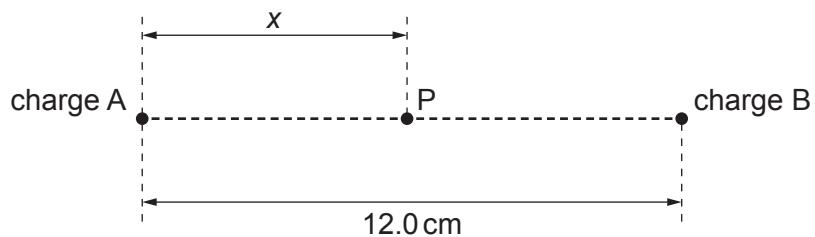


Fig. 5.1

The charge of A is $+2.0 \times 10^{-9} \text{ C}$.

A point P lies on the line joining charges A and B. Its distance from charge A is x.

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

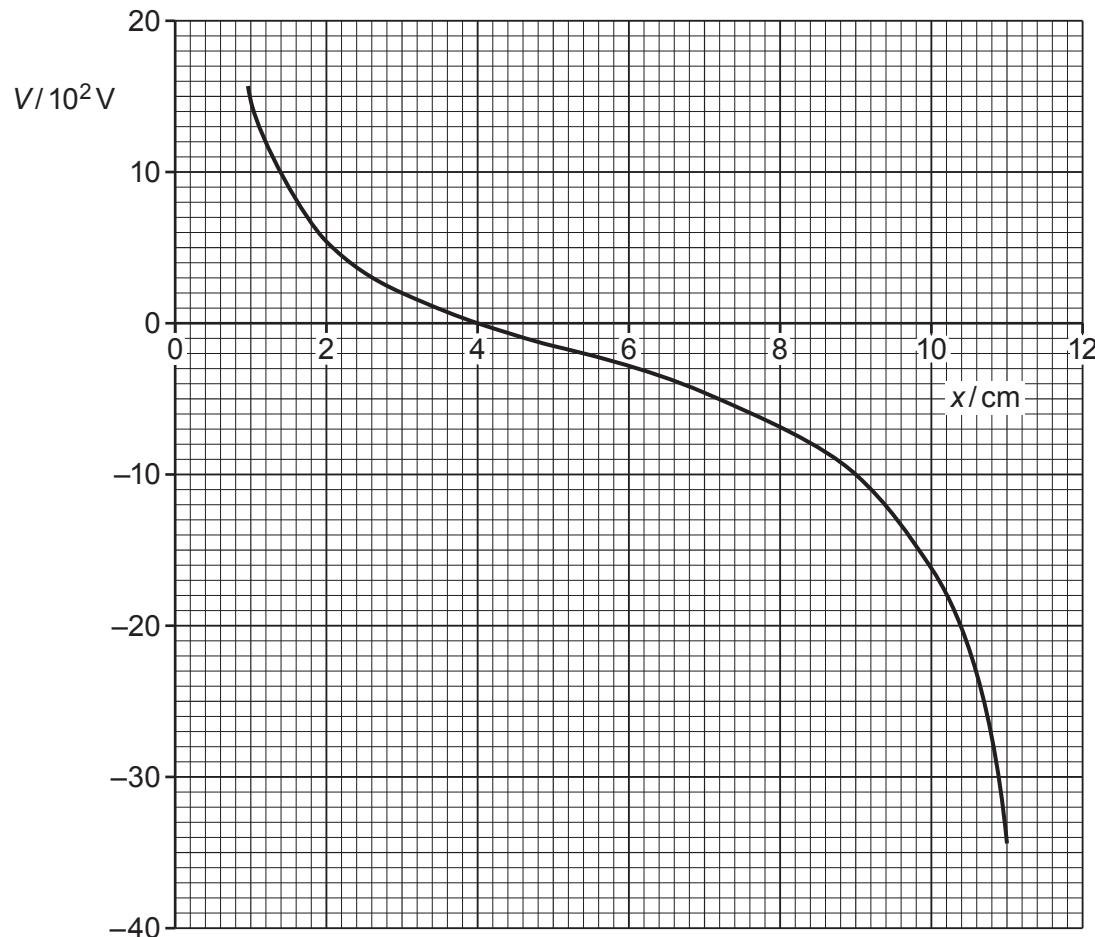


Fig. 5.2

Use Fig. 5.2 to determine:

- (i) the charge of B

$$\text{charge} = \dots \text{C} [3]$$

- (ii) the change in electric potential when point P moves from the position where $x = 9.0\text{ cm}$ to the position where $x = 3.0\text{ cm}$.

$$\text{change} = \dots \text{V} [1]$$

- (c) An α -particle moves along the line joining point charges A and B in Fig. 5.1.

The α -particle moves from the position where $x = 9.0\text{ cm}$ and just reaches the position where $x = 3.0\text{ cm}$.

Use your answer in (b)(ii) to calculate the speed v of the α -particle at the position where $x = 9.0\text{ cm}$.

$$v = \dots \text{ms}^{-1} [3]$$