

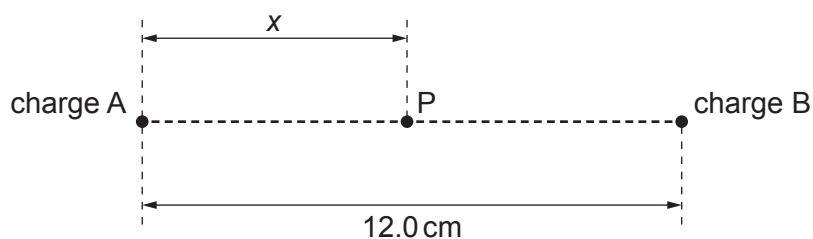
5 (a) Define *electric potential* at a point.

.....

.....

..... [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.

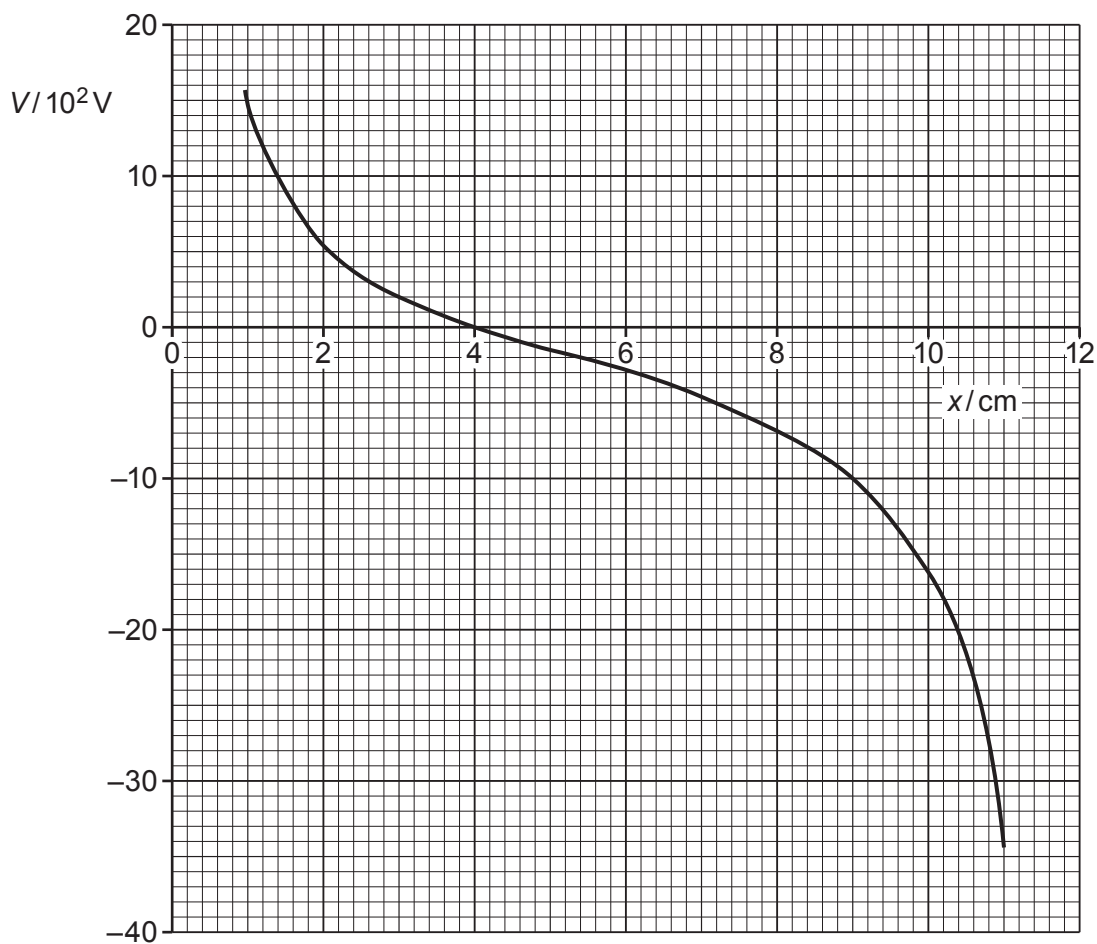


**Fig. 5.1**

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

charge = ..... C [3]

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

change = ..... V [1]

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

The  $\alpha$ -particle moves from the position where  $x = 9.0$  cm and just reaches the position where  $x = 3.0$  cm.

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

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