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.

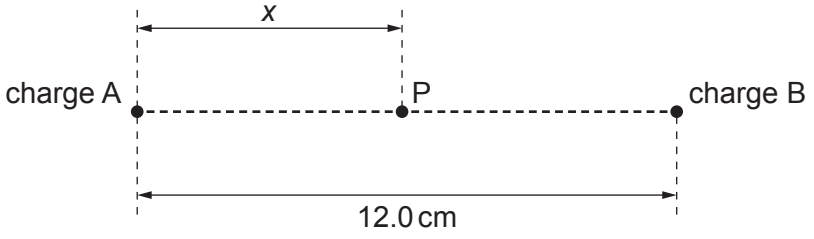

Fig. 5.1

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

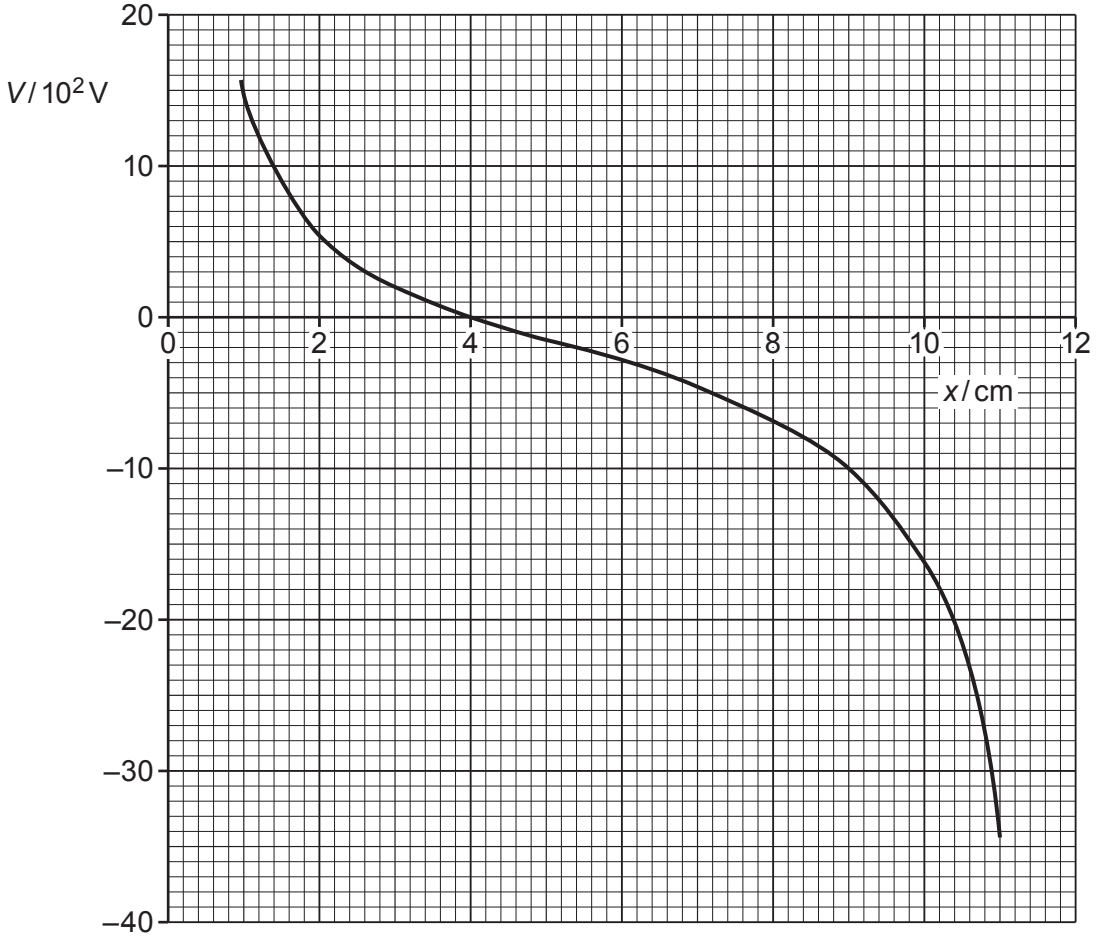

Fig. 5.2

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 $x = 9.0\,\text{cm}$ to the position where $x = 3.0\,\text{cm}$.

change = ... 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 = ... m s^{-1} [3]

[Total: 9]