4 **(a)** Two isolated point charges A and B are separated by a distance of 30.0 cm, as shown in Fig. 4.1.

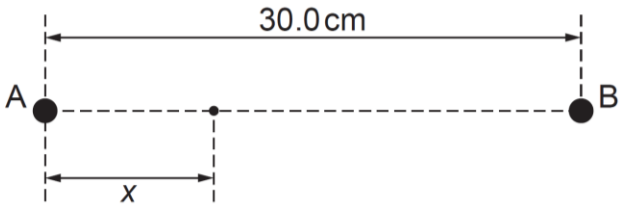

Fig. 4.1

The charge at A is + 3.6×10^{-9} C.
The variation with distance x from A along AB of the potential V is shown in Fig. 4.2.

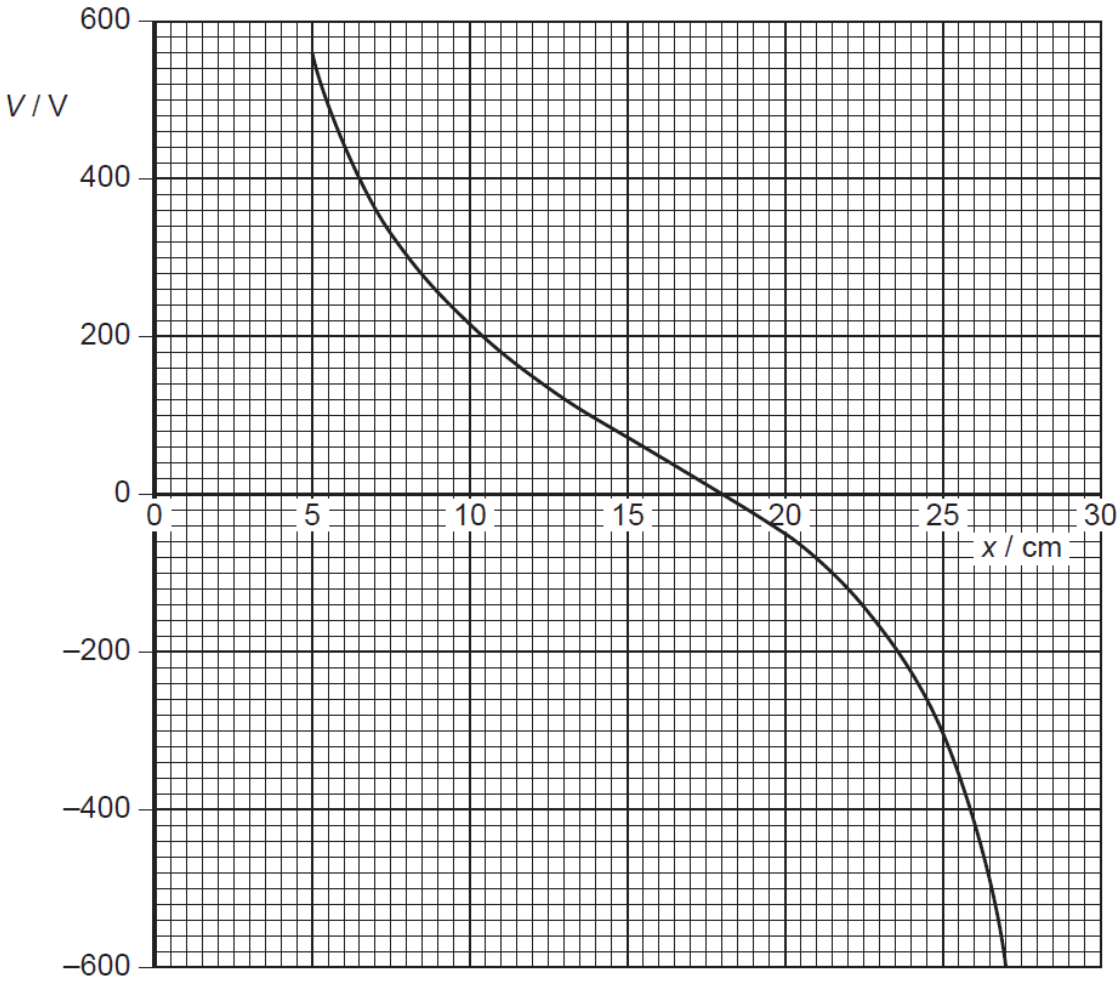

Fig. 4.2

(i) State the value of x at which the potential is zero.

x = …….. cm [1]

(ii) Use your answer in **(i)** to determine the charge at B.

charge = …….. C [3]

(b) An electron is projected along the line AB in **(a)** from x = 5.0 cm to 27.0 cm so that the electron is just able to reach the position x = 27.0 cm.

Determine the projection speed of this electron.

speed = …….. m s^{-1} [3]

(c) A small test charge is now moved along the line AB in **(a)** from x = 5.0 cm to 27.0 cm.

State and explain the value of x at which the force on the test charge will be maximum.

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……

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…… [3]

[Total: 10]