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

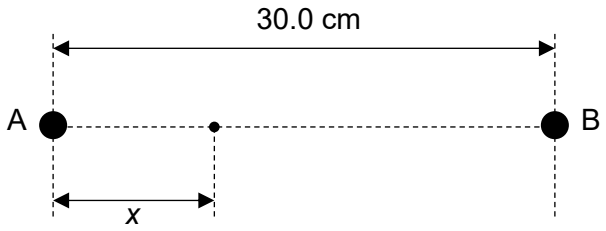

Fig. 4.1

The charge at A is $+3.6 \times 10^{-9}$ C.

The variation with distance *x* from A along AB of the potential *V* is shown in Fig. 4.2.

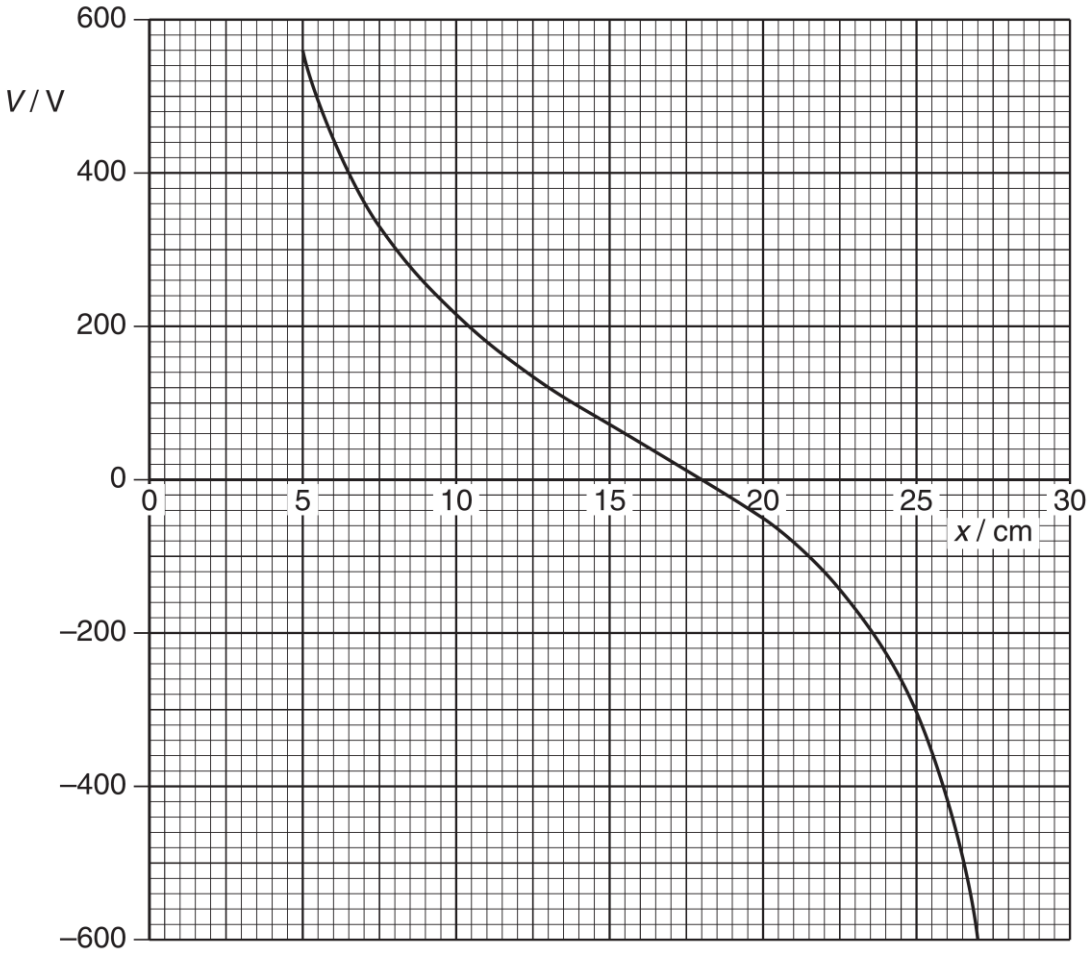

Fig. 4.2

(a) Use Fig. 4.2 to determine the charge at B.

charge = ... C [3]

(b) A small test charge is now moved along the line AB from x = 5.0 cm to x = 27 cm.

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

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.....

.....

..... [2]

(c) On Fig. 4.2, sketch, between 5 cm ≤ x ≤ 27 cm, the variation with distance x from A along AB of the potential V when the charge at B is halved.

Indicate clearly where the graph intersects the x-axis. Show your working clearly. [3]

[Total: 8]