

- 4 (a) Define *electric field strength*.

.....  
.....[1]

- (b) Fig. 4.1 is a **full scale** diagram that shows a series of equipotential lines around a few point charges.

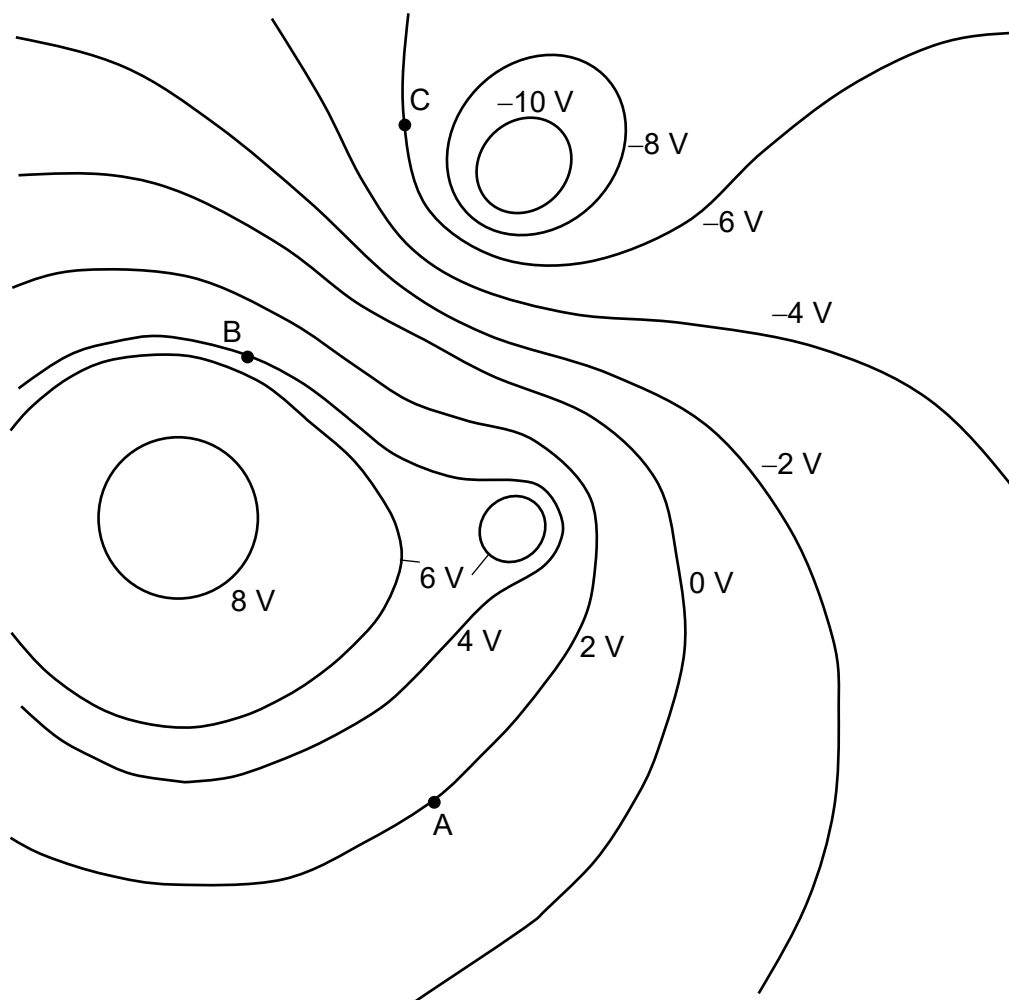


Fig. 4.1

- (i) Determine the magnitude of the electric force experienced by an electron placed at point A.

electric force = ..... N [2]

- (ii) Another electron is projected from point B to point C with an initial speed of  $5.3 \times 10^6 \text{ m s}^{-1}$ .

Calculate the final speed of the electron at point C.

final speed = .....  $\text{m s}^{-1}$  [3]

- (c) Electrons are emitted from a cathode P and accelerated towards an anode Q. The distance PQ is 8.0 cm.

The variation with distance  $d$  from P along PQ of the magnitude of the electric field strength  $E$  is shown in Fig. 4.2.

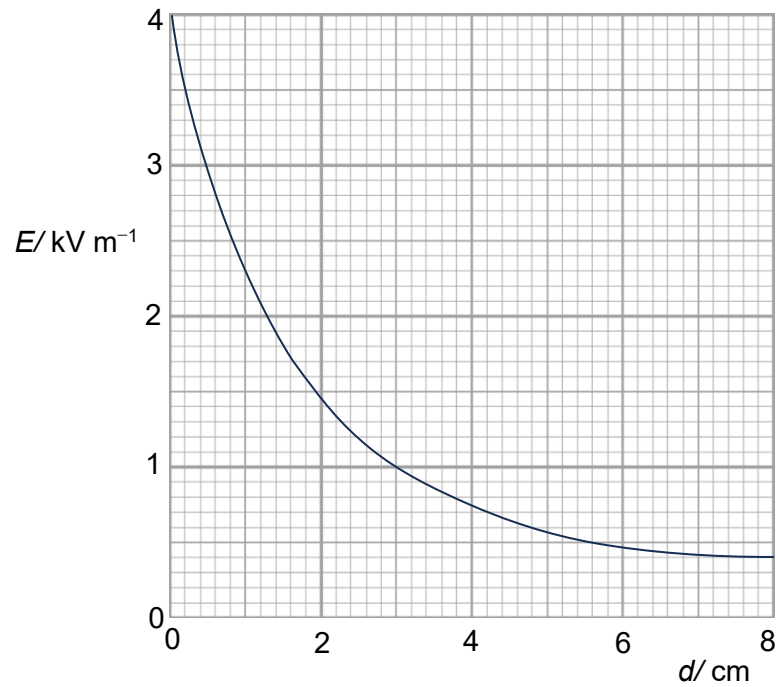


Fig. 4.2

Estimate the change in electric potential energy experienced by an electron as it accelerates from P to Q.

change in potential energy = ..... J [3]

[Total: 9]

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