

## Section A

Answer **all** the questions in the spaces provided.

- 1 An electron is accelerated from rest through a potential difference of 850V. The electron is in a vacuum.

(a) Show that the speed of the accelerated electron is  $1.7 \times 10^7 \text{ ms}^{-1}$ .

[1]

- (b) The electron then enters the region between two oppositely-charged parallel metal plates, as shown in Fig. 1.1.

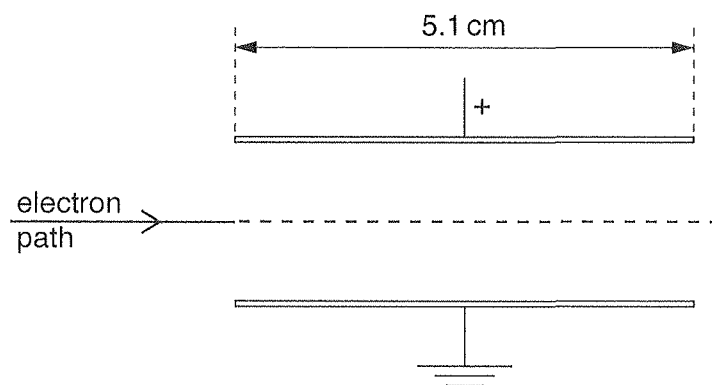


Fig. 1.1

The plates have length 5.1 cm.

The electric field in the region between the plates is uniform and is zero outside this region.

The original direction of motion of the electron is normal to the electric field.

During the time that the electron is in the region between the plates, the constant force acting on the electron at right-angles to the plates is  $4.0 \times 10^{-15} \text{ N}$ .



For the electron as it leaves the region of the electric field, calculate

- (i) its velocity in the direction normal to the plates,

velocity normal to plates = .....  $\text{ms}^{-1}$  [3]

- (ii) the magnitude of the resultant velocity.

magnitude of velocity = .....  $\text{ms}^{-1}$  [2]

