

- 6 Two vertical parallel metal plates are situated 2.50 cm apart in a vacuum. The potential difference between the plates is 350 V, as shown in Fig. 6.1.

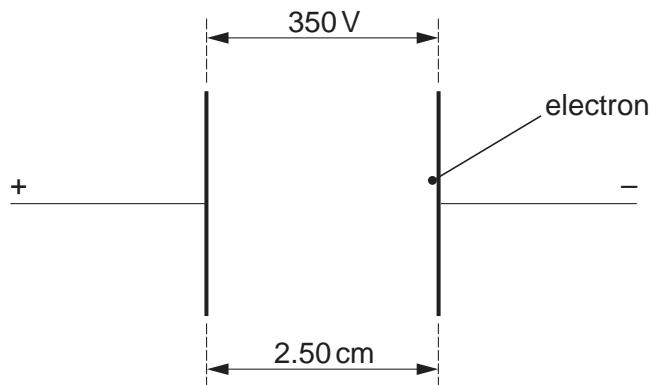


Fig. 6.1

An electron is initially at rest close to the negative plate and in the uniform electric field between the plates.

- (a) (i) Calculate the magnitude of the electric field between the plates.

$$\text{electric field strength} = \dots \text{NC}^{-1} [2]$$

- (ii) Show that the force on the electron due to the electric field is  $2.24 \times 10^{-15} \text{ N}$ .

[2]

(b) The electron accelerates horizontally across the space between the plates. Determine

- (i) the horizontal acceleration of the electron,

$$\text{acceleration} = \dots \text{ ms}^{-2} [2]$$

- (ii) the time to travel the horizontal distance of 2.50 cm between the plates.

$$\text{time} = \dots \text{ s} [2]$$

(c) Explain why gravitational effects on the electron need not be taken into consideration in your calculation in (b).

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