2 **(a)** Define *electric field strength*.

.....

.....[1]

(b) Two flat parallel metal plates, each of length 12.0 cm, are separated by a distance of 1.5 cm, as shown in Fig. 2.1.

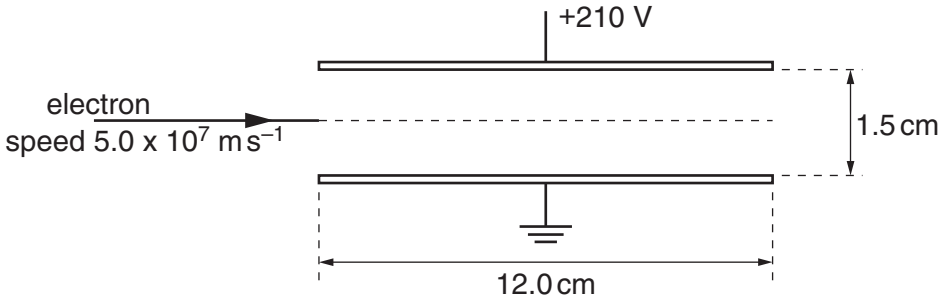

Fig. 2.1

The space between the plates is a vacuum.
The potential difference between the plates is 210 V. The electric field may be assumed to be uniform in the region between the plates and zero outside this region.
Calculate the magnitude of the electric field strength between the plates.

field strength = ...N C^{-1} [1]

(c) An electron initially travels parallel to the plates along a line mid-way between the plates, as shown in Fig. 2.1. The speed of the electron is 5.0×10^7 m s^{-1}.

For the electron between the plates,

(i) determine the magnitude and direction of its acceleration,

acceleration = ... m s^{-2}

direction .....[4]

(ii) calculate the time for the electron to travel a horizontal distance equal to the length of the plates.

time = ... s [1]

(d) Use your answers in **(c)** to determine whether the electron will hit one of the plates or emerge from between the plates.

[3]