5 **(a)** Define electric field.

.....

.....

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(b) Fig. 5.1 shows two parallel conducting plates that are in a vacuum. The plates are separated by a distance of 6.7 cm and have a potential difference (p.d.) of 430 V between them.

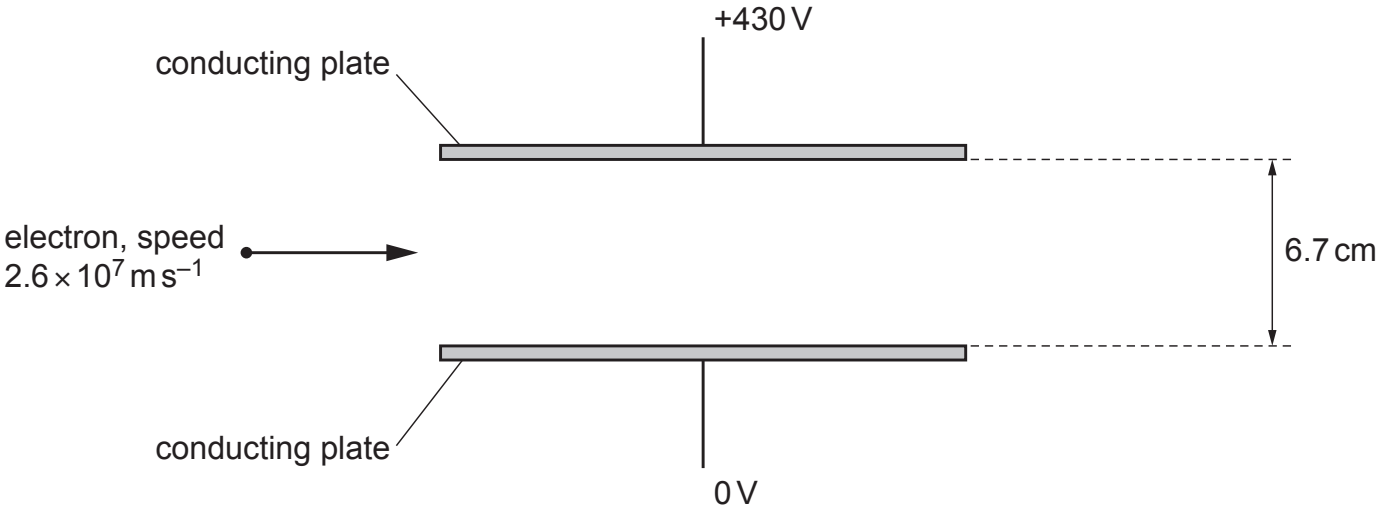

Fig. 5.1

(i) On Fig. 5.1, draw four field lines to represent the electric field between the plates. [2]

(ii) Determine the strength E of the electric field between the plates.

E = ... N C^{-1} [2]

(iii) An electron travels at a speed of 2.6×10^7 m s^{-1} towards the region between the plates, as shown in Fig. 5.1.

On Fig. 5.1, draw the path of the electron as it moves between and beyond the plates. [2]

(c) A uniform magnetic field is now applied in the region of the electric field in Fig. 5.1, so that the electron in **(b)(iii)** travels undeviated through the region.

(i) Determine the direction of the uniform magnetic field.

..... [1]

(ii) Explain, with reference to the forces exerted by the two fields on the electron, why the path of the electron is undeviated.

.....

.....

..... [2]

(iii) Determine the flux density *B* of the uniform magnetic field. Give a unit with your answer.

B = ... unit ..... [2]

[Total: 13]

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.....

.....

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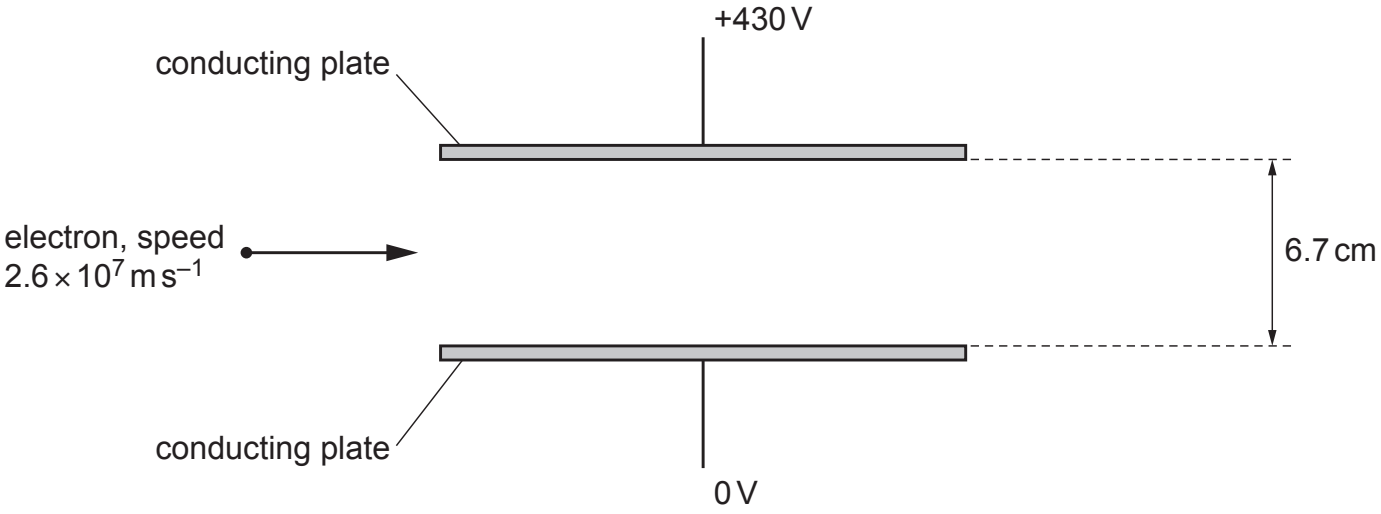

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