

5 (a) Define electric field.

.....

 [2]

(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.

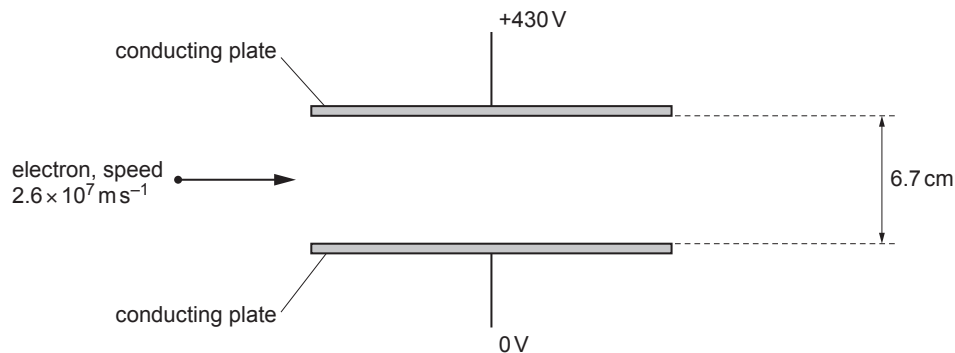


Fig. 5.1

(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.

$$E = \text{..... NC}^{-1} \text{ [2]}$$

(iii) An electron travels at a speed of $2.6 \times 10^7 \text{ ms}^{-1}$ 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.

$$B = \text{..... unit [2]}$$

[Total: 13]

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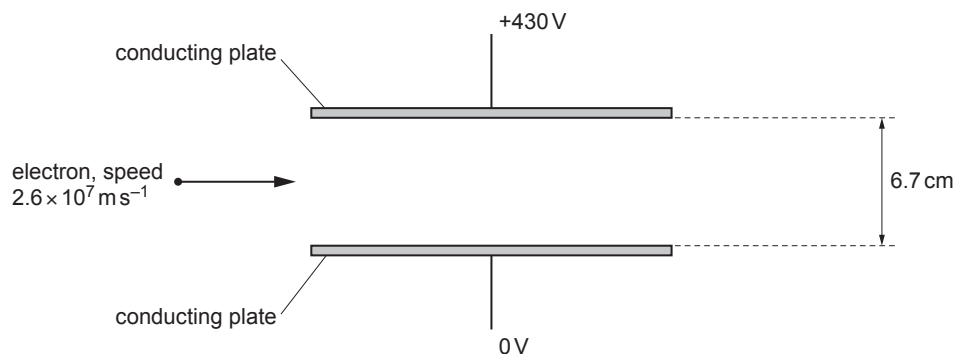


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