

- 6 (a) Define *electric field strength*.

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 [1]

- (b) Two parallel metal plates in a vacuum are separated by a distance of 15 mm, as shown in Fig. 6.1.

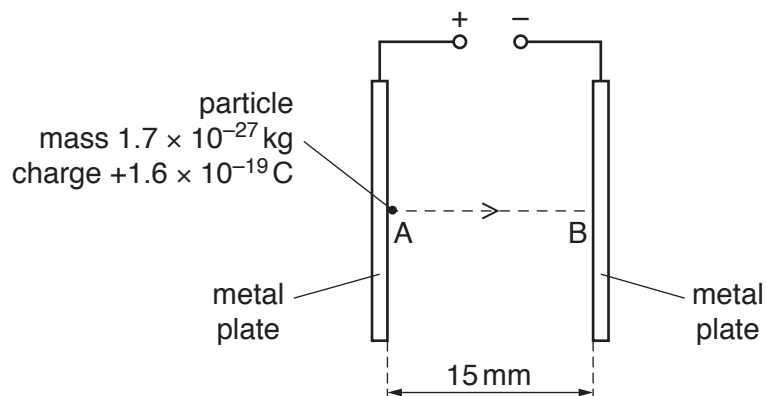


Fig. 6.1

A uniform electric field is produced between the plates by applying a potential difference between them.

A particle of mass $1.7 \times 10^{-27} \text{ kg}$ and charge $+1.6 \times 10^{-19} \text{ C}$ is initially at rest at point A on one plate. The particle is moved by the electric field to point B on the other plate. The particle reaches point B with kinetic energy $2.4 \times 10^{-16} \text{ J}$.

- (i) Calculate the speed of the particle at point B.

speed = ms^{-1} [2]

- (ii) State the work done by the electric field to move the particle from A to B.

work done = J [1]

- (iii) Use your answer in (ii) to determine the force on the particle.

force = N [2]

- (iv) Determine the potential difference between the plates.

potential difference = V [3]

- (v) On Fig. 6.2, sketch a graph to show the variation of the kinetic energy of the particle with the distance x from point A along the line AB.
Numerical values for the kinetic energy are not required.

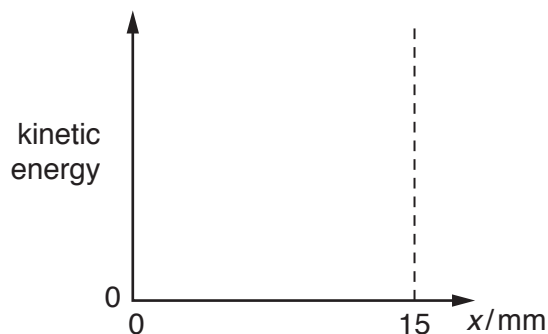


Fig. 6.2

[1]

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