

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

.....  
.....

[1]

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

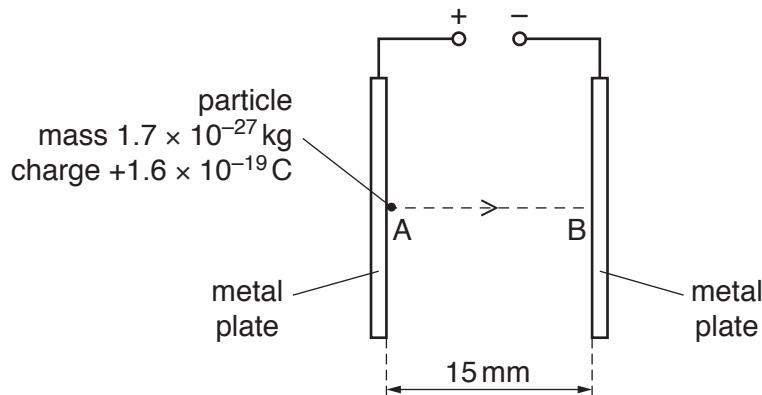


Fig. 6.1

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

A particle of mass  $1.7 \times 10^{-27}$  kg and charge  $+1.6 \times 10^{-19}$  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  $2.4 \times 10^{-16}$  J.

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

$$\text{speed} = \dots \text{ms}^{-1} \quad [2]$$

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

$$\text{work done} = \dots \text{J} \quad [1]$$

- (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.

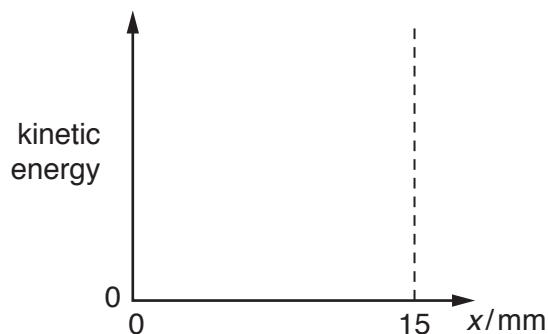


Fig. 6.2

[1]

[Total: 10]