

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

.....
..... [1]

- (b) A uniform electric field is produced by applying a potential difference of 1200V across two parallel metal plates in a vacuum, as shown in Fig. 4.1.

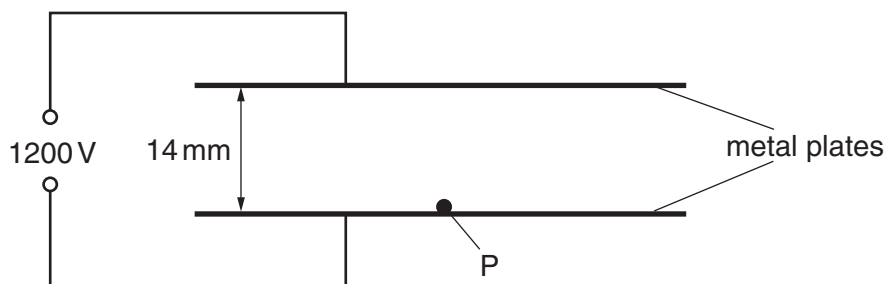


Fig. 4.1

The separation of the plates is 14 mm. A particle P with charge $3.2 \times 10^{-19} \text{ C}$ and mass $6.6 \times 10^{-27} \text{ kg}$ starts from rest at the lower plate and is moved vertically to the top plate by the electric field.

Calculate

- (i) the electric field strength between the plates,

electric field strength = V m^{-1} [2]

- (ii) the work done on P by the electric field,

work done = J [2]

- (iii) the gain in gravitational potential energy of P,

gain in potential energy = J [2]

(iv) the gain in kinetic energy of P,

gain in kinetic energy = J [1]

(v) the speed of P when it reaches the top plate.

speed = ms^{-1} [2]