

- 6 The current  $I$  in a metal wire is given by the expression

$$I = A n v e$$

where  $v$  is the average drift speed of the free electrons in the wire and  $e$  is the elementary charge.

- (a) State what is meant by the symbols  $A$  and  $n$ .

$A$ : .....

$n$ : .....

[2]

- (b) Use the above expression to determine the SI base units of  $e$ .  
Show your working.

base units ..... [2]

- (c) Two lamps P and Q are connected in series to a battery, as shown in Fig. 6.1.

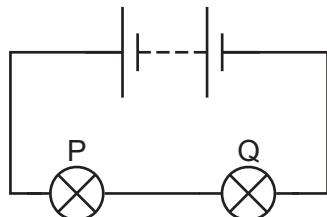


Fig. 6.1

The radius of the filament wire of lamp P is twice the radius of the filament wire of lamp Q. The filament wires are made of metals with the same value of  $n$ .

Calculate the ratio

$$\frac{\text{average drift speed of free electrons in filament wire of P}}{\text{average drift speed of free electrons in filament wire of Q}}.$$

ratio = ..... [2]