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

$$I = Anve$$

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) 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.

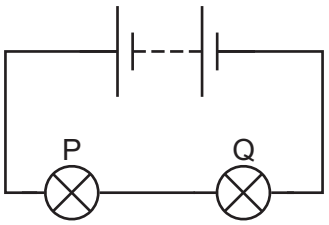

Fig. 6.1

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]

[Total: 6]