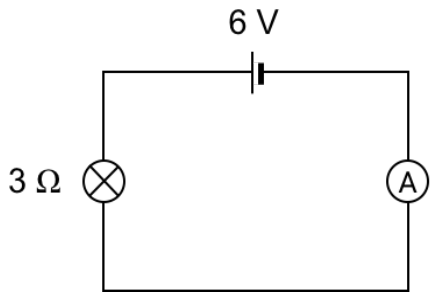
0 1

A student sets up the below circuit.



0 1 . 1

Calculate the reading on the ammeter.

V = I R
I = V ÷ R
I = 6 ÷ 3 = **2 A**

[2 marks]

0 1 . 2

Calculate the charge that flows through the bulb in two-and-a-half minutes.

t = 2.5 × 60 = 150 s
Q = I t
Q = 2 × 150 = **300 C**

[3 marks]

0 1 . 3

A second bulb, identical to the first, is added to the circuit between the first bulb and the ammeter.

Describe and explain the effect that this will have on the ammeter reading.

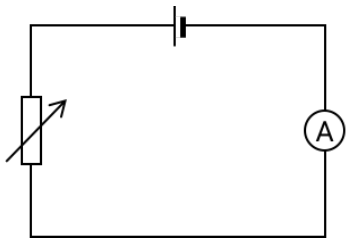
The ammeter reading will decrease [1]

Adding a second bulb to the circuit increases the total resistance of the circuit, which decreases the circuit current (or reference to V = I R) [1]

[2 marks]

0 2

The reading on the ammeter in the below circuit is observed to remain at 1.5 A over a period of **four minutes**.



0 2 . 1

Calculate the charge that flows through the variable resistor in this time.

t = 4 × 60 = 240 s
Q = I t
Q = 1.5 × 240 = **360 C**

[2 marks]

0 2 . 2

The p.d. across the variable resistor is measured to be 6 V.
Show that its resistance is 4 Ω.

V = I R
R = V ÷ I
R = 6 ÷ 1.5 = **4 Ω**

[1 mark]

0 2 . 3

The resistance of the variable resistor is then **increased by 50%**.
Calculate the new reading on the ammeter.

New resistance, R = 4 × 1.5 = 6 Ω
I = V ÷ R
I = 6 ÷ 6 = **1 A**

[3 marks]