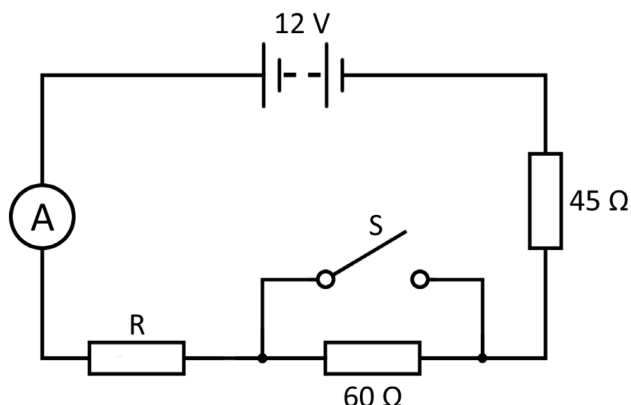


Name:

Class:



A student set up the electrical circuit shown in the figure below.



The ammeter displays a reading of 0.10 A.

- i. Calculate the potential difference across the 45 Ω resistor.

$$V = I \times r \quad V = 0.10 \times 45$$

$$\text{Potential difference} = \mathbf{4.5 \text{ V}}$$

- ii. Calculate the resistance of the resistor labelled R.

$$\text{Potential difference of } 60 \, \Omega \text{ resistor: } V = I \times r \quad V = 0.10 \times 60 \quad V = 6 \text{ V}$$

$$\text{Potential difference of } 45 \, \Omega \text{ resistor: } V = 4.5 \text{ V}$$

$$\text{Potential difference of resistor R: } V = 12 - (6 + 4.5) \quad V = 12 - (6 + 4.5) \quad V = 1.5 \text{ V}$$

$$R = 1.5 \div 0.10 \quad R = 15 \, \Omega$$

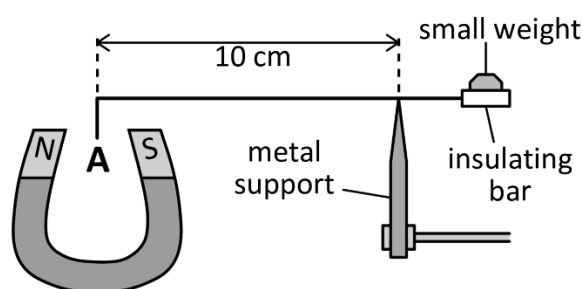
$$\text{Resistance} = \mathbf{15 \, \Omega}$$

- iii. State what happens to the total resistance of the circuit and the current through the circuit when switch S is closed.

The resistance of the circuit will decrease.

The current through the circuit will increase.

The figure below shows how a small weight placed on the insulating bar which makes the wire A balance in its original position.



The wire A is 5 cm long and carries a current of 1.5 A.

The small weight causes a clockwise moment of $4.8 \times 10^{-4} \text{ Nm}$.

Calculate the magnetic flux density where the wire A is positioned and give the unit.

$$\text{Moment} = \text{force} \times \text{distance}$$

$$4.8 \times 10^{-4} = \text{force} \times 0.10$$

$$\text{force} = 4.8 \times 10^{-4} \div 0.10 = 0.0048 \text{ N}$$

$$F = B \times I \times L$$

$$B = F \div (I \times L)$$

$$B = 0.0048 \div (1.5 \times 0.05)$$

$$B = \mathbf{0.064 \text{ T}}$$

$$\text{Magnetic flux density} = \mathbf{0.064 \text{ unit: T}}$$