Ohm’s law

1. Use the particle model to explain how electrical energy is converted to heat when a current flows through a conductor.

   As electrons flow through a conductor they interact with the atoms of the material increasing their KE, and hence temperature.

2. Calculate the current flowing in the circuits shown.

   \[ I = \frac{V}{R} = \frac{9}{18} = 0.5mA \]

3. A current of 0.1A flows into three resistors as shown.

   \[
   \begin{array}{c}
   \text{P} \quad 0.1A \quad 3\Omega \quad 6\Omega \quad Q \quad 12\Omega \\
   \end{array}
   \]

4. (a) How much current flows through the 12Ω resistor? 0.1A

   (b) What is the pd across the 6Ω resistor? 6 \times 0.1 = 0.6V

   (c) If the potential at point P is 6V what is the potential at Q?

   \[
   \begin{align*}
   \text{PD across } 3\Omega &= 0.3V \\
   \text{PD across } 6\Omega &= 0.6V \\
   \text{Total potential at Q} &= 6 - 0.9 = 5.1V
   \end{align*}
   \]

5. For the circuit shown:

   (a) How much current will flow through the 3Ω resistor?

   \[
   \text{Current splits twice as much through } 1\Omega \text{ as through } 6\Omega \Rightarrow 4A
   \]

   (b) What is the pd across the 6Ω resistor?

   \[ V = IR = 2 \times 6 = 12V \]