Current, Resistance and Potential Difference **Answers**

Potential difference can be calculated using the equation:

potential difference = current × resistance

1. What is the potential difference if a current of 3A flows through a resistance of 20Ω?

   potential difference = 3 × 20

   = 60

   potential difference = **60**V

2. A current of 150mA passes through a 10Ω resistor.

   Calculate the potential difference across the resistor.

   $\frac{\textbf{150mA}}{\textbf{1000}}$ **= 0.15A**

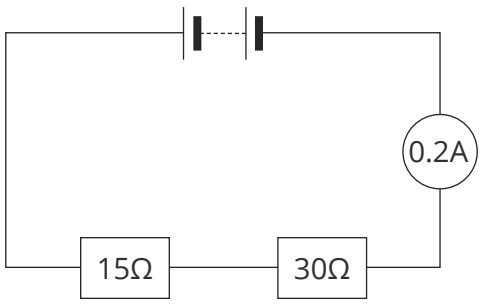
   potential difference = 0.15 × 10

   = 1.5

   potential difference = **1.5**V

3. **Figure 1** shows a series circuit.

Figure 1



Calculate the potential difference across the battery.

15 + 30 = 45Ω

potential difference = 0.2 × 45

= 9

potential difference = **9**V

4. A 6V battery is connected across a filament lamp with a resistance of 40Ω.

   Calculate the current through the lamp.

   6 = current × 40

   current = $\frac{6}{40}$

   = 0.15A

   current = **0.15**A

5. A 1.5V battery is connected across a 50Ω resistor.

   Calculate the current through the resistor.

   Give your answer in mA.

   1.5 = current × 50

   current = $\frac{1.5}{50}$

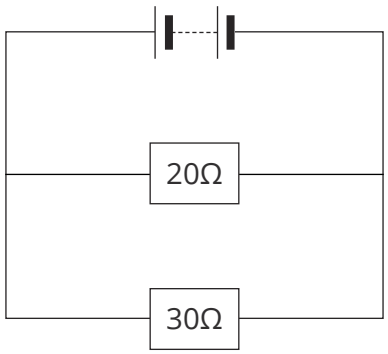
   = 0.03A

   0.03 × 1000 = 30mA

   current = **30**mA

6. **Figure 2** shows a parallel circuit.

Figure 2



   The potential difference across the battery is 6V.

   Calculate the current through the 20Ω resistor.

   6 = current × 20

   current = $\frac{6}{20}$

   = 0.3A

   current = **0.3**A

7. A 12V battery causes a current of 3A to flow through a circuit.

   Calculate the resistance of the circuit.

   12 = 3 × resistance

   resistance = $\frac{12}{3}$

   = 4Ω

   resistance = **4**Ω

8. A potential difference of 6V causes a current of 200mA to flow through a circuit.

   Calculate the resistance of the circuit.

   $\frac{200mA}{1000}$ = 0.2A

   6 = 0.2 × resistance

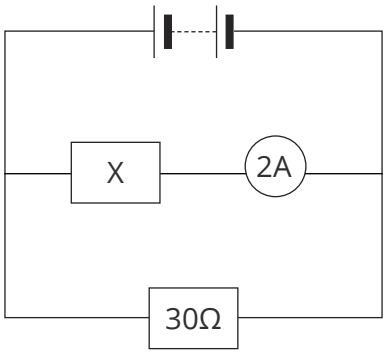
   resistance = $\frac{6}{0.2}$

   = 30Ω

   resistance = **30**Ω

9. **Figure 3** shows a parallel circuit.

Figure 3



   The potential difference across the battery is 9V.

   Calculate the resistance of resistor **X**.

   9 = 2 × resistance

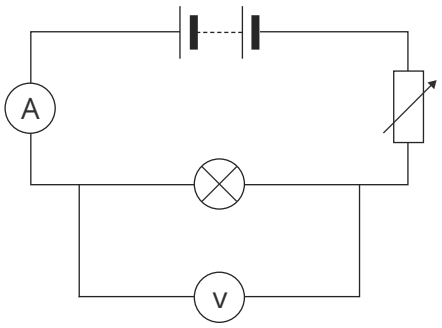
   resistance = $\frac{9}{2}$

   = 4.5Ω

   resistance = **4.5**Ω

10. A student set up the circuit in **Figure 4**.

Figure 4



Describe how the student could use the circuit in **Figure 4** to investigate how the current through the lamp affects its resistance.

Mark Scheme	**Mark**
Level 3: There is a clear and logically ordered description of the method that could be followed to obtain valid results.	5-6
Level 2: There is a clear description of a method that may not produce valid results.	3-4
Level 1: There are simple statements that give a brief description of parts of the method. Two marks can be awarded for two correct statements.	1-2
No relevant content.	0
Indicative content: • An ammeter is used to measure current. • A voltmeter is used to measure potential difference. • The resistance of the variable resistor is altered to change the current in the circuit **or** change the potential difference across the lamp. • Five or more different values for current have been used (to allow for a valid conclusion). • resistance = $\frac{\text{potential difference}}{\text{current}}$ • Repeats of each value of current are taken. • A mean is calculated.	