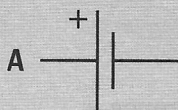


Current and Circuit Symbols

Warm-Up

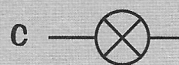
Draw lines to match circuit symbols A-D to their correct names.



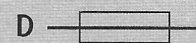
switch



filament lamp



fuse

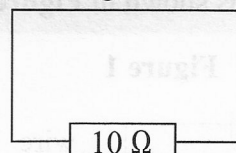


cell

- 1 **Figure 1** shows a simple circuit, featuring a $10\ \Omega$ resistor.



Figure 1



- 1.1 Explain why there is no current in the circuit.

[1]

- 1.2 Use a word from the following list to complete the sentence below:

charge

potential difference

resistance

frequency

Current is the rate of flow of

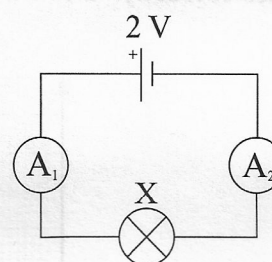
[1]

[Total 2 marks]

- 2 **Figure 2** shows two ammeters, A_1 and A_2 , in a circuit. The reading on A_1 is 0.5 A .



Figure 2



- 2.1 What is the reading on A_2 ?

Current = ... A
[1]

- 2.2 State the equation that links electric charge, time and current.

[1]

- 2.3 Calculate the charge that flows through component X in 2 minutes. Give the unit in your answer.

Charge = ... Unit = ...
[3]

[Total 5 marks]

Exam Practice Tip

You'll need to know the basics of how circuits work and the different circuit symbols for most electricity questions.



Resistance and $V = IR$

- 1 A current of 3 A flows through a $6\ \Omega$ resistor.
Calculate the potential difference across the resistor.



Potential Difference = ... V

[Total 2 marks]

PRACTICAL

- 2 A student investigated how the resistance of a piece of wire depends on its length. The circuit she used is shown in **Figure 1**. Her results are displayed in **Table 1**.



Figure 1

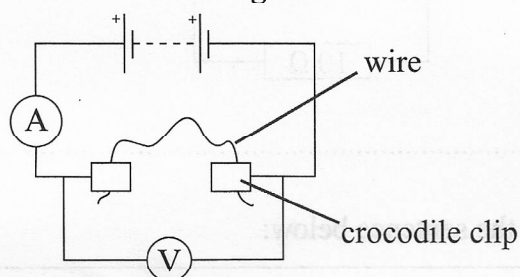


Table 1

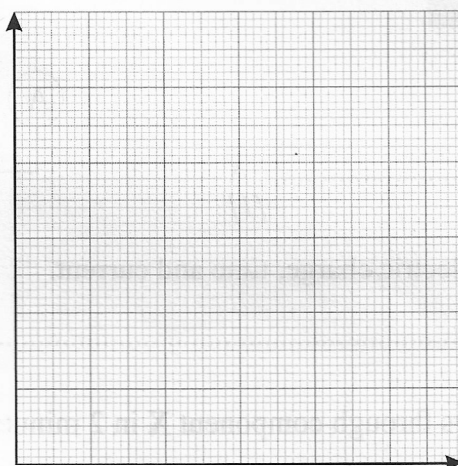
Length / cm	Resistance / Ω
10	0.6
20	1.3
30	1.7
40	2.4
50	3.0

- 2.1 Describe how the student could have used the apparatus in **Figure 1** to obtain the results in **Table 1**.

.....
 [2]

- 2.2 Plot a graph of the data in **Table 1** on the grid shown in **Figure 2**.
Label the axes correctly. Draw a line of best fit on the graph.

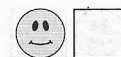
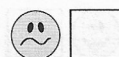
Figure 2



- 2.3 State **one** conclusion the student can make about the relationship between the resistance of a wire and its length. Explain how **Figure 2** shows this.

.....
 [2]

[Total 8 marks]



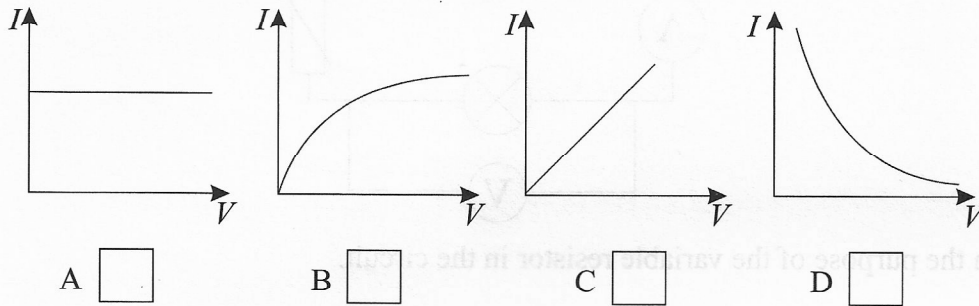
Resistance and I-V Characteristics

1 **Figure 1** shows some graphs of current against potential difference.



1.1 Tick the box below the correct graph for a resistor at constant temperature.

Figure 1



[1]

1.2 Name the type of graph shown in **Figure 1**.

..... [1]

1.3 Use words from the following list to complete the sentences below:

linear	non-linear	non-ohmic	ohmic
--------	------------	-----------	-------

A resistor at a constant temperature is an example of a(n)
 conductor. It is also an example of a(n) component.

[2]

[Total 4 marks]

2 This question is about diodes.



2.1 Draw the standard circuit symbol for a diode.

[1]

2.2 An old name for a diode is a valve. A valve in a bicycle pump only lets air flow through it in one direction. In what way do diodes behave in a similar way to valves?

..... [1]

2.3 A student measured the resistance of a diode using an electric circuit. He found the resistance to be $0.02\ \Omega$. The next day he measured the diode again. This time he measured the resistance to be $100\ \text{M}\Omega$. Suggest why the student's measurements were so different. You may assume that the circuit is working perfectly on both occasions.

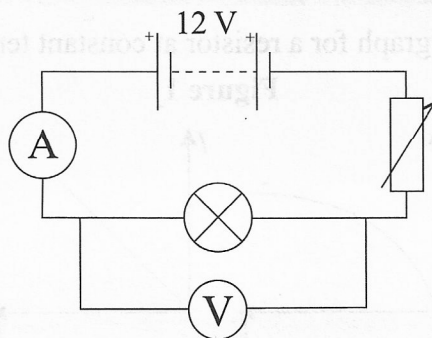
.....
 [2]

[Total 4 marks]

PRACTICAL

3

A student used the circuit in **Figure 2** to find the I - V characteristic of a filament lamp.

**Figure 2**

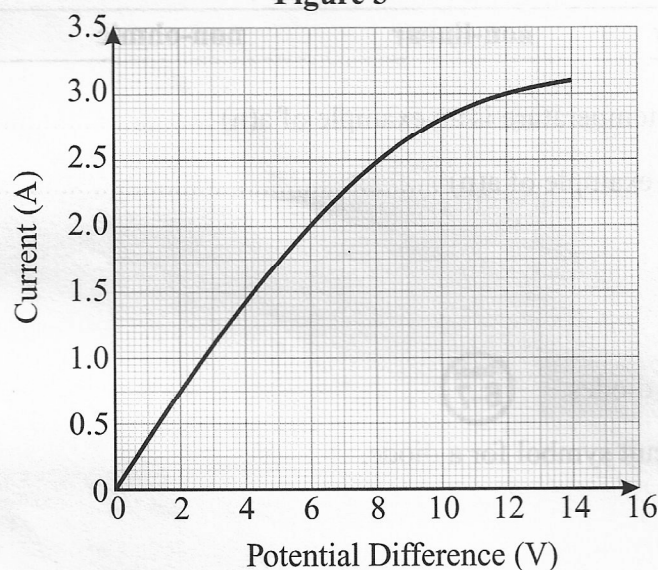
3.1 Explain the purpose of the variable resistor in the circuit.

.....

[2]

3.2 The student obtained the graph displayed in **Figure 3**.

Use the graph to find the resistance of the lamp at 3 A.

Figure 3

Resistance = ... Ω

[4]

3.3 What does the graph tell you about the lamp's resistance as the current increases?

Explain why the resistance behaves in this way.

.....

[2]

3.4 The student states that the lamp behaves as an ohmic conductor up to a potential difference of approximately 3.5 V. Explain what has led the student to this conclusion.

.....

[2]

[Total 10 marks]

