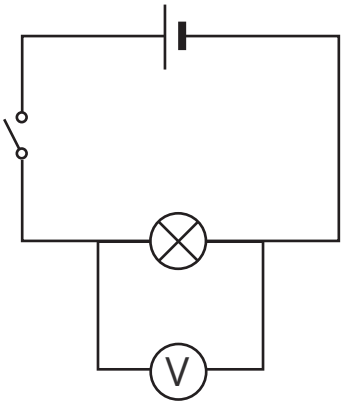
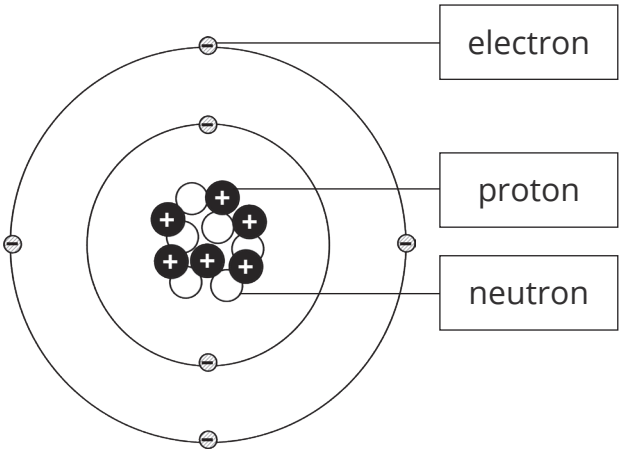
Question 1

Question	Answers	Extra information	Mark
01.1	switch	If more than one box is ticked, award no marks.	**1**
01.2	voltmeter drawn in parallel to bulb 		**1**
01.3	resistance = potential difference ÷ current	If more than one box is ticked, award no marks.	**1**
01.4	current — amps (A) potential difference — ohms (Ω) resistance — volts (V)	**2** marks for all lines correct. **1** mark for one or two lines correct.	**2**
Total			**5**

Question 2

Question	Answers	Extra information	Mark
02.1		**2** marks for all labels correct. **1** mark for one or two labels correct.	**2**
02.2	neutral	If more than one box is ticked, award no marks.	**1**
02.3	atoms have an equal number of protons and electrons	If more than one box is ticked, award no marks.	**1**
02.4	positive negative opposite	Answers in this order only.	**1** **1** **1**
Total			**7**

Question 3

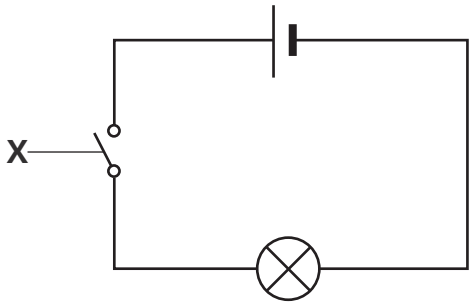
Question	Answers	Extra information	Mark
03.1	Any three from: • wrap the insulated copper wire around the iron nail • attach crocodile clips to each end of the insulated copper wire • attach the crocodile clips to the power pack • switch on the power pack to allow a current to flow through the wire		**3**
03.2	the paperclips are magnetic/made of a magnetic material	Allow the paperclips are made of iron/ steel.	**1**
03.3	all points plotted correctly straight line of best fit	Allow **1** mark for 2 or 3 points plotted correctly.	**2** **1**
03.4	increases		**1**
03.5	increase the number of turns in the coil of wire		**1**
Total			**9**

Question 4

Question	Answers	Extra information	Mark
04.1	**A** series (circuit) **B** parallel (circuit)	Answers in this order only.	**1** **1**
04.2	ammeter		**1**
04.3	series circuit/circuit A: • current is the same everywhere in the circuit • potential difference is split between the components parallel circuit/circuit B: • current is shared between the components/branches • potential difference is the same across the components in each branch		**1** **1** **1** **1**
04.4	the other bulb would stop working because the circuit is broken/current can no longer flow through the circuit		**1** **1**
Total			**9**

0 1 **Figure 1** shows a simple circuit.

Figure 1



0 1 . 1 What is the component labelled **X**?

Tick **one** box.

[1 mark]

- bulb ☐
- battery ☐
- cell ☐
- switch ☐

0 1 . 2 Draw a voltmeter on **Figure 1** that would allow you to measure the potential difference across the bulb.

[1 mark]

0 1 . 3 What is the equation that links current, potential difference and resistance?

Tick **one** box.

[1 mark]

- current = resistance ÷ potential difference ☐
- potential difference = current ÷ resistance ☐
- resistance = potential difference ÷ current ☐

0 1 . 4 Draw **one** line from each variable to the correct unit.

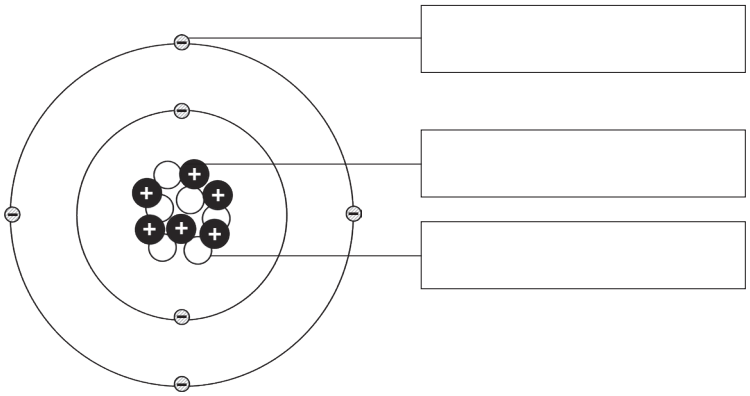
[2 marks]

current	amps (A)
potential difference	ohms (Ω)
resistance	volts (V)

5

0 2 **Figure 2** shows the structure of an atom.

Figure 2



0 2 . 1 Choose answers from the box to complete **Figure 2**.

[2 marks]

electron	neutron	proton

0 2 . 2 What is the overall charge of an atom?

Tick **one** box.

[1 mark]

negative ☐

neutral ☐

positive ☐

0 2 . 3 How does the number of protons in an atom compare to the number of electrons?

Tick **one** box.

[1 mark]

Atoms have an equal number of protons and electrons. ☐

Atoms have more electrons than protons. ☐

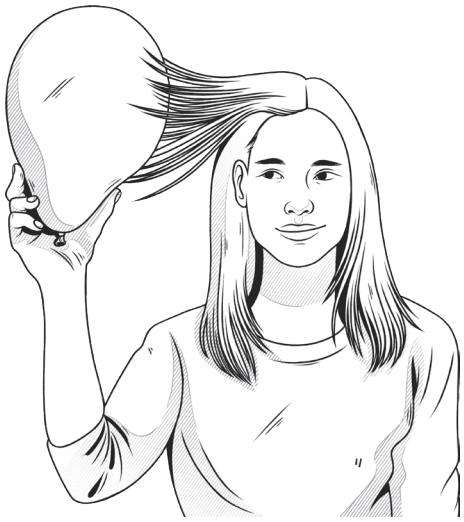
Atoms have more protons than electrons. ☐

7

0 2 . 4 A student used a balloon to investigate static electricity.

They rubbed the balloon against their hair and observed what happened. The outcome is shown in **Figure 3**.

Figure 3



When the student rubbed the balloon against their hair, electrons were transferred from the hair to the balloon.

Complete the sentences to explain why the balloon caused the student's hair to stand on end.

Choose answers from the box.

negative	neutral	
opposite	positive	similar

[3 marks]

The hair had a _____ charge.

The balloon had a _____ charge.

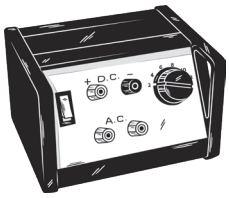
The hair was attracted to the balloon because _____ charges attract.

7

0 3 A student investigated how the strength of an electromagnet is affected by changing the current through the electromagnet.

The equipment they used is shown in **Figure 4**.

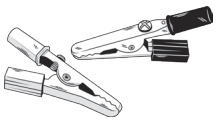
Figure 4



power pack

insulated copper wire

iron nail



crocodile clips

0 3 . 1 Describe how the student used the equipment in **Figure 4** to make an electromagnet.

[3 marks]

0 3 . 2 When the electromagnet was switched on, paperclips were attracted to the electromagnet.

Explain why the paperclips were attracted to the electromagnet.

[1 mark]

0 3 . 3 The student counted how many paperclips were attracted to the electromagnet.

Their results are shown in **Table 1**.

Table 1

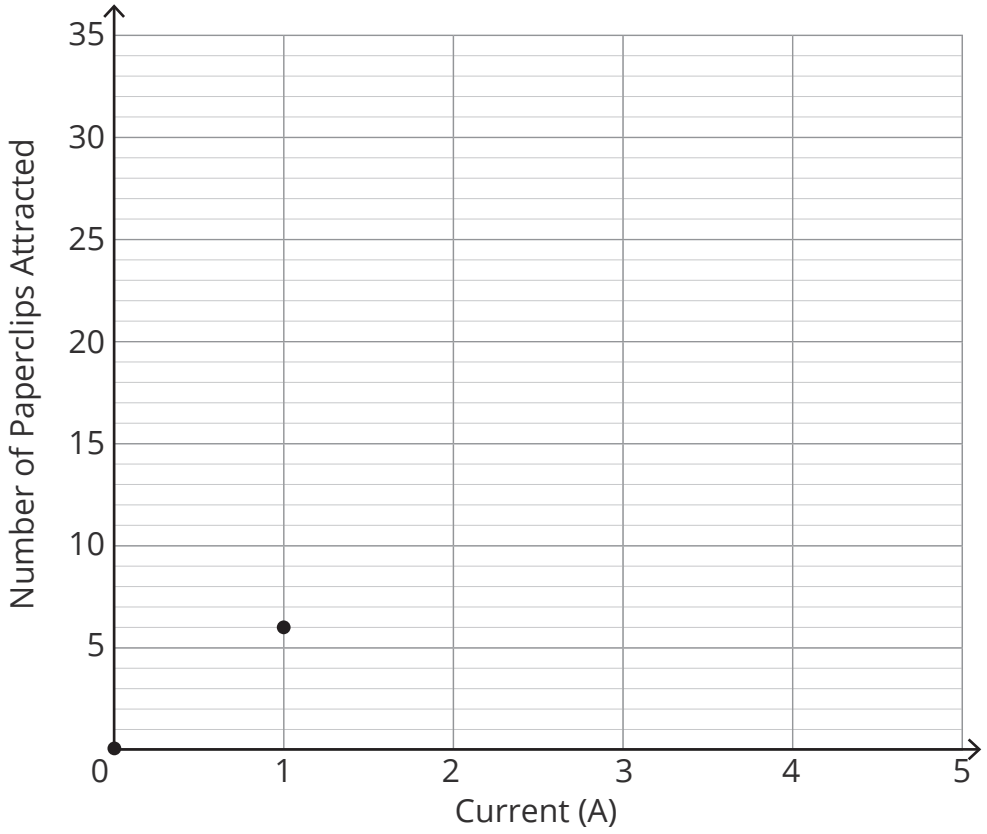
Current (A)	Number of Paperclips Attracted
0	0
1	6
2	12
3	17
4	25
5	30

Plot the results from **Table 1** on **Figure 5.** The first two points have been plotted for you.

Draw a line of best fit.

[3 marks]

Figure 5



0 3 . 4 Complete the sentence to describe how changing the current affects the strength of an electromagnet.

Choose the answer from the box.

decreases	increases	stays the same

[1 mark]

As the current increases, the strength of the electromagnet _____.

0 3 . 5 Give **one** other way that the student could vary the strength of the electromagnet.

[1 mark]

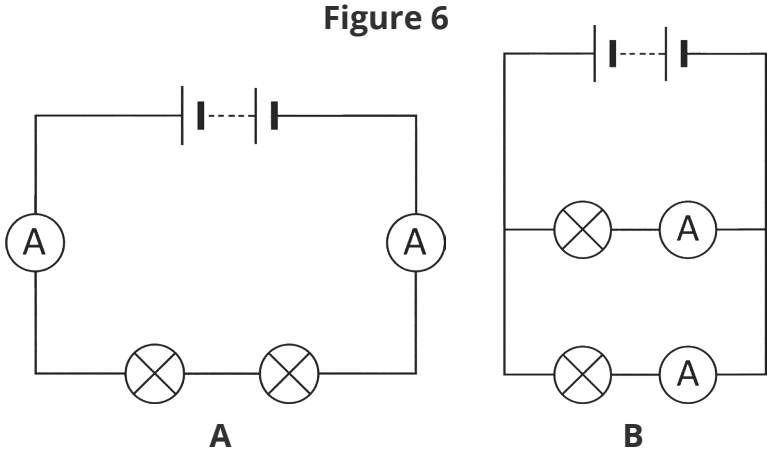
_____

_____

9

0 4 **Figure 6** shows two circuits, each containing two bulbs.

Figure 6



A **B**

0 4 . 1 Name the two types of circuit shown in **Figure 6**.

[2 marks]

A _____

B _____

0 4 . 2 Name the component that is used to measure current.

[1 mark]

_____

0 4 . 3 Compare the current and potential difference across the bulbs in the two circuits in **Figure 6**.

[4 marks]

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

0 4 . 4 Explain what would happen if one of the bulbs in circuit **A** was broken.

[2 marks]

9