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GCSE

COMBINED SCIENCE: TRILOGY

END OF TOPIC TEST

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Time allowed: 1 hour

**Materials**

For this paper you must have:

- a ruler
- a calculator

**Instructions**

- Answer **all** questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**

- There are 50 marks available on this paper.
- The marks for questions are shown beside each question.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

**Advice**

- In all calculations, show clearly how you work out your answer.

Please write clearly, in block capitals:

Surname: \_\_\_\_\_

Forename(s): \_\_\_\_\_

Class: \_\_\_\_\_

Teacher: \_\_\_\_\_

Date: \_\_\_\_\_

Q1a Shown below are some circuit symbols for electrical components.

Match the symbol with its correct name.



Bulb



Ammeter



Resistor



Fuse



Diode

3

Q1b Describe what the role of the **ammeter** is.

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1

Q1c Explain how a fuse works.

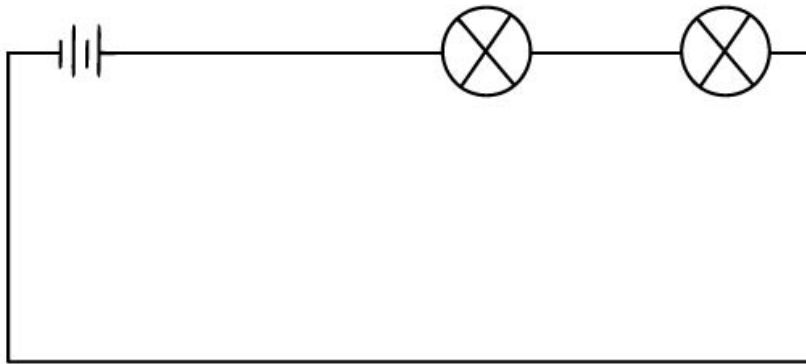
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1

Q2 The diagram below shows an electrical circuit.



Q2a What name is given to this type of circuit.  
Circle the correct answer.

Parallel      Series      Basic      Complex

1

Q2b A student wanted to measure the current in the circuit and the potential difference across both of the bulbs.

The student had two voltmeters and two ammeters.

On the diagram above, draw where the student should place these devices to be able to know the current the circuit and the potential difference across each bulb.

You do not need to use every piece of equipment.

2

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The student got the following results.

<b>Quantity</b>	<b>Unit</b>
Current in circuit	0.08
Potential Difference across bulb 1	1.5
Potential Difference across bulb 2	1.5

Q2c The student has forgotten to include units with these results.

In the table above, write the correct unit for each quantity.

2

Q2d Using the results above, what is the voltage of the battery?

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Explain your answer

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3

Q3a What equation links charge flow, current and time?

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1

Q3b If a charge of 5C flows around an electrical circuit in 3 seconds, calculate the current.

**Give your answer to 3 significant figures.**

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3

Q3c A variable resistor can be used within a circuit.

In the space below, draw the symbol for a variable resistor.

1

Q3d Why are variable resistors used in circuits?

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Q3e What is the standard unit for resistance?

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1

Q2f What equation links resistance, current and voltage?

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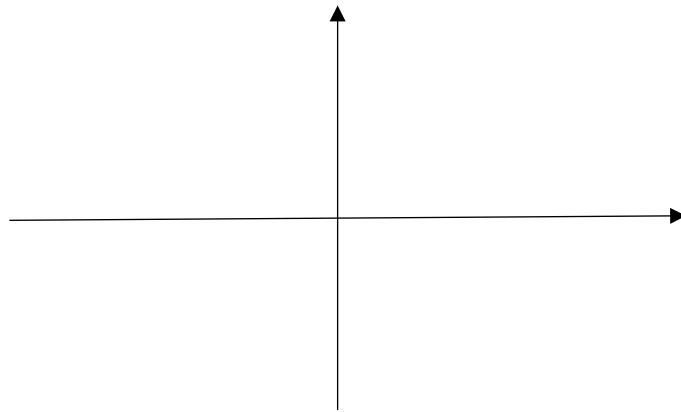
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1

Q2g Sketch a graph to show the relationship between current and potential difference through a fixed resistor that is at constant temperature.

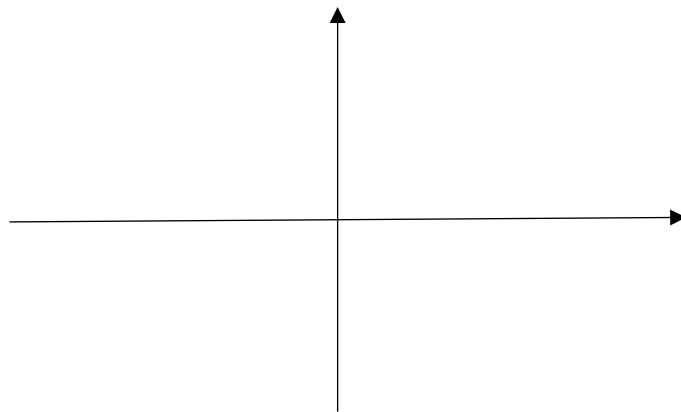
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You need to label both axis.



2

Q2h Sketch a graph and explain how this graph would be different for a diode.



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4

Q3 Design an investigation to show how you can investigate how the resistance of a wire depends on the length of the wire.

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You should:

- List the equipment that you intend to use.
- Describe how you will use the equipment.
- Describe what measurements you will take
- Describe how you will ensure you have a fair test.
- Describe how you will ensure that you are safe.

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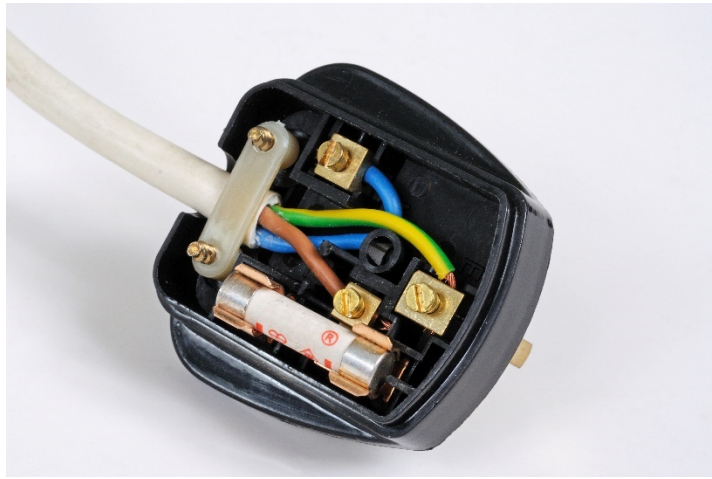
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Q4a There is three different coloured insulation covering to three wires.

Complete the table to show the colour of the insulation covering and the name of the wire.

Colour of Insulation Covering	Name of wire

3

Q4b Complete the sentence below by circling the correct answer.

The live wire carries the direct/alternating potential difference from the mains supply. 1

Q4c What is the difference between direct and alternating potential difference?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2

Q4d Mains electricity is supplied in the UK at what potential difference **and** frequency?

\_\_\_\_\_

\_\_\_\_\_

2

Q4e The picture below shows part of the National Grid.



Explain how electricity companies reduce the energy losses through the National Grid.

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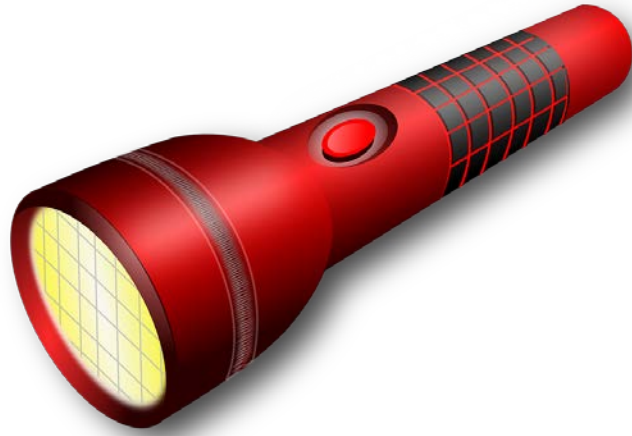
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Q5 The diagram below shows a 6V torch.

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Q5a If the torch transfers 1.5kJ of energy from the batteries to the bulb.

How much charge passes from the batteries to the bulb ?

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2

Q5b The energy transferred by an electrical device depend of what two factors?

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2