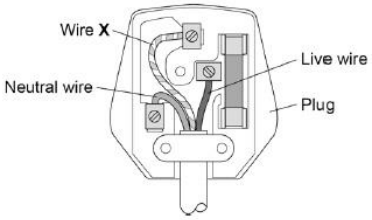
Physics unit 2 homework – Electricity

For each of the questions below: -
Highlight the command word if there is one & annotate what the command word means. - Answer the question!

Q1. Figure 1 shows a three pin plug connected to the cable of a metal toaster.

Figure 1



(a) Name wire **X**.

_____

(1)

(b) What does wire **X** do?

Tick **one** box.

It provides extra energy to the toaster when needed.	☐
It completes the circuit in the toaster.	☐
It can prevent an electric shock from the toaster.	☐
It supplies the current to the toaster.	☐

(1)

(c) The toaster is plugged in to the mains electricity supply.

What is the potential difference between the live and neutral wires?

Tick **one** box.

0 V ☐ 120 V ☐ 230 V ☐ 460 V ☐

(1)

(d) Mains electricity is an alternating supply.

A battery is a direct supply.

Give **two** differences between an alternating supply and a direct supply.

1. _____

2. _____

(2)

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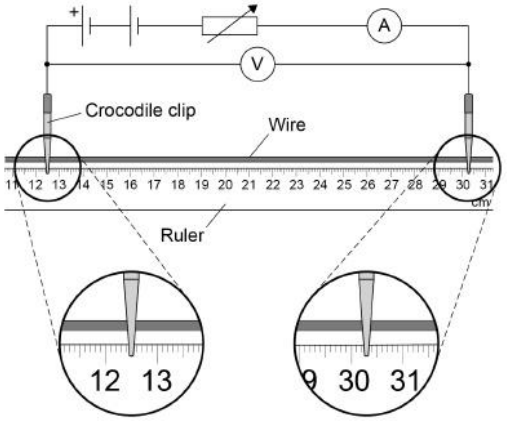
Q2. A student investigates how the length of a piece of wire affects its resistance.

The diagram shows the apparatus used.



(a) What is the length of wire between the two crocodile clips shown in the diagram?

Length = _____ cm

(1)

(b) Write the equation which links current, potential difference and resistance.

_____

(1)

(c) For the experiment shown in the diagram, the student recorded:
- a potential difference of 3.22 V
- a current of 2.18 A

Calculate the resistance of the length of wire between the crocodile clips.

Give your answer to 3 significant figures.

_____

_____

_____

_____

_____

_____

_____

_____

Resistance = _____ Ω

(4)

For each of the questions below: -
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(d) The student used constantan wire.

The resistance of constantan only changes a small amount when its temperature changes.

Suggest why using constantan is an advantage in this experiment.

_____

_____

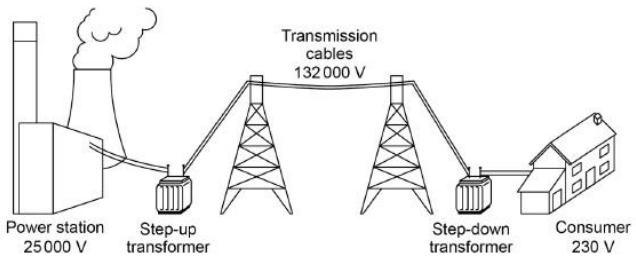
_____

(2)

Q3. The National Grid is used to transfer electrical power around the country.

Figure 1 shows a simplified diagram of the National Grid.

Figure 1



(a) The gas-fired power station shown in **Figure 1** uses a non-renewable energy resource.

Some power stations use renewable energy resources.

What is the difference between renewable and non-renewable energy resources?

_____

_____

_____

_____

(2)

(b) Explain how transformers are used in the National Grid.

_____

_____

_____

_____

_____

(3)

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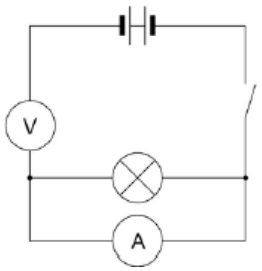
Q4. A student used electrical circuits to investigate the relationship between resistance, potential difference and current.

Figure 1 shows how the student connects the first circuit he set up.

Figure 1



(a) The circuit does not work.

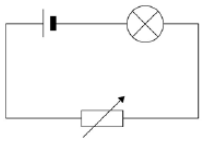
Draw the correct circuit.

(2)

(b) The student then set up a circuit to investigate how resistance affects the brightness of a lamp.

Figure 3 shows the circuit he set up.

Figure 3



The student increases the resistance of the variable resistor.

What effect does this have on the brightness of the lamp?

Explain your answer.

_____

_____

_____

(2)

(c) The battery transfers 10 000 C of charge in 20 minutes. Calculate the current through the circuit. Include the correct equation and unit.

_____

_____

Current = _____

(5)