a

Draw the symbol diagrams for:

cell

resistor

battery

variable resistor

lamp (bulb)

ammeter

fuse

voltmeter

LED

diode

LDR

thermistor

b

What is electric current?

_____

State the equation that links charge, current and time.

_____

Write the symbols and units for the following:

charge: _____

current: _____

time: _____

c

A charge of 12A flows through an electric cooker for 1 hour. How much charge has been used?

_____

_____

State the equation that links current, potential difference and resistance. Remember to include units.

_____

A voltmeter reading is 3V and the resistance is 2Ω. What is the current?

_____

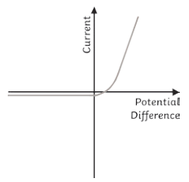
_____

d

Use the components stated below to identify the potential difference/current graphs:

filament lamp, diode, ohmic conductor

_____



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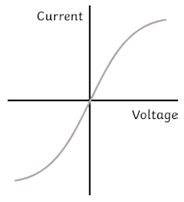

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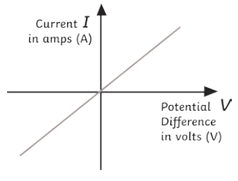


State Ohm's law.

_____

_____

_____

_____

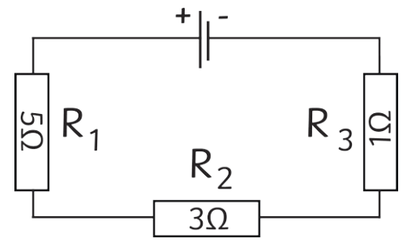
e

Complete the table.

Type of Circuit	Potential Difference Shared or the Same?	Current Same or Split?
series		
parallel		

For the circuit below, calculate the total resistance.

_____



On the diagram, draw where a voltmeter could be positioned to measure the voltage through one of the components.

f

Complete the following sentences.

For a thermistor: as the temperature increases, the resistance _____

Used in: _____

For an LDR: as the light intensity increases, the resistance _____

Used in: _____

g

State the two different types of electricity supply.

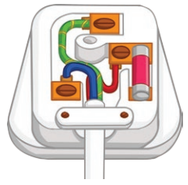
1. _____

2. _____

The UK mains supply has an AC supply of -____V and frequency of ____Hz.

h

Label the diagram of the three pin plug.



What is the purpose of:

the neutral wire?

_____

_____

the live wire?

_____

_____

the earth wire?

_____

_____

a

Complete the energy transfers for the following electrical appliances.

mains-powered kettle:

electrical ➔ t_____ + s_____

hairdryer:

e_____ ➔ k_____ + t_____ + s_____

toaster

_____ ➔ _____ + _____

b

What is the equation linking energy transferred, power and time?

_____

what are the units for:

energy? _____

power? _____

time? _____

c

Most devices have a power rating. Describe the relationship between the power rating and the changes in stored energy when a device is used.

_____

_____

_____

_____

d

Explain how a fuse works.

_____

_____

_____

Calculate the current flowing through a 2kW electric fire at a potential difference of 230V.

_____

e

State the equation that links power, current and potential difference.

_____

A 2.4kW kettle is connected to the mains power supply (230V). Calculate the current through the kettle.

You will need to rearrange your equation above.

_____

_____

_____

_____

_____

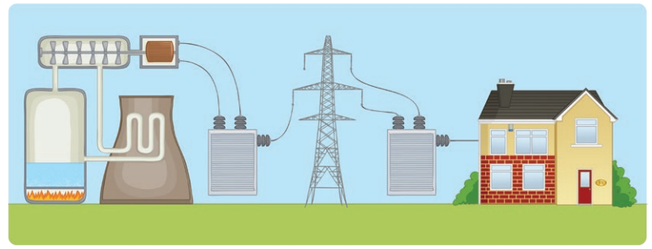
f

True or false:

- The current in a circuit can be altered by a variable resistor. _____
- A voltmeter is connected in parallel with a component. _____
- An ammeter is connected in parallel with a component. _____

g

Label the national grid diagram.



Give two examples of when the demand for electricity is likely to be high.

1. _____
2. _____

h

Why is energy transferred at such high voltage in cables?

_____

_____

_____

_____

_____

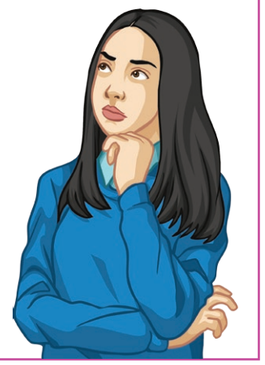
Describe how the following work:

step-up transformer.

_____

step-down transformer.

_____



i

Describe an experiment to show how the length of a wire affects its resistance.

_____

_____

_____

_____

_____

_____

_____

_____

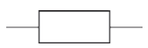
_____

a

Draw the symbol diagrams for:

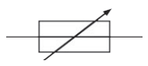
cell

resistor



battery

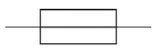
variable resistor



lamp (bulb)

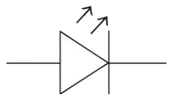
ammeter

fuse

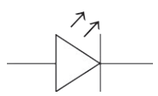


voltmeter

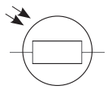
LED



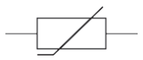
diode



LDR



thermistor



b

What is electric current?

The flow of electrical charge.

State the equation that links charge, current and time.

charge = current × time

Write the symbols and units for the following:

charge: **(Q) coulombs, C**

current: **(I) amperes, A**

time: **(t) seconds, s**

c

A charge of 12A flows through an electric cooker for 1 hour. How much charge has been used?

Convert hours to minutes: 60 mins

12 × 60 = 720C

State the equation that links current, potential difference and resistance. Remember to include units.

potential difference (V) = current (A) × resistance (Ω)

A voltmeter reading is 3V and the resistance is 2Ω. What is the current?

current = potential difference ÷ resistance

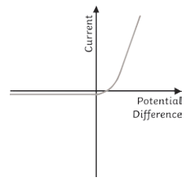
3 ÷ 2 = 1.5A

d

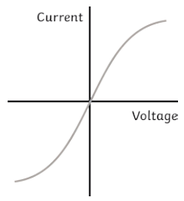
Use the components stated below to identify the potential difference/current graphs:

filament lamp, diode, ohmic conductor

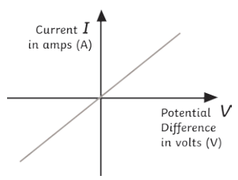
diode



filament lamp



ohmic conductor



State Ohm's law.

The current flowing through a resistor at a constant temperature is directly proportional to the voltage across the resistor.

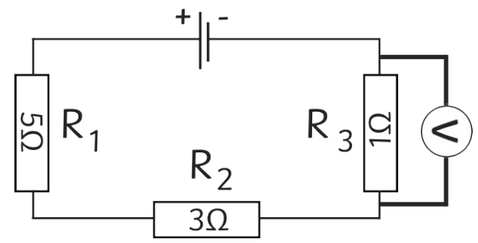
e

Complete the table.

Type of Circuit	Potential Difference Shared or the Same?	Current Same or Split?
series	**shared**	**same**
parallel	**same**	**split between branches**

For the circuit below, calculate the total resistance.

9Ω



On the diagram, draw where a voltmeter could be positioned to measure the voltage through one of the components.

f

Complete the following sentences.

For a thermistor: as the temperature increases, the resistance **decreases.**

Used in: **thermostats**

For an LDR: as the light intensity increases, the resistance **decreases.**

Used in: **street lights**

g

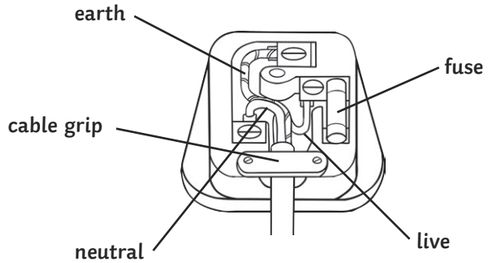
State the two different types of electricity supply.

1. **alternating current**
2. **direct current**

The UK mains supply has an AC supply of -**230**V and frequency of **50**Hz.

h

Label the diagram of the three pin plug.



What is the purpose of:

the neutral wire?

It completes the circuit and carries away the current.

the live wire?

It provides alternating potential difference.

the earth wire?

It is a safety feature to prevent the application from becoming live.

a

Complete the energy transfers for the following electrical appliances.

mains-powered kettle:

electrical ➔ thermal + sound

hairdryer:

electrical ➔ kinetic + thermal + sound

toaster

electrical ➔ thermal + light

b

What is the equation linking energy transferred, power and time?
energy transferred = power × time

what are the units for:

energy? **joules**

power? **watts**

time? **seconds**

c

Most devices have a power rating. Describe the relationship between the power rating and the changes in stored energy when a device is used.
A device with a higher power rating will transfer stored energy to other types of energy at a faster rate.

d

Explain how a fuse works.
A fuse is a tube with a piece of wire running through it. If the current becomes too high, the fuse wire melts and creates a break in the circuit.

Calculate the current flowing through a 2kW electric fire at a potential difference of 230V.
current = 2000 ÷ 230
8.69A

e

State the equation that links power, current and potential difference.
power (W) = potential difference (V) × current (A)

A 2.4kW kettle is connected to the mains power supply (230V). Calculate the current through the kettle.

You will need to rearrange your equation above.

2.4 × 1000 = 2400

Current = power ÷ potential difference
= 2400 ÷ 230
= 10.43A

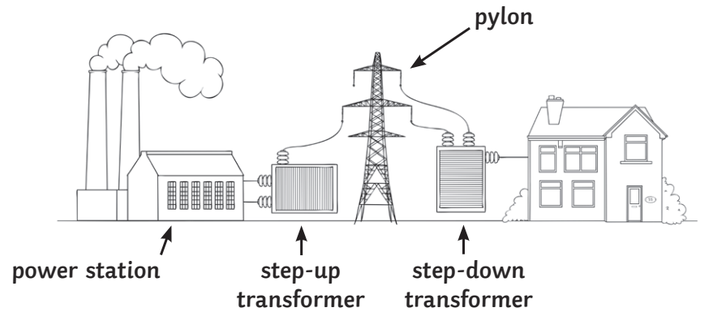
f

True or false:

- The current in a circuit can be altered by a variable resistor. **true**
- A voltmeter is connected in parallel with a component. **true**
- An ammeter is connected in parallel with a component. **false**

g

Label the national grid diagram.



Give two examples of when the demand for electricity is likely to be high.

1. **At half-time or the end of large sporting events.**
2. **First thing in the morning when people are getting up, or later when arriving home.**

h

Why is energy transferred at such high voltage in cables?
High voltage means that the energy is transferred at low currents. This results in less resistance, therefore less energy is lost as heat, so the transmission is more efficient.

Describe how the following work:

step-up transformer.

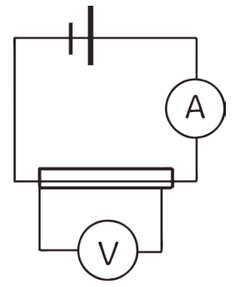
Potential difference is increased.

step-down transformer.

Potential difference is decreased.

i

Describe an experiment to show how the length of a wire affects its resistance.



Set up the apparatus as shown.
Attach the first crocodile clip at 0cm.
Attach the second crocodile clip at 10cm.
Record the potential difference and the current.
Connect the second crocodile clip at different lengths (20cm, 30cm) and repeat the process.
Use the results to calculate resistance at different lengths, using the formula:
resistance = potential difference ÷ current