



Electromancer Homework Exercise 1

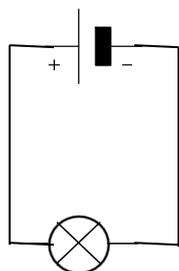
1. Symbols are used when drawing circuits. Identify each of the symbols below:



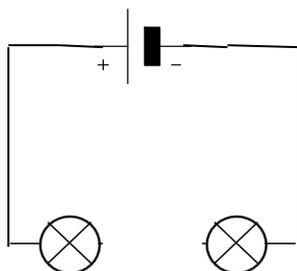
2. For each of the circuits below, say whether or not the bulb will light up.

If your answer is no, explain why.

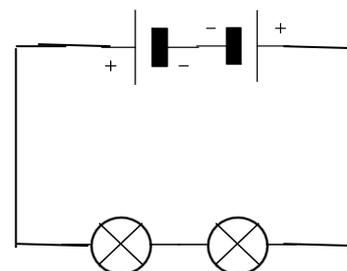
a)



b)



c)



3. Copy and complete the following paragraph by filling in the blanks with the correct answers:

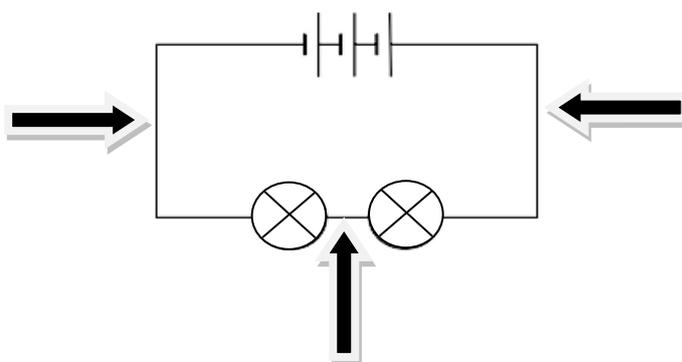
In a _____ circuit, the current flows round from one component to the next in a _____ loop. If one component breaks or is _____, the circuit is no longer complete and no _____ can flow. As more _____ are added in series, the current _____ and the bulbs become _____. As more _____ are added in series, the current _____ and the bulbs become _____.

4 a) What is meant by an electric current?

b) Which piece of equipment is used to measure the current in a circuit?

c) What units are used when talking about current?

d) Copy the circuit diagram below using a ruler and write what the current would be at the three points indicated by an arrow. **Each battery is 0.2A.**



Electromancer Homework Exercise 2



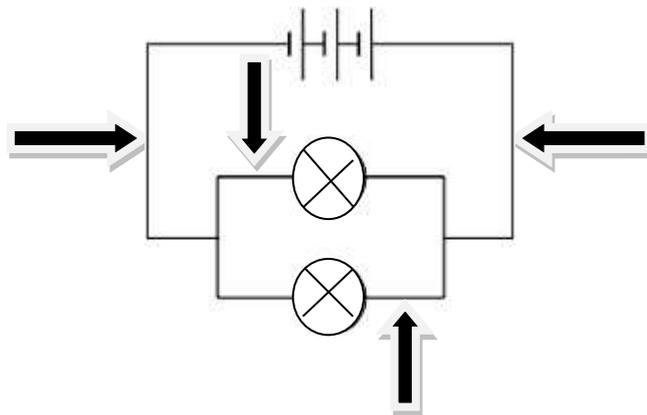
1. a) Copy and complete the following paragraph by filling in the blanks with the correct answers:

In a _____ circuit, there are different _____ for the current to take. If one component _____ or is removed, there will still be a complete circuit for the _____ to flow through. This means that all bulbs receive an _____ share of the current and so the bulbs are equally as _____.

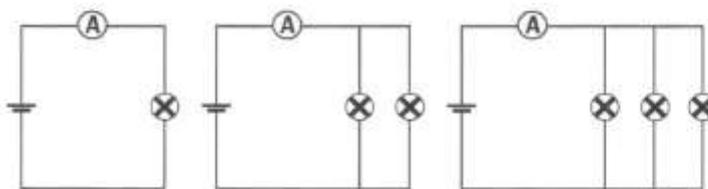
b) Where are you most likely to find a parallel circuit?

Explain why this is useful.

c) Copy the circuit diagram below using a ruler and write what the current would be at the four points indicated by an arrow. **Each battery is 0.2A.**



2.



A pupil does an experiment with different numbers of lamps in a parallel circuit. The diagrams above show the three circuits used.

a) What happens to the brightness of the lamps as the pupil adds more of them?

Explain your answer.

b) What happens to the ammeter reading as more lamps are added?

Explain your answer.

c) One of the bulbs in the third circuit is unscrewed. What happens to the brightness of the other bulbs?

Electromancer Homework Exercise 3

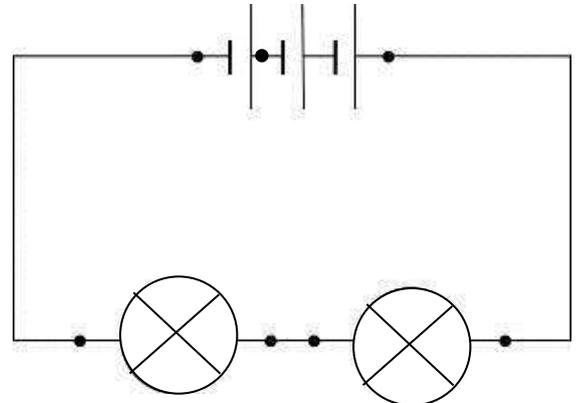


- 1 a) What is meant by the "voltage" of a battery?
- b) Explain why a bulb is brighter when more batteries are added in series.

2. A pupil wants to measure voltage using the circuit shown.

Copy out the circuit and draw in how the voltmeter should be connected to measure the voltage across:

- a) A bulb
- b) A battery



3. Match the correct question with the correct answer:

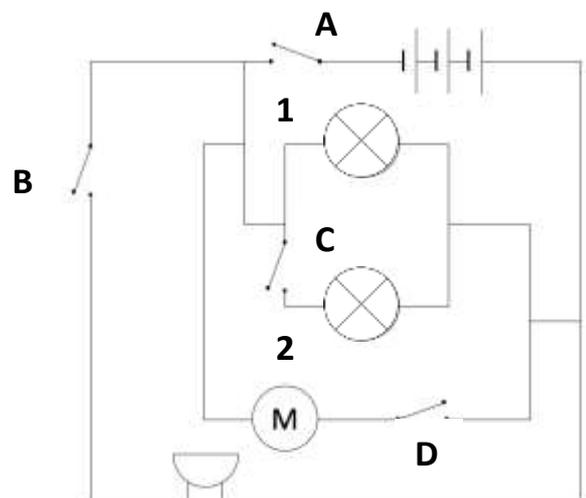
An electric current is
Static electricity is
An amp is
A filament is
A volt is

charge staying on insulated material
the tiny wire inside a bulb
electrons travelling through wires
the unit of voltage
the unit for electric current

4. Switches can be used to turn on and off different components in a circuit. This can save energy.

Identify the switches (A, B, C or D) you would need to close in order to switch on:

- a) Bulb 1 only
- b) Bulbs 1 and 2 only
- c) Bulb 1 and the buzzer only
- d) Bulbs 1, 2 and the motor only



Electromancer Homework Exercise 4



1. In a battery, electricity comes from a chemical reaction.

- Why do batteries sometimes go "flat"?
- Some batteries are rechargeable. How can they be recharged?
- Give an example of a rechargeable battery.

2. Electricity can be produced by connecting different metals together with an electrolyte (a solution which can conduct electricity)

a) Look at the different pairs of metals below and arrange them in order (highest to lowest) of the voltage they could produce when in an electrolyte.

Magnesium - Tin	Magnesium - Zinc	Magnesium - Iron
Magnesium - Magnesium	Magnesium - Aluminium	Magnesium - Copper

b) With reference to the **Electrochemical Series**, what is the rule for changing the voltage produced?

c) Other than changing the metals used, how else could you change the voltage of the battery?

3. Batteries can be made using fruit juice as the electrolyte.

a) Name two pieces of fruit which can be used to conduct electricity.

b) Which of these fruits would produce the greatest voltage?

c) What is inside the fruit that allows it to conduct electricity?



4. a) How does the voltage from a battery compare with the voltage from the mains inside your house?

b) Every year, hundreds of people in the UK die from electric shocks.

Why then are people shocked by defibrillators in hospitals?

c) Give one advantage **and** one disadvantage of using batteries rather than mains electricity.

Electromancer Homework Exercise 5



1. Look at each of the examples below and explain, using the words **conduction**, **convection** and **radiation**, which methods help cook the food and how it works. (Some answers include 2 methods and some include 3. Make sure you mention all relevant methods in your answer)

An oven with a shiny, reflective surface. What method does this use?

Baking a potato with a metal skewer through it uses 1 main method.

Barbeque. This uses all 3 methods – but how?

A pizza oven with a hot floor uses 2 methods. Which ones and how?

2. The water in a kettle is heated using the energy from an electrical element near the bottom.

(a) Explain how **both conduction** and **convection** play a part in transferring the energy. Remember to give details in your answer.

(b) Suggest a reason why kettles are usually coloured white or silver.

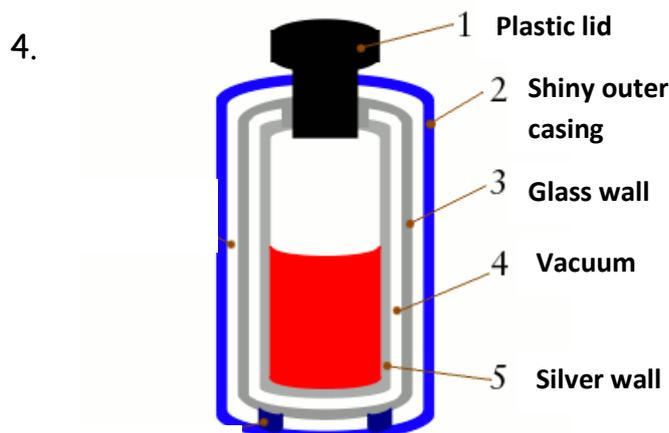
(c) Suggest some reasons why the element in an electric kettle is not placed near the top.

3. (a) Copy and complete the following paragraph by filling in the blanks with the correct answers:

Infrared _____ is given off by all objects. It travels in _____ and can travel through a _____ (a space which contains no _____). Most of the infrared radiation which reaches earth comes from the _____. Special cameras can be used to detect this infrared radiation from the _____ which is very useful to the police when trying to catch _____ during the _____.



(b) Use different colours such as red, yellow and blue to draw the infrared picture you would expect to come from this girl using a hairdryer.



The thermos flask keeps hot drinks hot and cold drinks cold. It does this by reducing heat transfer by **conduction**, **convection** and **radiation**.

Using each of the 5 features shown in the diagram, explain (with reference to the words in bold) how each one helps reduce heat transfer.