



# **S2 Electricity & Magnetism**

## **Homework**



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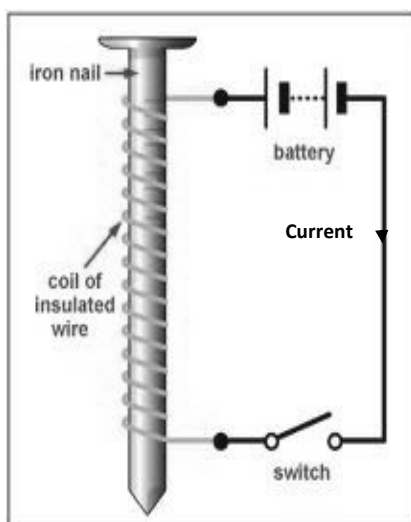
# Homework 1

## Magnets & Electromagnets

1. Complete the sentences below.

There are \_\_\_\_ types of magnetic pole, a \_\_\_\_ pole and a \_\_\_\_ pole. Like poles \_\_\_\_ each other and opposite poles \_\_\_\_ each other.

2. Electromagnets are made by wrapping a wire around an iron core and passing a current through it., as shown in the diagram below



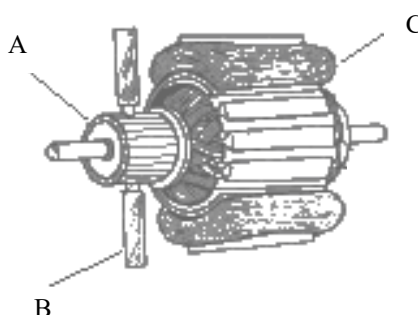
- List two methods of increasing the strength of the electromagnet.
3. What is the advantage of using an electromagnet instead of a permanent magnet?
  4. In an electric bell
    - a) How is the clapper moved towards the gong?
    - b) What happens once the gong has been struck?
  5. Name two other places where an electromagnet is used.



# Homework 2

## Motors & Induced Voltage

1. What happens when a current carrying wire is placed in a magnetic field?
2. The direction of the current in this wire is reversed. Predict what will happen to the wire.
3. Look at the diagram below:



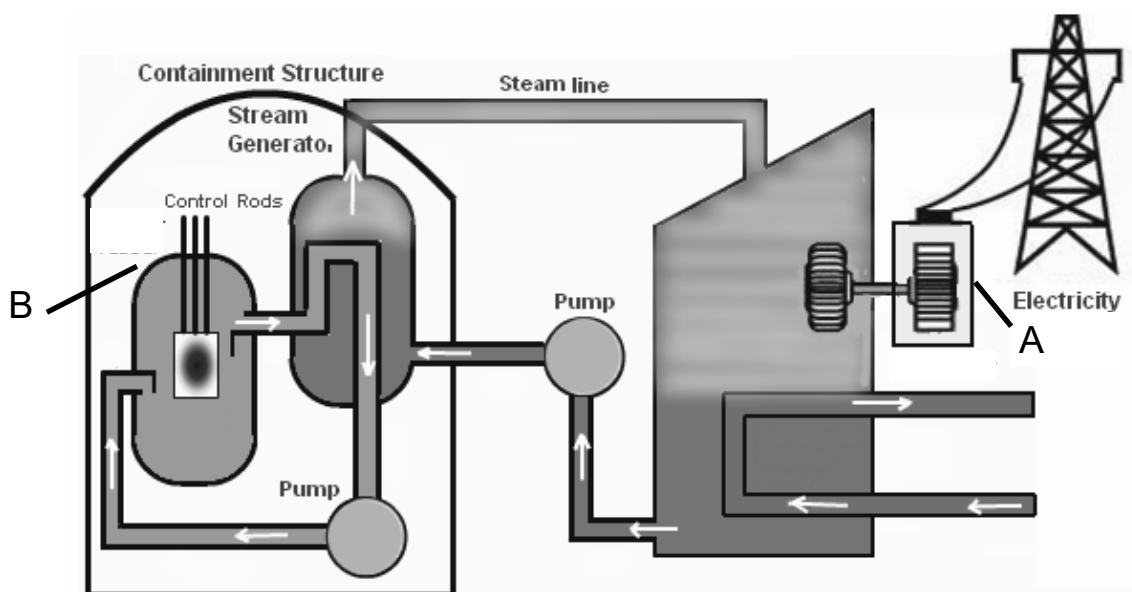
- (a) Name the components A, B and C.
  - (b) State the purpose of component B in the motor.
4. What is the energy change in an electric motor?
  5. Name three things that the size of induced voltage on a conductor depends on.
  6. What is the energy change in a dynamo?



# Homework 3

## Generating Electricity

1. What type of fuel is used in thermal power stations?
2. Give one advantage and one disadvantage of thermal power stations.
3. What type of fuel is used in a nuclear reactor?
4. What is the energy change in a generator?
5. The diagram below shows a nuclear power station:



Give the names of parts A and B in the diagram.

6. An advantage of nuclear power is that it does not produce  $\text{CO}_2$ . ( $\text{CO}_2$  contributes to global warming). Give a disadvantage of using nuclear power.



# **Homework 3 Contd.**

## **Generating Electricity**

1. Examples of energy sources are:

**gas          wind          oil          solar          wave          hydro          coal**

These energy sources can be classified as renewable or non-renewable.  
Complete the table below to show which of these examples are renewable and which are non-renewable.

Renewable	Non-Renewable

2. Is nuclear energy renewable? Explain your answer.
3. What type of energy do we change to electricity in a wind turbine?
4. The table below shows how much of our electricity is produced by different sources in Scotland.

Energy Source	% of Electricity
Hydroelectric	3.5
Gas	3
Nuclear	17
Solar	2
Wind	74

- (a) On graph paper, produce a bar chart of the information given in the table.
- (b) Which source produces most electricity?
- (c) Which source do we use least in Scotland?



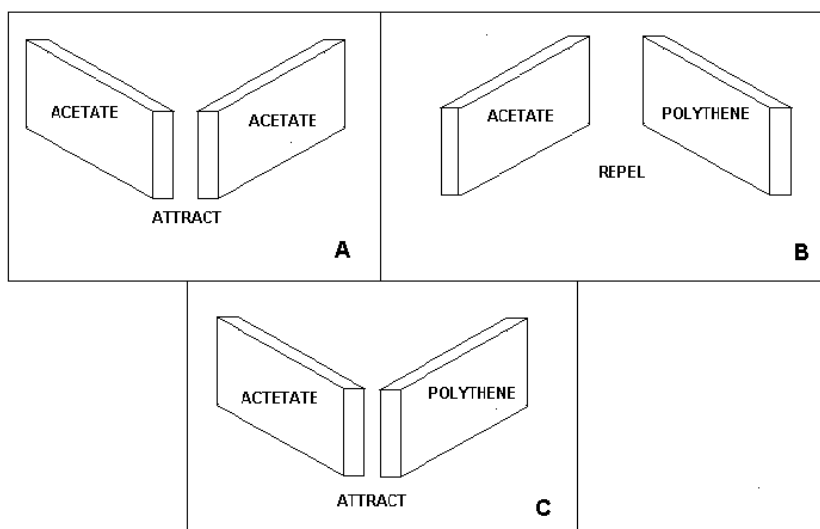
# Homework 4

## Charges and Symbols

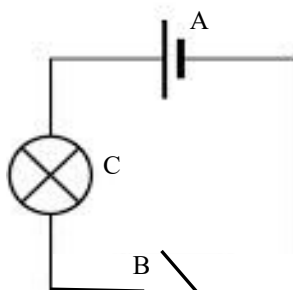
1. Complete the sentences below.

There are \_\_\_\_ types of electric charge, \_\_\_\_ and \_\_\_\_\_. We can charge materials by \_\_\_\_\_ them. Like charges \_\_\_\_\_ each other and opposite charges \_\_\_\_\_ each other. Negative charges are called \_\_\_\_\_.

2. When a polythene rod is rubbed with a cloth it becomes negatively charged. When an acetate rod is rubbed with a cloth it becomes positively charged. Which of the boxes below describes correctly the situation when two rods are brought close together ?



3. Look at the circuit below:



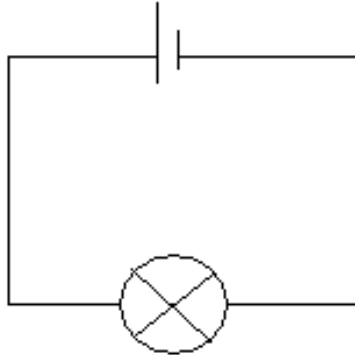
- (a) Name the components A, B and C.  
(b) State the purpose of components A, B and C in the circuit above.  
(c) Redraw the circuit, replacing the switch with a resistor.



# Homework 5

## Current and Voltage

1. Describe what is meant by an “electric current” and give its units.
2. Describe what is meant by the term “voltage” and give its units.
3. John wants to measure the voltage across and current through the bulb in the circuit below.



- (a) What type of meter would he use to measure the voltage across the bulb?
  - (b) What type of meter would he use to measure the current through the bulb?
  - (b) Redraw the circuit above to show how he would measure the voltage and current.
4. A pupil is investigating current in a circuit using a battery, two bulbs and wires. When she sets up the circuit she notices that none of the bulbs light. Her teacher checks the bulbs and informs her that only one of the bulbs was faulty.

Explain why this faulty bulb would cause the other bulb not to light.



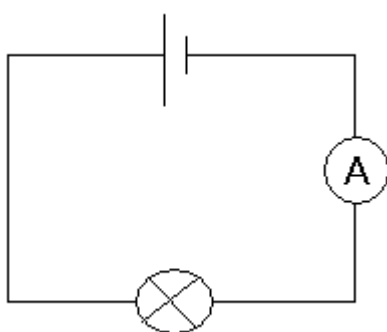
# Homework 6

## Resistance

1. Define what is meant by the term “resistance”.

2. What are the units of resistance?

3. A pupil adds a resistor to the circuit below.

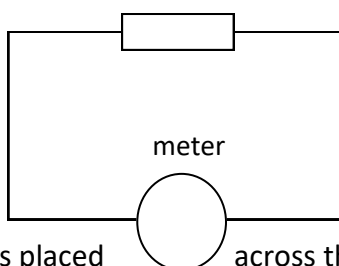


(a) Redraw the circuit with the resistor added.

(b) State the effect that this will have on the brightness of the bulb.

(c) What effect will the resistor have on the reading on the ammeter?

4. In another experiment a pupil sets up the following circuit.



(a) What type of meter is placed across the resistor to measure the resistance?

(b) What is the energy change that takes place in the resistor?

(c) Why are resistors used in electronic devices?

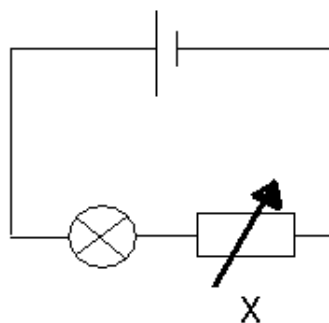




# Homework 7

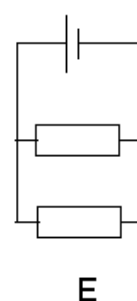
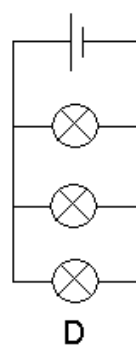
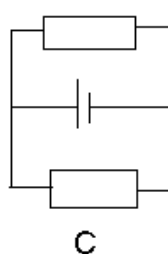
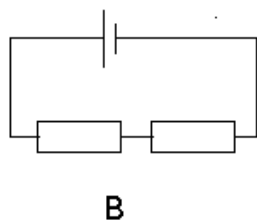
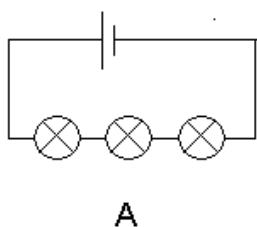
## Circuits

1. Jennifer sets up the circuit below.

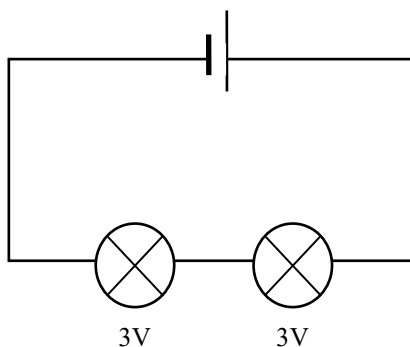


- (a) Name the component labelled X.
- (b) Describe what the circuit above could be used for.
- (c) Component X is used in many appliances. Name an appliance which uses component X and how it is used.

2. Look at the circuits below and identify whether they are series or parallel.



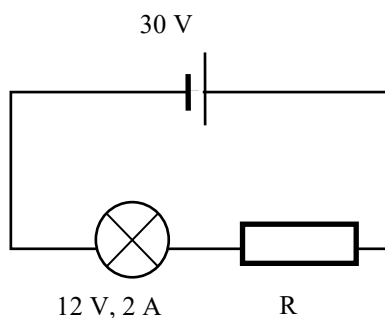
3. Two identical 3 V bulbs are connected to a supply as shown below. What is the voltage of the supply?



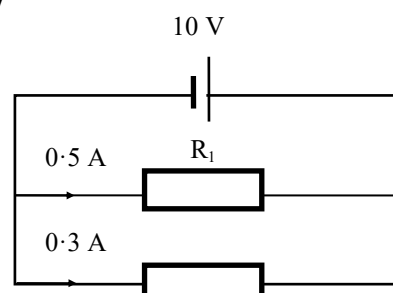
# Homework 7

## cont.

4. A simple circuit with a bulb and resistor in series is shown below.

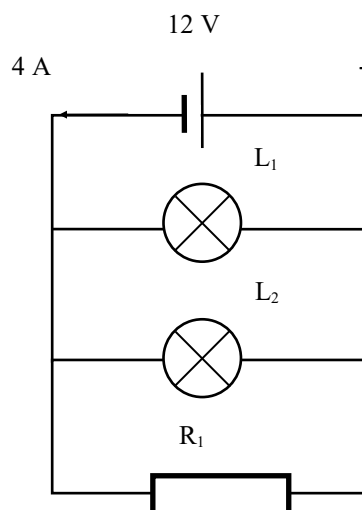


- (a) If the bulb is operating at its correct voltage, what is the voltage across the resistor R?
- (b) The current in the bulb is 2 A. What current flows through the resistor?
5. Two resistors are connected in parallel to a 10 V battery as shown opposite.



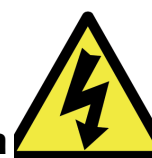
- (a) What is the voltage across R<sub>1</sub>?
- (b) What is the voltage across R<sub>2</sub>?
- (c) What size of current is drawn from the battery?

6.



Two identical bulbs and a resistor are connected in parallel to a 12 V supply.

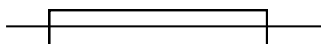
- (a) What is the voltage across L<sub>2</sub> ?
- (b) A current of 1.5 A flows through each of the bulbs. What is the current flowing through the resistor?



# Homework 8

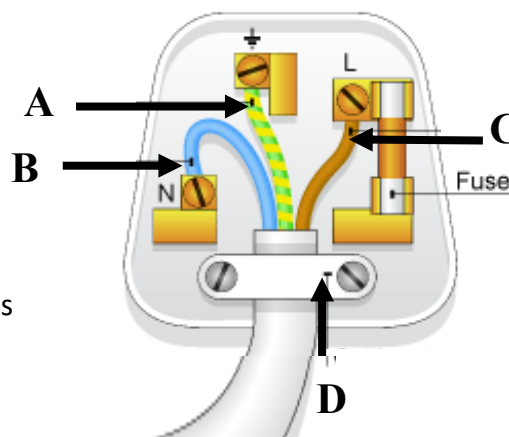
## Household Electricity

1. A pupil sees the following circuit symbol in a diagram.



- (a) Identify this component from the circuit diagram.
- (b) What is the purpose of this component in electrical appliances?
2. The diagram opposite shows a correctly wired plug.

- (a) Why are the copper wires coated in a plastic substance?
- (b) State the name of wire A and describe the purpose of this wire.
- (c) A student incorrectly states that it does not matter which way round wires B and C are connected. Explain why this statement is incorrect in terms of the fuse.



3. Electricity is very dangerous and should not be misused. Give two examples of possible dangerous situations involving electricity in the home.
4. Explain why there are no sockets in a household bathroom.

