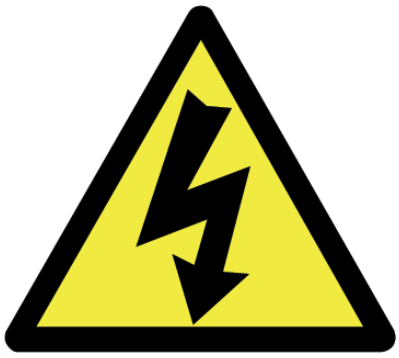
S2 Electricity & Magnetism

Homework

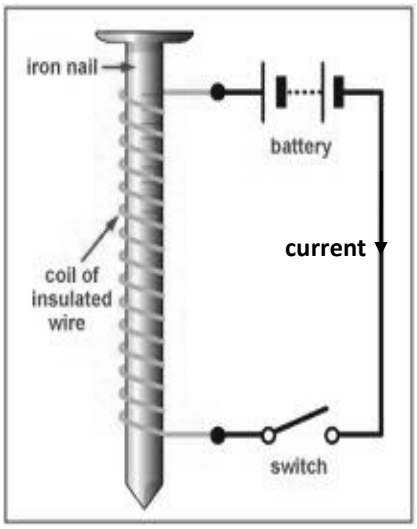


Homework 1
Magnets & Electromagnets

1. Copy and 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 .



   Describe to ways to increase the strength of an electromagnet.

3. State the advantage of using an electromagnet instead of a permanent magnet.

4. In an electric bell
   a) Explain why the clapper moves towards the gong.
   b) Describe what happens once the gong has been struck.

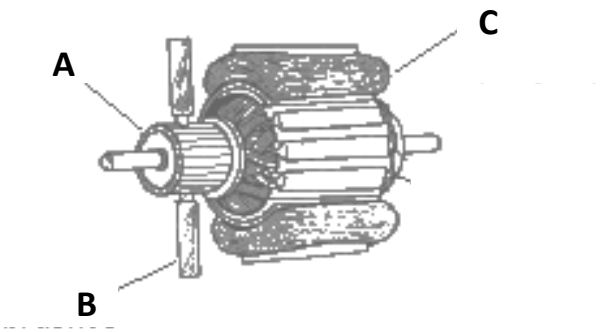
5. Name two other places where an electromagnet is used.

Homework 2
Motors & Induced Voltage

1. (a) Describe what happens when a current carrying wire is placed in a magnetic field.

   (b) The direction of the current in this wire is reversed.
   Predict what will happen to the wire.

2. Look at the diagram below:



   (a) Name components A, B and C.

   (b) State the purpose of component B in the motor.

3. State the energy change in an electric motor.

5. Name three things that the size of induced voltage on a conductor depends on.

6. State the energy change in a dynamo.

Homework 3
Generating Electrcity

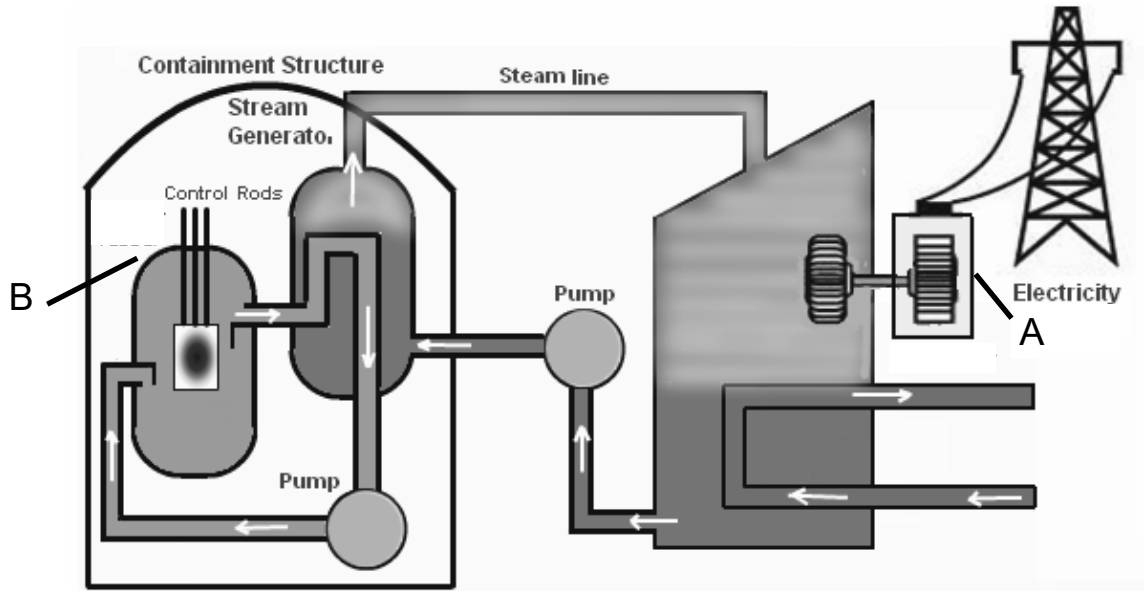
1. State a type of fuel that is used in thermal power stations.

2. Describe one advantage and one disadvantage of thermal power stations.

3. State the fuel used in a nuclear reactor.

4. State the energy change in a generator.

5. The diagram below shows a nuclear power station:



Name parts A and B in the diagram.

6. An advantage of nuclear power is that it does not produce CO_2 which contributes to global warming.
State a disadvantage of using nuclear power.

Homework 3 Contd.
Generating Electricity

7. Examples of energy sources are:

gas wind oil solar wave hydro coal

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

Renewable	Non-Renewable

8. A biology pupil says “Nuclear energy is great because its renewable!”. Comment on this statement made by the pupil.

9. The table below shows how much of our electricity is produced by different sources in Scotland.

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

(a) On graph paper, draw a bar chart using the information in the table.

(b) State which source produces the most electricity.

(c) State which source is used least in Scotland.

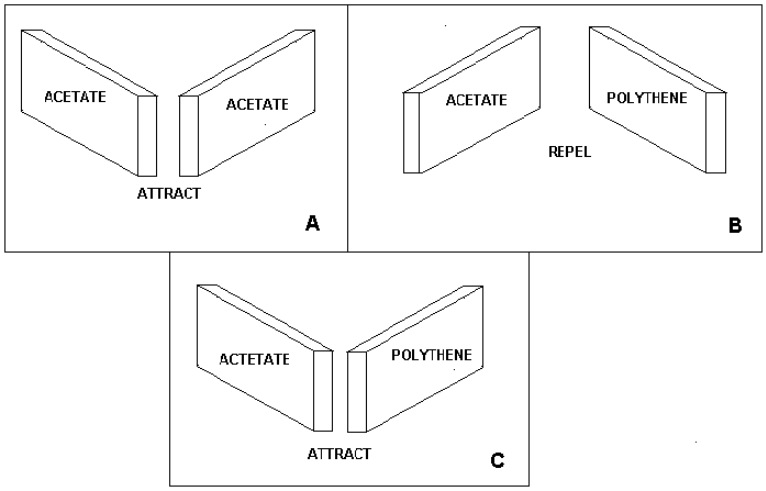
Homework 4
Charges and Symbols

1. Copy and complete the sentences below.

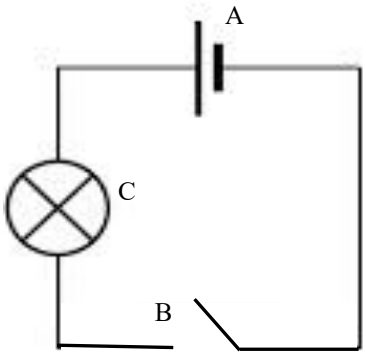
   There are ____ types of electric charge, _____ and _____.
   We can charge materials by _____ them.
   Like charges _____ each other and opposite charges _____ each other.

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 opposite.



   (a) Name the components A, B and C.

   (b) State the purpose of components A, B and C in the circuit.

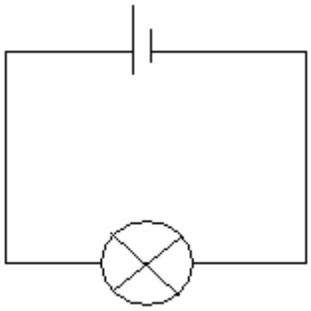
   (c) Redraw the circuit, replacing the switch with a resistor.

Homework 5
Current and Voltage

1. Describe what is meant by an “electric current” and state its units.

2. Describe what is meant by the term “voltage” and state its units.

3. John wants to measure the voltage across and current through the bulb in the circuit below.



   (a) State which type of meter he should use to measure the voltage across the bulb.

   (b) State which type of meter he should 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.

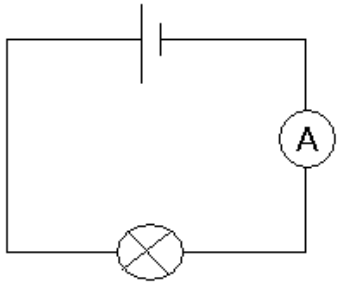
   Explain why this faulty bulb would cause the other bulb not to light.

Homework 6
Resistance

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

2. State the units of resistance.

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

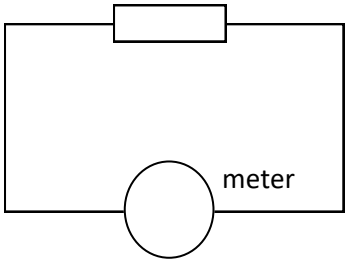


   (a) Redraw the circuit with the resistor added.

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

   (c) Describe what will happen to the reading on the ammeter when the resistor is added.
   Explain your answer.

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

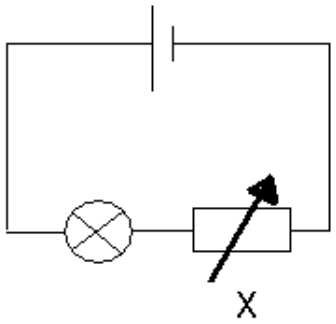


   (a) State which type of meter is placed across the resistor to measure the resistance.

   (b) State the energy change that takes place in the resistor.

Homework 7
Circuits

1. Jennifer sets up the circuit below.

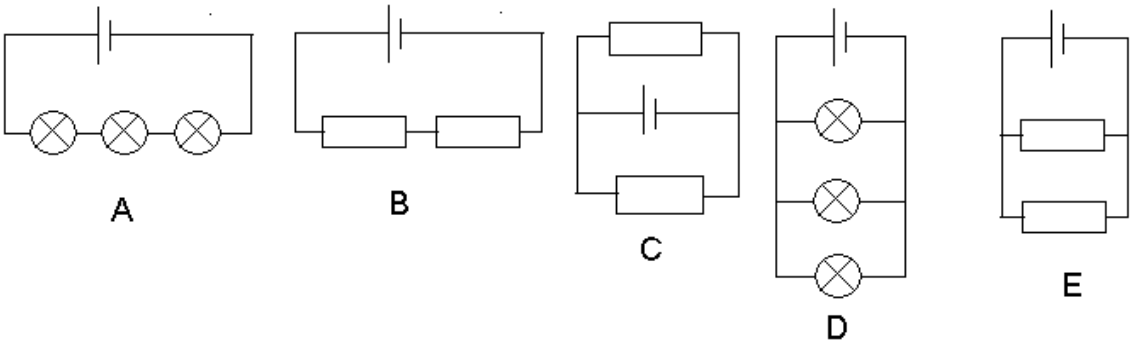


(a) Name the component labelled X.

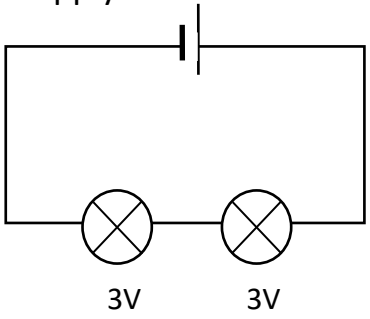
(b) Describe what the circuit above could be used for.

(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.

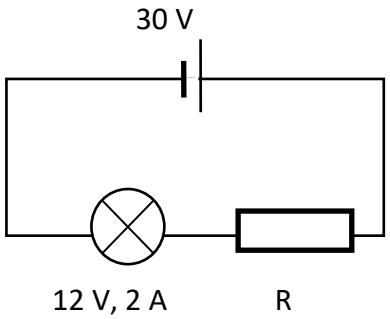


3. Two identical 3 V bulbs are connected to a supply as shown below.
State the voltage of the supply.



Homework 7 cont.
Circuits

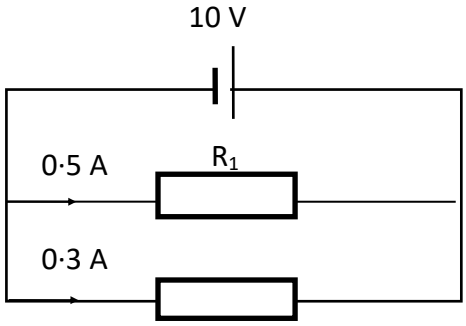
4. A simple circuit with a bulb and resistor in series is shown below.



(a) State the voltage across resistor R if the bulb is operating at its correct voltage.

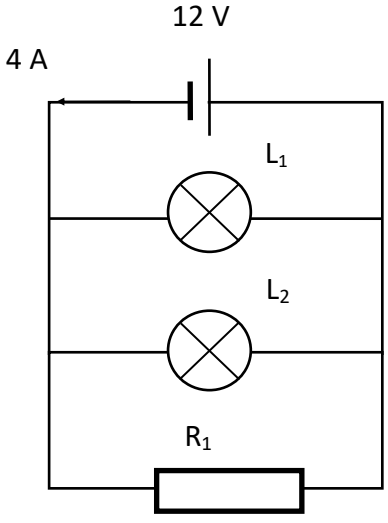
(b) State the current through the resistor if the current through the bulb is 2A.

5. Two resistors are connected in parallel to a 10 V battery as shown opposite.



(a) State the voltage across R_1.

(b) State the size of the current drawn from the battery.



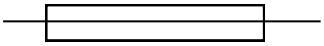
6. Two identical bulbs and a resistor are connected in parallel to a 12 V supply.

(a) State the voltage across L_2.

(b) A current of 1·5 A flows through each of the bulbs.
State the current flowing through the resistor.

Homework 8
Household Electricity

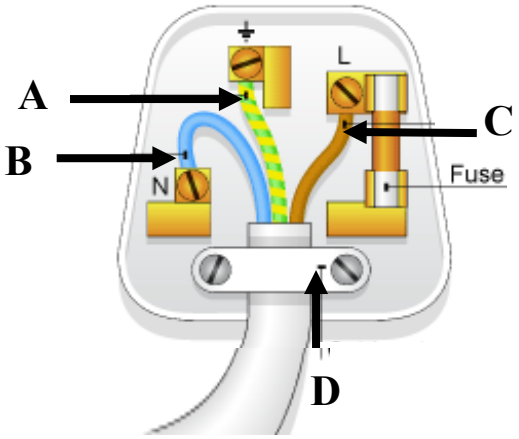
1. A pupil sees the following circuit symbol in a diagram.



(a) Identify this component from the circuit diagram.

(b) Describe the purpose of this component in electrical appliances.

2. The diagram opposite shows a correctly wired plug.



(a) Describe why the copper wires are coated in a plastic substance.

(b) State the name of wire A and describe the purpose of this wire.

3. Electricity is very dangerous and should not be misused.

Describe two examples of possible dangerous situations involving electricity in the home.

4. Explain why there are no sockets in a household bathroom.