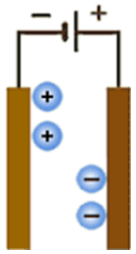
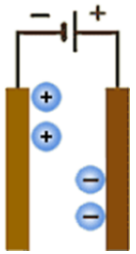
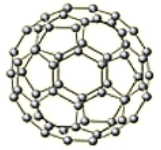
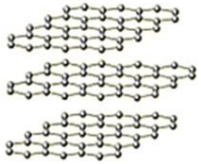
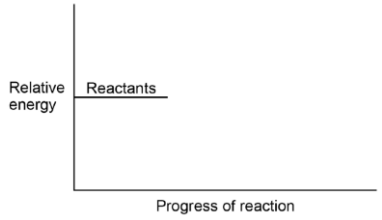
Illustrate sodium as an atom.	Illustrate chlorine as an atom.	Illustrate NaCl as an ionic bond.	Describe the electron transfer when sodium reacts with chlorine.
Explain why ionic bonds have high melting points.	Explain why ionic bonds will not conduct in a solid state.	Identify the following: (RPA) • Technique • Cathode • Anode 	Explain in why ionic substances are decomposed using this technique. 
Illustrate Cl_2 as a covalent bond.	Explain why Cl_2 has low boiling point.	Describe the structure pictured in terms: • Name • Bonding (type) • Properties 	Describe the structure pictured in terms: • Name • Bonding (type) • Properties 
Complete the energy profile diagram for an endothermic reaction (RPA). 	Calculate the Mr for the following: • $CaCO_3$ • MgO • NaOH • NaCl • Cl_2	Describe the differences between acids/bases in terms: • Ions • pH • Colour	Explain how a student could prepare copper sulfate crystals from an metal oxide/acid (RPA).

Some fertilisers contain potassium chloride.

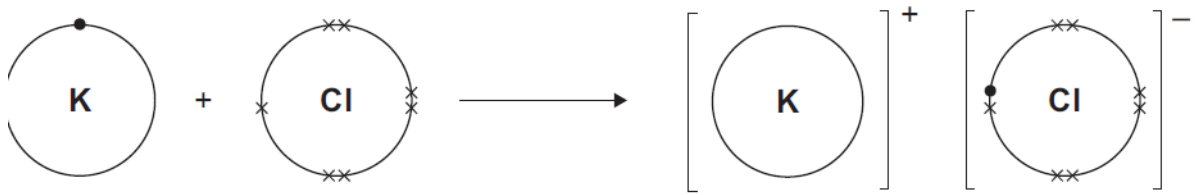
Potassium reacts with chlorine to produce potassium chloride.

Figure 6 shows how this happens.

The dots (•) and crosses (x) represent electrons.

Only the outer shell is shown.

Figure 6



Use **Figure 6** to help you answer this question.

Describe, as fully as you can, what happens when potassium reacts with chlorine to produce potassium chloride.

[4 marks]

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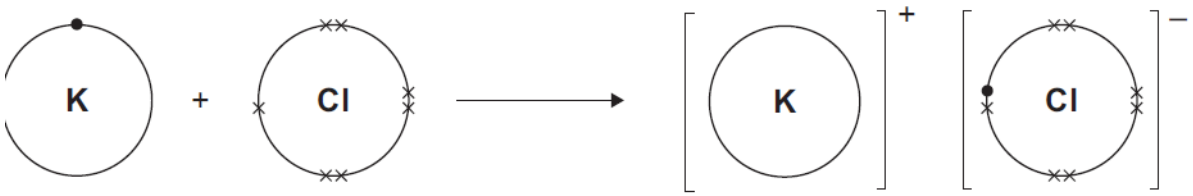


Use **Figure 6** to help you answer this question.

Describe, as fully as you can, what happens when potassium reacts with chlorine to produce potassium chloride.

[4 marks]

Potassium loses 1 electron (oxidation).

Chlorine gains 1 electron (reduction).

The 1 electron from potassium is transferred to the chlorine.

The positive and negative ions attract strongly to form an ionic bond.

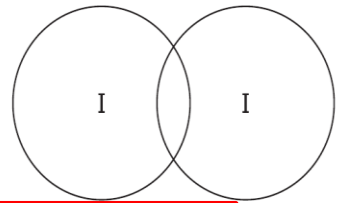
The bonding in iodine is similar to the bonding in chlorine.

Complete **Figure 4** to show the bonding in iodine.

Show the outer electrons only.

[2 marks]

Figure 4



Explain why iodine has a low melting point.

[3 marks]

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Explain, in terms of particles, why liquid iodine does not conduct electricity.

[2 marks]

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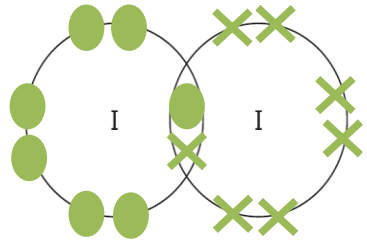
Complete **Figure 4** to show the bonding in iodine.

Show the outer electrons only.

[2 marks]

Figure 4



Explain why iodine has a low melting point.

[3 marks]

Sharing electrons (no charge)

Weak intermolecular attraction

Low energy to overcome

Explain, in terms of particles, why liquid iodine does not conduct electricity.

[2 marks]

Sharing electrons (no charge)

No free electrons

Describe a method to make pure, dry crystals of magnesium sulfate from a metal oxide and a dilute acid.

[6 marks]

Describe a method to make pure, dry crystals of magnesium sulfate from a metal oxide and a dilute acid.

[6 marks]

Reactants:

Sulfuric acid

Magnesium oxide

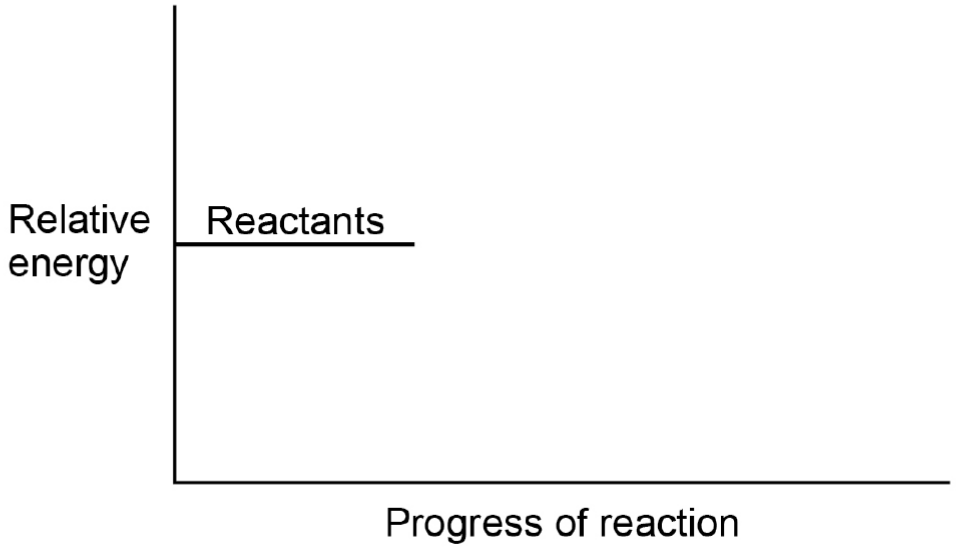
1. **Heat 40ml sulfuric acid gently (almost boiling)**
2. **Add 3 spatulas (magnesium oxide)**
3. **Stir**
4. **Filter (Collect filtrate)**
5. **Evaporate gently (until crystals)**
6. **Allow to cool (crystallisation)**

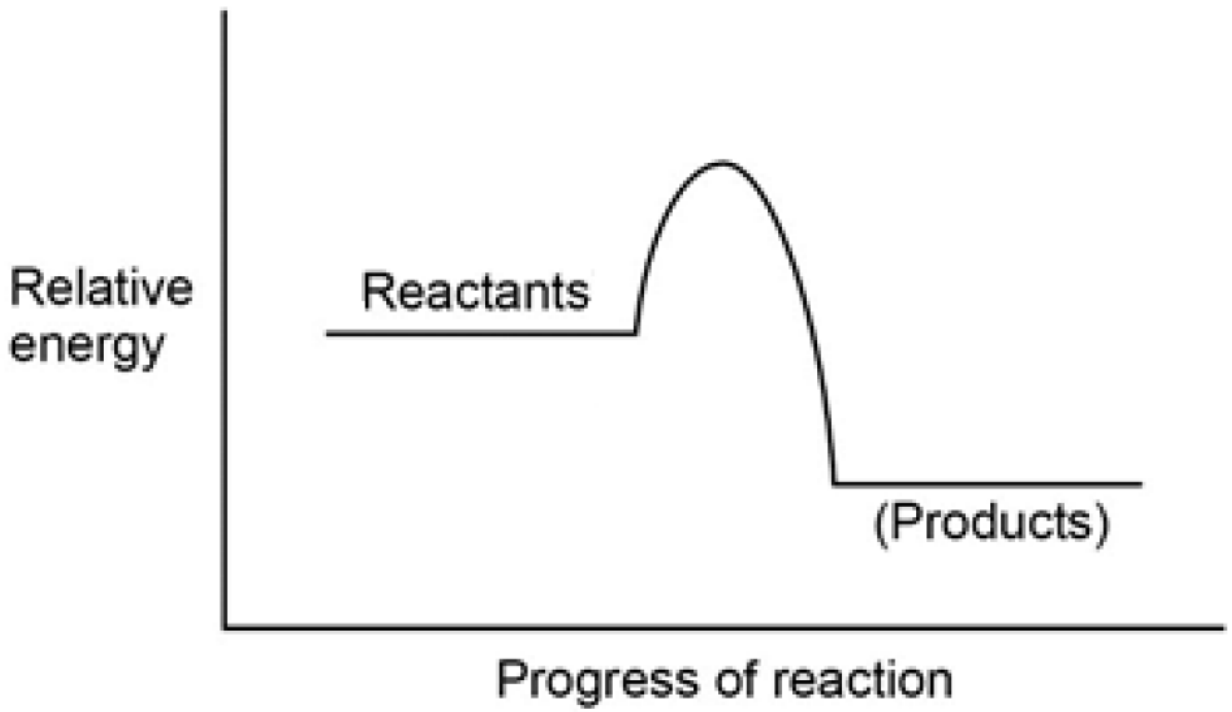
The reaction between sodium and chlorine is an exothermic reaction.

Complete the reaction profile for the reaction between sodium and chlorine.

[2 marks]

Figure 14





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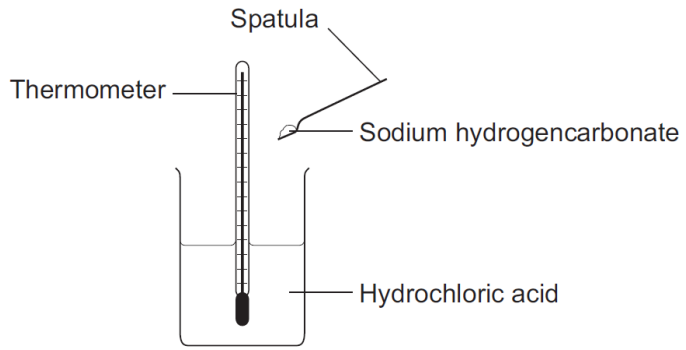
Some students did an experiment to find the temperature change when hydrochloric acid reacts with sodium hydrogencarbonate.



The results are in the table.

Number of spatula measures of sodium hydrogencarbonate	Start temperature in °C	Final temperature in °C	Change in temperature in °C
2	20	16	4
4	20	14	6
6	19	11	8
8	20	10	10
10	19	9	10
12	20	10	10

Describe, as fully as you can, the trends shown in the students' results.

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(3 marks)

State the type of energy transfer for this reaction.

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(1 mark)

the more sodium hydrogencarbonate the greater the temperature change

up to 8 spatula measures

then the temperature change is constant

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energy is taken in from the surroundings **or** endothermic