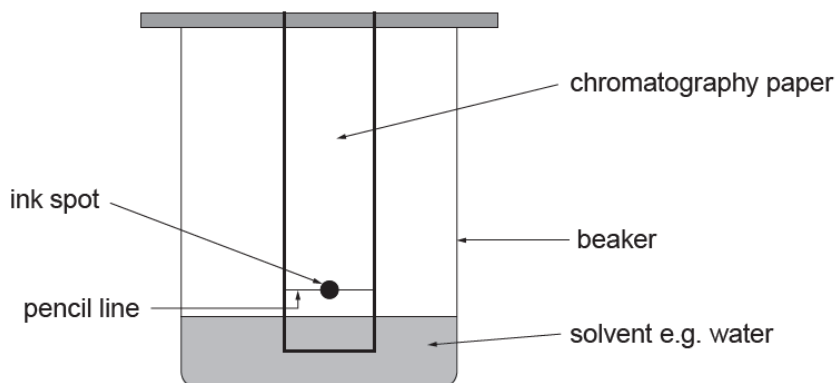


YR 10 –CHEMISTRY REVISION WORKSHEET

1. Chromatography can be used to separate the pigments in ink.



*Describe how chromatography can be used to determine whether **two** inks contain the same pigments.

Your answer should include

- a description of how chromatography is carried out
- a description of what happens during the process
- how the results would show whether the two inks contain identical or different pigments.

You may include a diagram in your answer.

[6]

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(Total for Question 1 = 6 marks)

2. The following table contains information about the numbers of particles contained within atoms and ions **A-F**.

A, B, C, D, E and **F** are **not** chemical symbols.

	A	B	C	D	E	F
Number of electrons	8	10	9	10	10	11
Number of neutrons	10	10	10	10	12	12
Number of protons	8	8	9	10	10	11

(a) State the atomic number of **C**. [1]

(b) State the group and period of the Periodic Table to which **A** belongs. [2]

Group Period

(c) (i) Choose the letter **A-F** which represents an ion. [1]

(ii) Give the charge of this ion. [1]

(d) Give the letter **A-F** which represents an atom/ion with a mass number of 20..... [1]

(e) Choose the letters **A-F** which represent isotopes and give the reason for your choice. [2]

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(f). Mendeleev's original periodic table is different from the modern periodic table.

(i) Give one difference between Mendeleev's early periodic table and the modern periodic table. [1]

.....

(ii) Which row of the table shows the correct relative charges of an electron, a neutron and a proton?

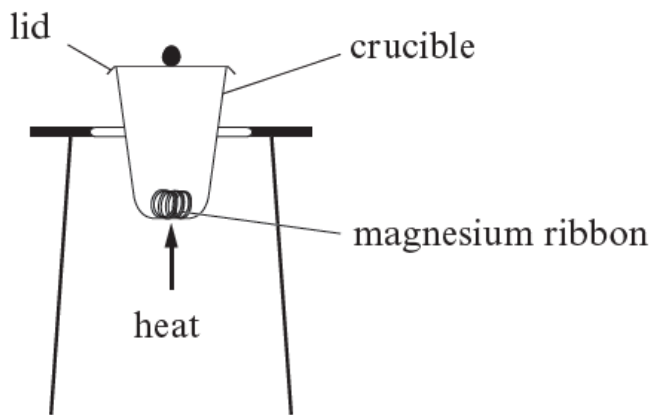
Put a cross (X) in the box next to your answer.

[1]

		relative charge of		
		electron	neutron	proton
<input checked="" type="checkbox"/>	A	-1	+1	0
<input checked="" type="checkbox"/>	B	+1	0	-1
<input checked="" type="checkbox"/>	C	-1	0	+1
<input checked="" type="checkbox"/>	D	0	-1	+1

(Total for Question 2 = 10 marks)

3. Magnesium burns in air with a bright white flame to give a white powder called magnesium oxide. In order to work out the formula of magnesium oxide, Owain and Seren carried out an experiment using the apparatus shown in the diagram below.



The results of their experiment are shown below.

Mass of crucible and lid (g)	19.80
Mass of crucible, lid and magnesium (g)	20.28
Mass of crucible, lid and product after burning (g)	20.44

(a) Using Owain and Seren's results calculate the simplest formula for magnesium oxide. **Show your workings.**

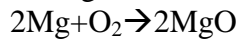
$$\text{Ar}(\text{Mg}) = 24, \text{Ar}(\text{O}) = 16$$

[3]

(b) The formula calculated in part (a) raises a question about the data collected since the correct formula for magnesium oxide is MgO. Assuming no product was spilt and that all weighings were carried out correctly, suggest **two** reasons that could explain the unexpected results in this experiment. [2]

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.....

(c) When magnesium reacts with oxygen, magnesium oxide is formed.



Calculate the mass of MgO formed from 0.48g of Mg.

[2]

(Total for Question 3 = 7 marks)

4. Iron and aluminium are metals.

(a) Complete the sentence by putting a cross (X) in the box next to your answer.

Most metals are extracted from rocks found in the Earth's crust.

Rocks from which metals can be extracted are called

[1]

A elements

B igneous

C ores

D sand

(b) Iron is extracted by heating a mixture of iron oxide and carbon.

[2]

Complete the word equation for this reaction.

iron oxide + → iron +

(c) Aluminium, rather than iron, is used as the main metal in the production of aeroplanes.

Give **two** reasons why aluminium is used as the main metal in the production of aeroplanes.[2]

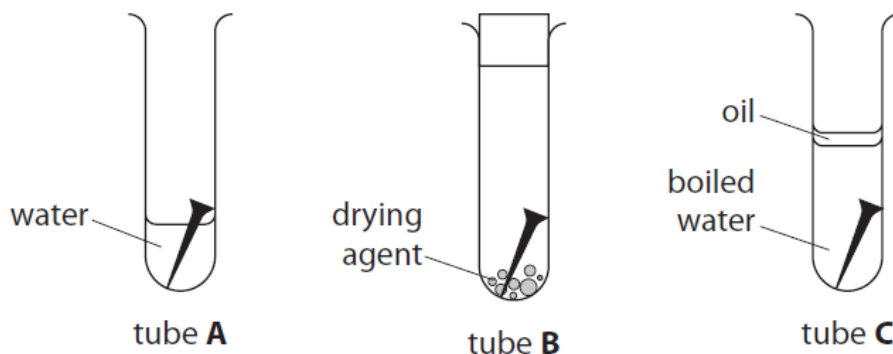
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(d) An experiment was carried out to investigate the conditions needed for iron to rust.

Three test tubes, **A**, **B** and **C**, had identical iron nails placed in them, under different conditions.



The tubes were left for two weeks. The observations are recorded in the table.

test tube	conditions	observations
A	air and water	rusted
B	dry air	not rusted
C	boiled water containing no air	not rusted

Explain why the iron nail placed in test tube **A** rusted but the iron nails in test tubes **B** and **C** did not rust. [2]

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(e) Stainless steel is an alloy containing iron and chromium.

(i) State what is meant by an **alloy**. [2]

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(ii) Cutlery is made of stainless steel.

Give a reason why cutlery is not made of pure iron. [1]

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(Total for Question 4 = 10 marks)

5. Lead nitrate solution reacts with sodium iodide solution to form solid lead iodide and sodium nitrate solution.

(a) Complete the sentence by putting a cross (X) in the box next to your answer. [1]

This reaction is an example of

A combustion

B separation

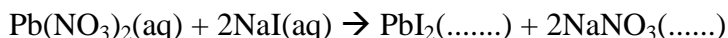
C neutralization

D precipitation

(b) The balanced equation for this reaction is shown.

Complete the equation by filling in the state symbols for the products.

[1]



(c) Calculate the relative formula mass of sodium nitrate, NaNO_3 .

(relative atomic masses: Na = 23, N = 14, O = 16)

[1]

.....
relative formula mass =

(d) The formula of lead iodide is PbI_2 .

Calculate, using this formula, the percentage by mass of lead in lead iodide.

(relative atomic masses: Pb = 207, I = 127; relative formula mass of PbI_2 = 461)

[2]

.....
percentage by mass =%

(Total for Question 5 = 5 marks)

6. Calcium reacts with nitrogen to form the ionic compound calcium nitride, Ca_3N_2 .

(a) Draw a diagram, based on the correct formula, which shows the charges on the ions and the arrangement of the electrons around the negative ion.

Use o to represent an electron from a calcium atom.

Use x to represent an electron from a nitrogen atom.

The electronic configurations of calcium and nitrogen are **(N 2,5) : (Ca 2,8,8,2)**

[3]

(b) In the lattice of calcium nitride, the ratio of calcium ions to nitride ions is 3 : 2.

(i) What is meant by the term *lattice*? **[2]**

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(ii) In terms of ionic charges, explain why the ratio of ions is **3 : 2**. **[1]**

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(c) Nitrogen exists as a diatomic gas in the atmosphere.

(i) What is meant by the term diatomic? **[1]**

.....

.....

(ii) Show bonding between nitrogen atoms to make nitrogen molecule.

Use only outer shell in your presentation **[2]**

(iii) Nitrogen has very low boiling point as compared to calcium nitride. Explain the property with respect to bonding in these two chemicals. [4]

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(Total for Question 6 = 13 marks)

7. The following table gives some information about five resources found in the Earth's crust.

Resource	Formula of important substance found in the resource
haematite	Fe_2O_3
bauxite	Al_2O_3
galena	PbS
cassiterite	SnO_2
gold	Au

Use the information in the table to answer parts (a) - (c).

(a) Give the **names** of the elements present in bauxite. [1]

..... and

(b) Give the **name** of the resource from which lead can be extracted. [1]

(c) State how the information in the table shows that gold is an unreactive metal. [1]

.....

(d) Haematite contains the compound iron oxide, Fe₂O₃.
State the **total** number of atoms present in the formula Fe₂O₃. [1]

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(e) Iron can be extracted from iron oxide using carbon monoxide.
iron oxide + carbon monoxide → iron + carbon dioxide
During this process, reduction takes place.

(i) Give the name of the substance that is reduced. [1]

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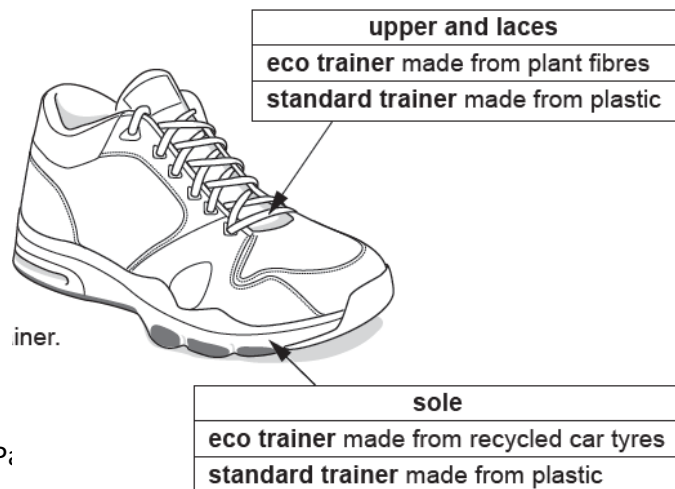
(ii) State the meaning of the term reduction. [1]

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(f) A company makes a **standard** trainer using plastics made from crude oil. They make a new **eco trainer** from plant fibres and recycled car tyres.

They expect a Life Cycle Assessment (LCA) to show that the eco trainers do less harm to the environment than standard trainers.



Here is data on the LCA of each trainer.

	Eco trainers		Standard trainers	
	Energy (MJ)	Greenhouse gases made (kg CO ₂)	Energy (MJ)	Greenhouse gases made (kg CO ₂)
Making materials for the trainers	1.6	0.1	6.0	4.2
Making the trainers from the materials	1.4	1.0	4.2	3.7
Disposing of the trainers	0.8	0.6	0.8	0.6

*Suggest two reasons why the company expected the LCA would show eco trainers do less harm to the environment than standard trainers. Does the data show the company was right? What additional information is needed to complete the LCA?

[4]

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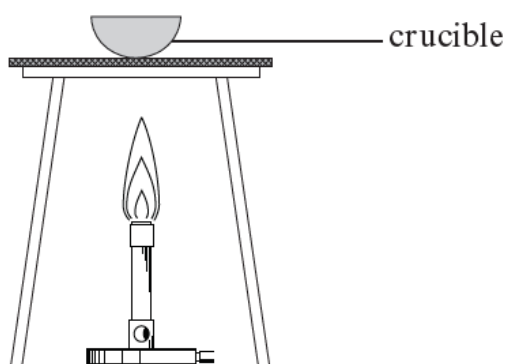
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(Total for Question 7 = 10 marks)

8. (a) The following list shows three metals in order of their reactivity. The most reactive metal is at the top of the list.



John carried out an experiment to find out which metals could be used to extract iron from iron oxide. He heated iron oxide with each metal powder separately as shown in the diagram below.



The table below shows whether or not a reaction took place.

Mixture being heated	Reaction takes place
magnesium powder and iron oxide	yes
zinc powder and iron oxide	yes
copper powder and iron oxide	no

(i) Using this information, select the list of reactivity which shows **iron** in its correct position. Place a tick (✓) in the appropriate box. [1]

<i>More reactive</i> ↑	iron	magnesium	magnesium	magnesium
	magnesium	iron	zinc	zinc
	zinc	zinc	iron	copper
	copper	copper	copper	iron
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

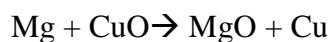
(ii) Give reason for your choice. [1]

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(b). When magnesium powder is heated with copper(II) oxide a violent reaction occurs. The equation for this reaction is given below:



(i) 4.0 g of magnesium oxide is formed when 2.4 g of magnesium reacts with 8.0 g of copper(II) oxide. Assuming both reactants are used up during the reaction and that no product is lost, calculate the mass of copper that forms. Explain your answer in terms of atoms. [2]

Mass of copper = g

Explanation

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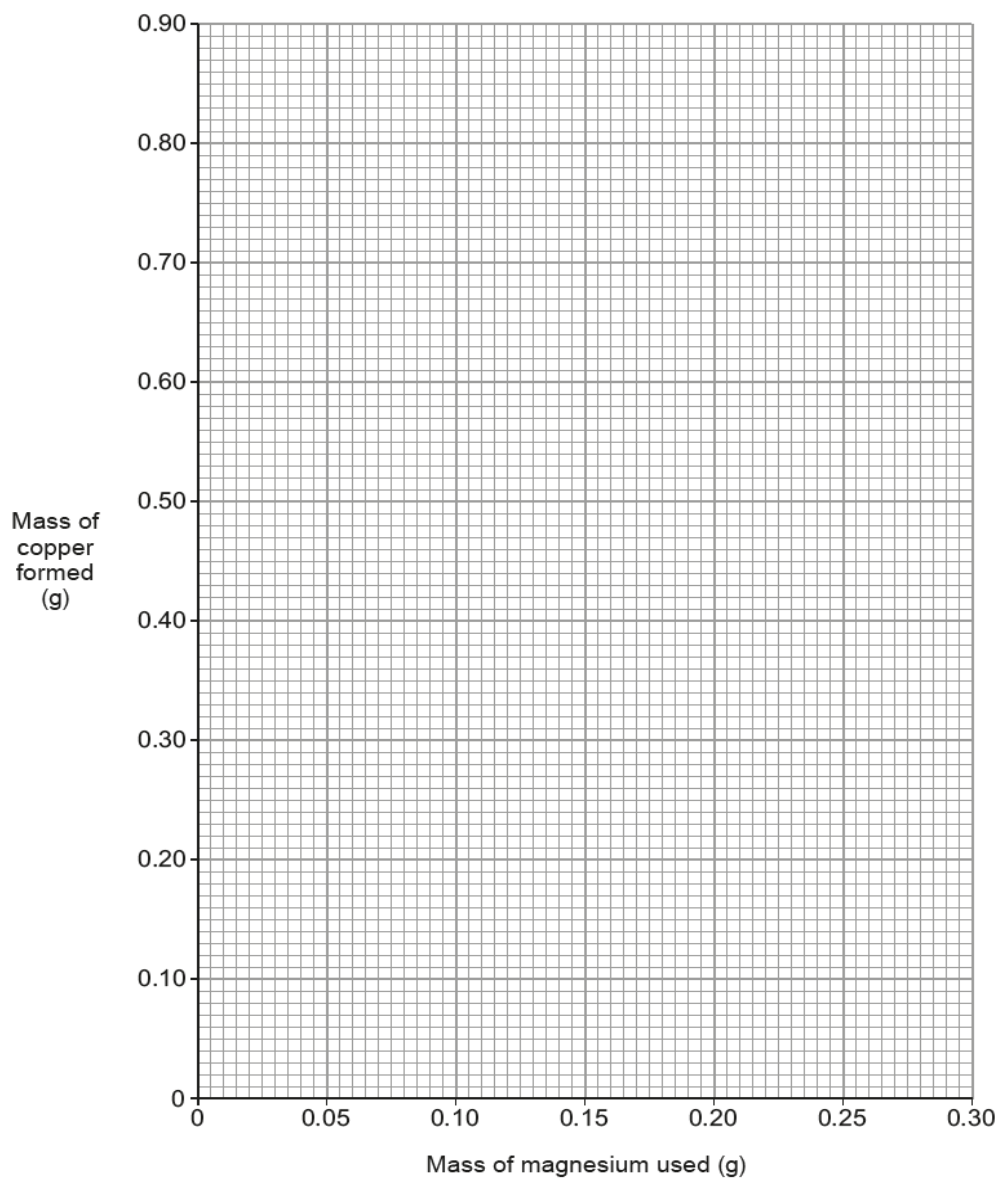
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(ii) The table below shows the mass of copper formed when different masses of magnesium were heated with 8.0 g of copper(II) oxide.

Mass of magnesium used (g)	Mass of copper formed (g)
0.05	0.14
0.10	0.27
0.15	0.40
0.20	0.53
0.25	0.66

Plot the results from the table on the grid opposite and draw a suitable line.

[3]



Describe the relationship between the mass of magnesium used and the mass of copper formed.

[2]

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Use your graph to find the mass of copper formed when 0.30 g of magnesium is used. [1]

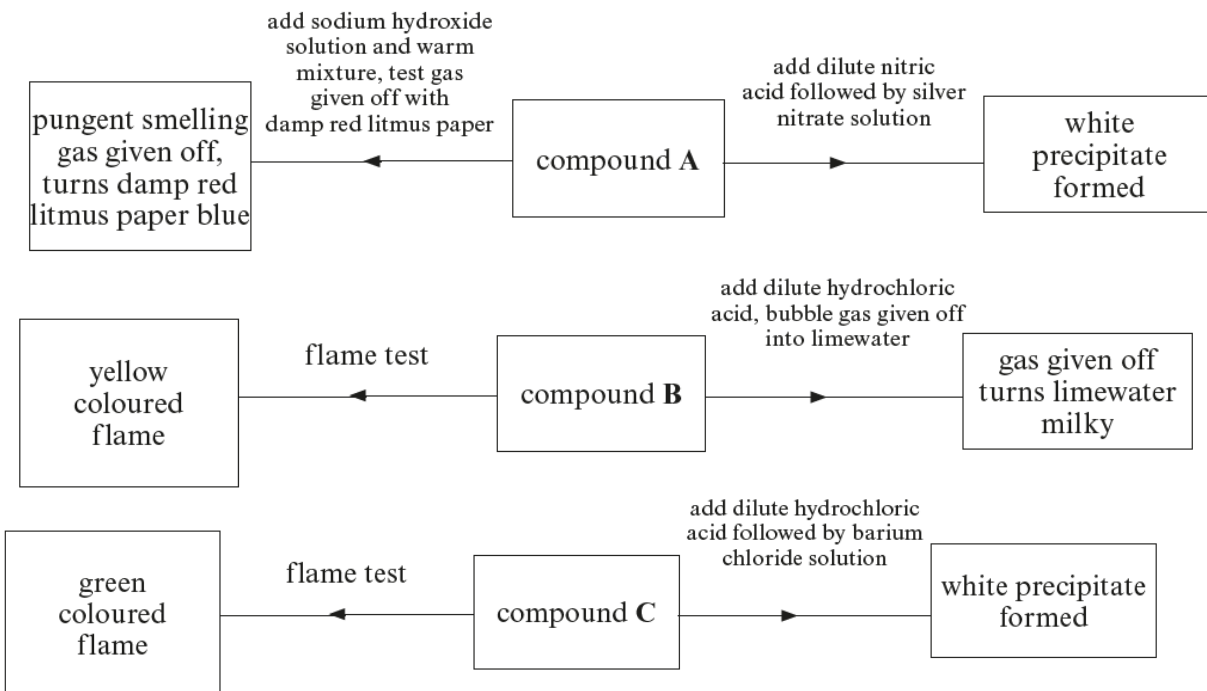
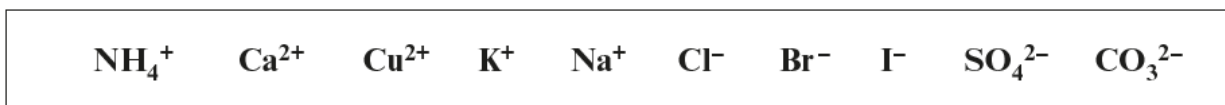
Mass of copper = g

(Total for Question 8 = 10 marks)

9. (a) The flow charts below show tests carried out on compounds A, B and C and the results

of those tests.

The compounds were known to include some of the following ions.



Use the information to give the **chemical formulae** of compounds **A**, **B** and **C**. [3]

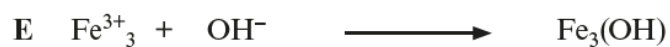
A

B

C

(b) Aqueous iron(III) ions form an orange-brown precipitate when mixed with aqueous sodium hydroxide.

Give the letter **A**, **B**, **C**, **D** or **E** for the ionic equation which correctly represents this reaction.



..... [1]

(c) Describe how will you carry out a flame test on given sample. [2]

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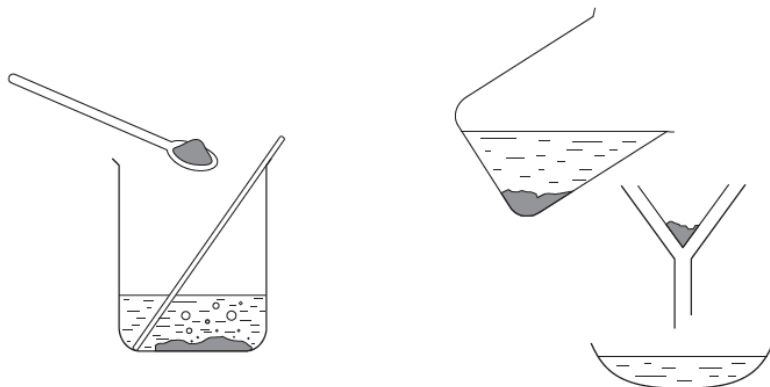
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(Total for Question 9 = 6 marks)

*10. Copper sulfate crystals can be prepared by reacting copper carbonate with dilute sulfuric acid. The unlabelled diagrams below show two of the three stages involved.



Describe the preparation of copper sulfate crystals using copper carbonate and sulfuric acid. Include in your answer what you would expect to see at each stage. [6]

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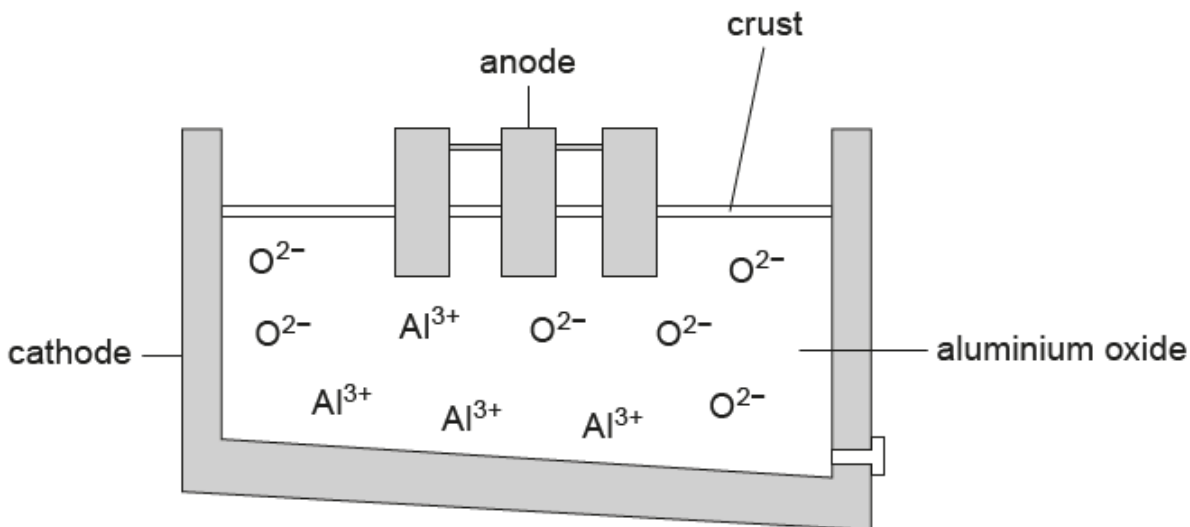
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(Total for Question 10 = 6 marks)

11. (a) The diagram below shows an electrolysis cell used in the extraction of aluminium.



(i) Give the state (solid, liquid or gas) of the aluminium oxide during this process. [1]

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(ii) Explain the movement of Al^{3+} and O^{2-} ions during the process. [3]

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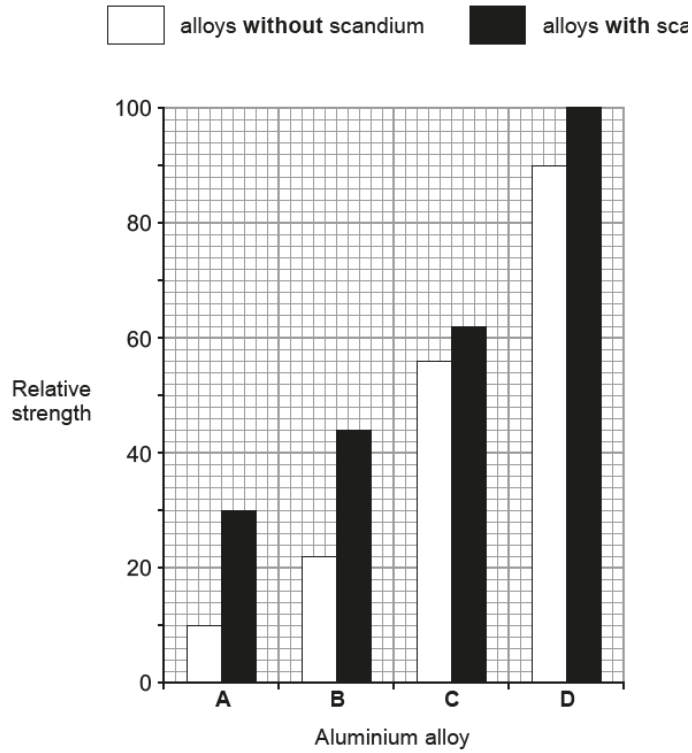
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(b) State **one** property of aluminium that is **unusual** compared to most other metals. [2]
Give a use which relies on this property.

Property

Use.....

(c) Scandium is added to aluminium alloys to increase their strength.
The graph below shows the relative strength of aluminium alloys, **A-D**, with and without added scandium.



Give the **letter** of the aluminium alloy where the relative strength is **increased** by 100 % when scandium is added. Use data from the graph to explain your choice. [2]

Letter

Reason

(c). Metals can be recycled and reused. Describe the benefits and drawbacks associated with the **recycling** of metals. [4]

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(Total for Question 11 = 12 marks)

12. Most tennis racquets are made from a polymer reinforced with carbon fibres.
Nanotechnology is used to make better tennis racquets.
Nanoparticles are added to fill gaps in the reinforced polymer.

(a) Explain the meaning of the term **nanoparticles**.

.....
..... [2]

(b) Suggest how these new tennis racquets are better than those that do not contain nanoparticles.

..... [1]

(c) Nanoparticles are used in a wide variety of products. [2]

Some scientists are worried about this.
Which two statements give reasons for their concern?

Put ticks (✓) in the boxes next to the **two** correct answers.

Nanoparticles do not occur in nature.

Nanoparticles have a smaller surface area than larger particles.

The effects of nanoparticles have not yet been fully investigated.

Nanoparticles are larger than 1000 nm.

Nanoparticles may be harmful to health.

Nanoparticles are too small to be seen by the unaided eye.

(Total for Question 12 = 5 marks)

END