ST MARY'S SCIENCE DEPARTMENT:

CHEMISTRY

F

GCSE CHEMISTRY **HOMEWORK BOOK**

TOPIC 4: CHEMICAL CHANGE

STUDENT BOOK

BOOK 1

YOU MUST ANSWER ALL THREE SECTIONS IN EACH PART OF THE HOMEWORK TASKS

NAME	
CLASS	
TEACHER	
FORM	

TASK	MARK	GRADE
1		
2		
3		
4		
OVERALL		

GCSE CHEMISTRY

YEAR 10

TOPIC 2a

HOMEWORK SCHEDULE

Please use the following table to ensure each homework task is completed and submitted on time.

Carrying out these homework tasks can only increase your ability to gain a high grade in the GCSE examinations.

Failure to hand in work on time will lead to sanctions to complete this work.

Task	Submission Date	Completed?	On Time?
Task 1 Metal Oxides			
Task 2 Acids and Metals			
Task 3 Reactivity Series			
Task 4 Neutralisation			

SCIENCE DEPARTMENT MARKING CODE

ID = Insufficient detail in answer
W = Wrong understanding of science
IR = Irrelevant information given.
V = This is too vague to get a mark.
AQ = Answer the question asked
R = Read the question/information
M = Maths mistake
BOD = Benefit of the doubt given.
E = Explain the answer further please.
U = Wrong units used.
SF = Wrong significant figures used.
SP = Wrong spelling of a technical term
SR = Same reason given more than once.
A circle means this lost you marks
An underline means this gained you marks

PLEASE READ

This homework booklet has made with custom selected examination questions and activities to assess your understanding in the concepts covered in class. This will increase your familiarity with the style of examination questions.

Carrying out these questions can only increase your ability to gain a high grade in the GCSE examination.

Thank you for your hard work in completing this book, and good luck.

Mr. Turnbull

TASK 1: METAL OXIDES

SPEC CHECK

Content	Achieved?
Metals react with oxygen to produce metal oxides. The reactions are oxidation reactions because the metals gain oxygen.	
Students should be able to explain reduction and oxidation in terms of loss or gain of oxygen.	

Target Setting

In this assessed piece of work, what target should I look to achieve in completing this task? Please refer to your marking feedback for your target.

From your previous work, fill in the following boxes with your personal progress in Physics.

What Topics Do I Know Well?

What Topics Do I Need to Revise?

SECTION A

This is a revision question on a previous topic.

You should aim to spend **10 minutes** answering this section.

1. This question is about hydrogen chloride.

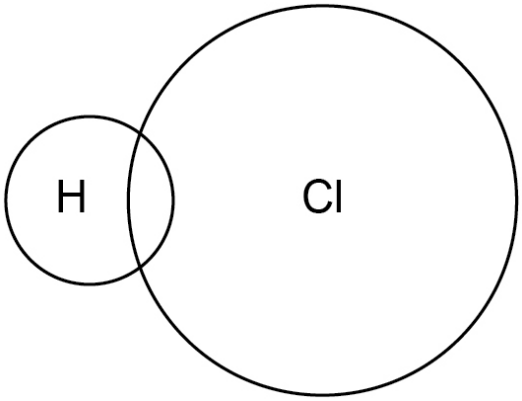
1.1 A hydrogen atom contains 1 electron and a chlorine atom contains 17 electrons.

Complete **Figure 1** to show a dot and cross diagram for a hydrogen chloride molecule.

Show the outer electrons only.

[2 marks]

Figure 1



Hydrogen gas (H_2) reacts with chlorine gas to produce hydrogen chloride.

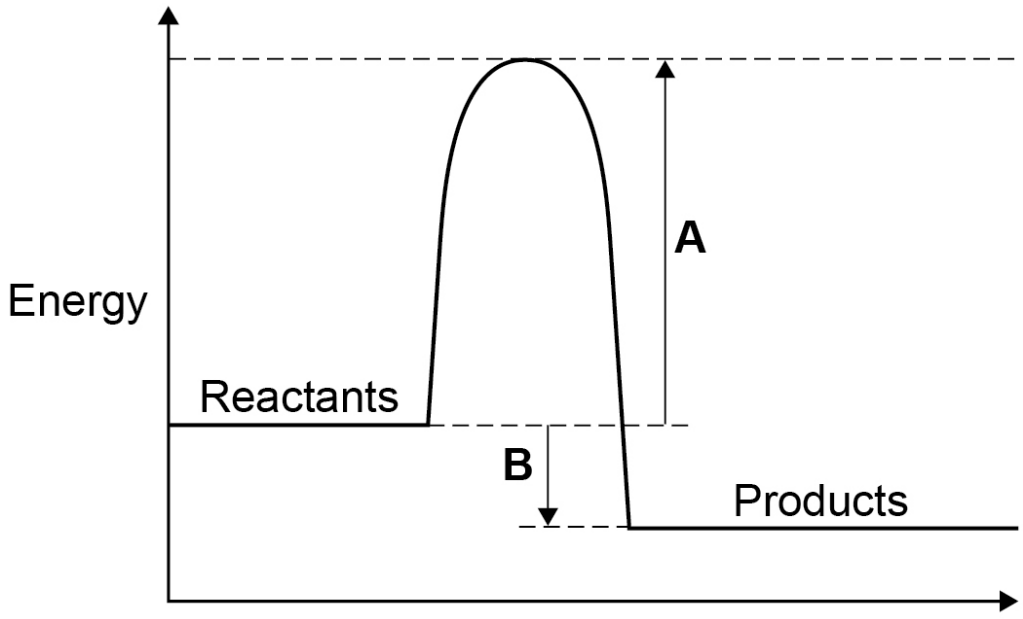
1.2 Complete the balanced chemical equation for the reaction between hydrogen and chlorine.

[2 marks]

$$H_2 + \_\_\_\_\_ \rightarrow \_\_\_\_\_$$

Figure 2 shows the reaction profile diagram for the reaction between hydrogen and chlorine.

Figure 2



1.3 What do **A** and **B** represent on **Figure 2**?

[2 marks]

A .....

B .....

1.4 How does the reaction profile diagram show that the reaction is exothermic?

[1 mark]

.....

.....

.....

.....

1.5 Hydrogen chloride gas dissolves in water to form hydrochloric acid.

Hydrochloric acid contains hydrogen ions and chloride ions.

Explain why hydrogen chloride gas does **not** conduct electricity but hydrochloric acid is able to conduct electricity.

[3 marks]

.....

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SECTION B

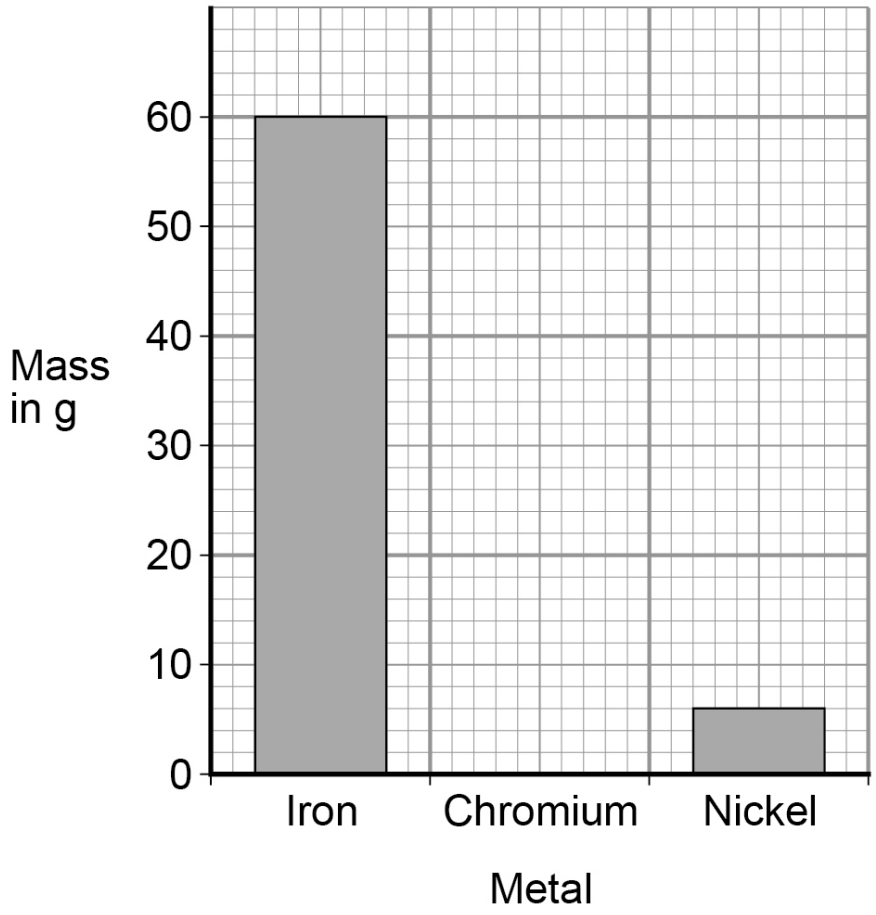
This is a revision question on a previous topic.

You should aim to spend **10 minutes** answering this section.

1. One alloy contains iron, chromium and nickel.

Figure 2 shows the mass of iron and the mass of nickel in 80 g of this alloy.

Figure 2



1.1 Determine the mass of iron and nickel in 80 g of the alloy.

Use **Figure 2.**

[1 mark]

Mass of Iron = ... g

Mass of Nickel = ... g

1.2 Calculate the mass of chromium in 80 g of the alloy.

Draw a bar on **Figure 2** to show the mass of chromium in 80 g of the alloy.

[2 marks]

.....

.....

.....

Mass of Chromium =..... g

1.3 What mass of iron is present in 0.80 kg of the alloy?
Give your answer in grams.

[1 mark]

.....

.....

Mass of Iron = ... g

1.4 What is an alloy?

[1 mark]

.....

.....

1.5 Give **one** reason why alloys are used instead of pure metals.

[1 mark]

.....

.....

1.6 Iron and nickel are both magnetic metals.
Which is also a magnetic metal?

[1 mark]

Tick **one** box.

Cobalt	☐
Copper	☐
Sodium	☐
Zinc	☐

SECTION C

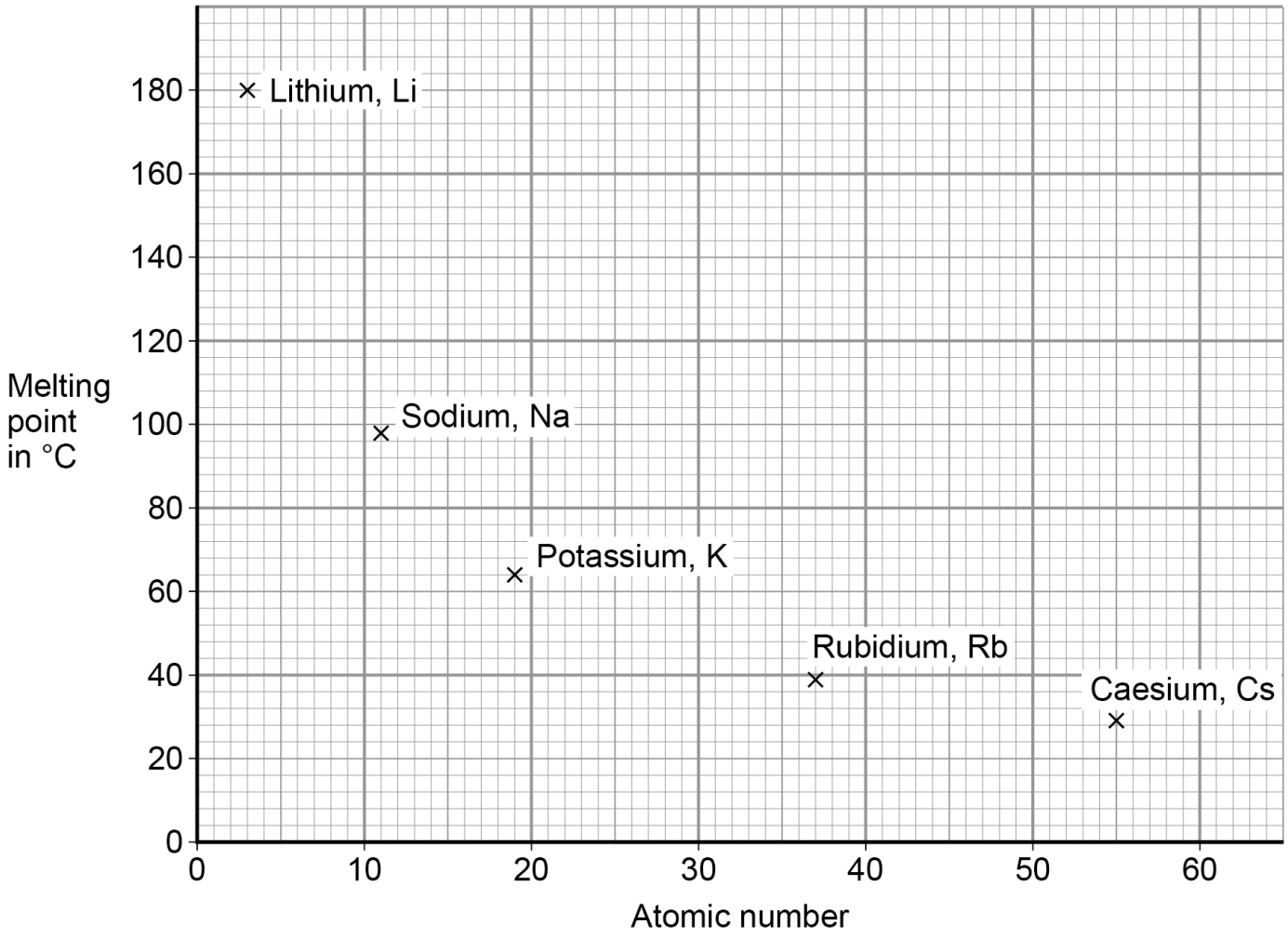
This is a revision question to consolidate your understanding.

You should aim to spend **10 minutes** answering this section.

1. This question is about Group 1 metals.

Figure 1 shows the melting points of Group 1 metals plotted against their atomic number.

Figure 1



1.1 Describe the trend shown by the melting points of Group 1 metals as the atomic number increases.

[1 mark]

.....

.....

.....

.....

1.2 Determine the atomic number and melting point of caesium.

Use **Figure 1.**

[1 mark]

Atomic Number of Caesium = ...

Melting Point of Caesium = ... °C

Lithium is a Group 1 metal.

1.3 A lithium atom can be shown as $^{7}_{3}Li$.

How many electrons does the outer shell of a lithium atom contain?

[1 mark]

Tick **one** box.

- 1 ☐
- 3 ☐
- 4 ☐
- 7 ☐

1.4 Lithium reacts with oxygen to produce lithium oxide.

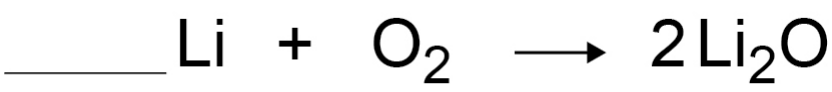
Draw **one** line from each substance to the correct description of the substance.

[2 marks]

Substance	Description
Lithium oxide	compound
Oxygen	element
	metal
	mixture
	polymer

1.5 Balance the equation for the reaction of lithium with oxygen.

[1 mark]



$$\_\_\_\_\_\ Li + O_2 \longrightarrow 2Li_2O$$

1.6 What type of bonding is present in lithium oxide?

[1 mark]

Tick **one** box.

Covalent	☐
Ionic	☐
Metallic	☐

1.7 Calculate the relative formula mass (M_r) of lithium oxide (Li_2O).

Relative atomic masses (A_r): Li = 7 O = 16

[2 marks]

.....

.....

.....

.....

Relative Formula Mass = ...

FEEDBACK SHEET

Overall Mark:	**/26**
Section A: Mark	/10
Section B: Mark	/7
Section C: Mark	/9

GRADE ACHIEVED:

5 ☐ **1** ☐

4 ☐ **U** ☐

3 ☐

2 ☐

Knowledge and understanding shown	Unsatisfactory	Satisfactory	Good	Outstanding

Strengths:	☐ Basic Knowledge of Concepts ☐ Quality of Written Communication ☐ Working Scientifically ☐ Answering Examination Questions ☐ Analytical Skills **Others** (Topic Specific)	☐ Applications of Concepts ☐ Mathematical Skills ☐ Experimental Technique ☐ Previous Topics ☐ Problem Solving
Areas to Improve:	☐ Basic Knowledge of Concepts ☐ Quality of Written Communication ☐ Working Scientifically ☐ Answering Examination Questions ☐ Analytical Skills **Others** (Topic Specific)	☐ Applications of Concepts ☐ Mathematical Skills ☐ Experimental Technique ☐ Previous Topics ☐ Problem Solving

Progress:	Unsatisfactory	Satisfactory	Good	Outstanding
Working:	Below	In line with	Above	**(your target)**
Effort:	Poor	Inconsistent	Good	Excellent

To improve further you need to:

☐ Carry out **independent** revision.	☐ Revise the equations.
☐ Complete outstanding work.	☐ Check the units on answers.
☐ Make corrections as indicated by the teacher.	☐ Check the correct amount of sig figs on answers.
☐ Attend intervention for this topic	☐ Check to convert values correctly.
☐ Include more information in responses.	☐ Show your full working out.
☐ Include more key words in responses.	☐ Check your calculations.
☐ Attend departmental revision sessions.	☐ Revise the science investigative skills.
☐ Read the questions carefully.	☐ Revise the key concepts of the topics.
☐ Explain your answers in more detail.	☐ Thoroughly check your work for mistakes.
☐ Carry out revision on Seneca Learning.	Other:

Student response

TASK 2: ACIDS AND METALS

SPEC CHECK

Content	Achieved?
Acids react with some metals to produce salts and hydrogen.	
Knowledge of reactions limited to those of magnesium, zinc and iron with hydrochloric and sulfuric acids.	

Target Setting

In this assessed piece of work, what target should I look to achieve in completing this task? Please refer to your marking feedback for your target.

From your previous work, fill in the following boxes with your personal progress in Physics.

What Topics Do I Know Well?

What Topics Do I Need to Revise?

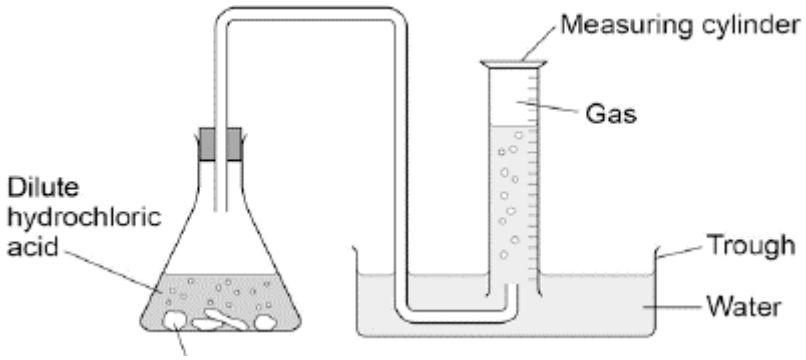
SECTION A

This is a revision question on a previous topic.

You should aim to spend **10 minutes** answering this section.

1. A student investigated the reaction of sodium carbonate with dilute hydrochloric acid. The student used the apparatus shown in **Figure 1**.

Figure 1



Sodium carbonate

This is the method used.

1. Place a known mass of sodium carbonate in a conical flask.

2. Measure 15 cm^3 of dilute hydrochloric acid using a measuring cylinder.

3. Pour the acid into the conical flask.

4. Place a bung in the flask and collect the gas as shown in **Figure 1**.

1.1 Balance the equation for the reaction.

[1 mark]

Na_2CO_3 (s) + _____ HCl (aq) → _____ NaCl (aq) + H_2O (l) + CO_2 (g)

1.2 Name the substance produced as a gas.

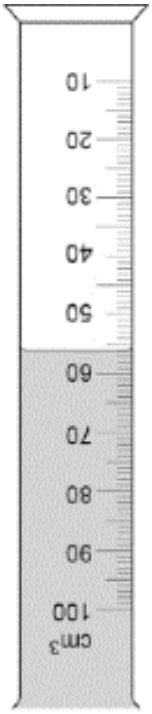
[1 mark]

.....

.....

Figure 2 shows the measuring cylinder.

Figure 2



1.3 What volume of gas has been collected?

[1 mark]

Volume = _____ cm^3

1.4 Table 1 shows the student's results.

Table 1

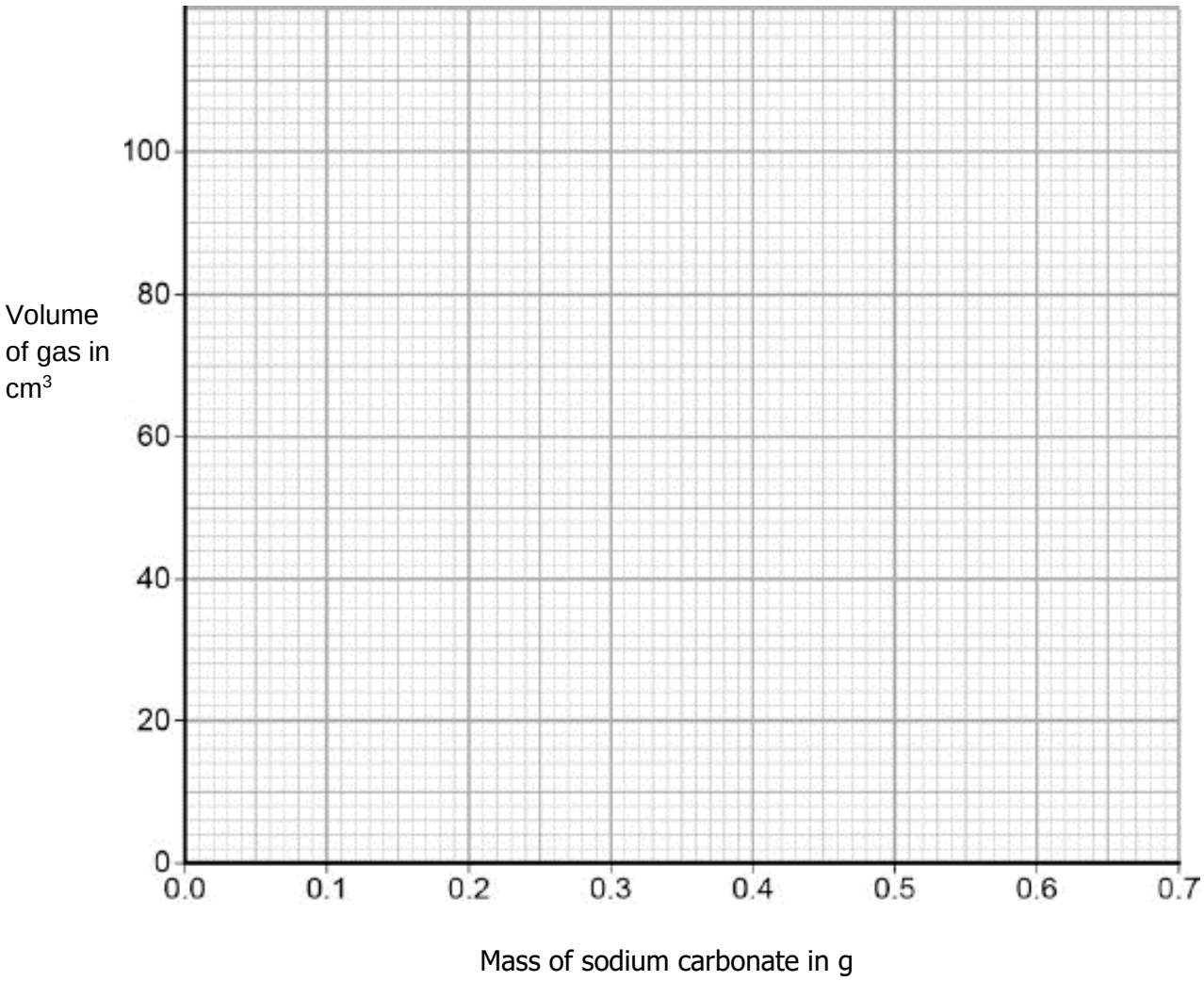
Mass of sodium carbonate in g	Volume of gas in cm^3
0.0	0
0.1	23
0.2	28
0.3	69
0.4	92
0.5	98
0.6	98
0.7	98

On **Figure 3**:

- Plot these results on the grid.
- Complete the graph by drawing **two** straight lines of best fit.

[4 marks]

Figure 3



1.5 Describe **two** patterns the graph shows when sodium carbonate is added.

[2 marks]

.....

.....

SECTION B

This is a question to revise understanding carried out in lesson.

You should aim to spend **10 minutes** answering this section.

1.1 Write the word equation for the reaction of magnesium with sulfuric acid.

[1 Mark]

.....

1.2 Construct a balanced equation for this reaction.

[2 Marks]

.....

1.3 Predict what you would observe during the reaction.

[1 Mark]

.....

.....

Many metals react with oxygen to produce metal oxides.

1.4 Write a word equation for the reaction of calcium with oxygen.

[1 Mark]

.....

1.5 Construct a balanced equation, including state symbols, for this reaction.

[1 Mark]

.....

Complete and balance the following equations

1.6 ___Zn(s) + _____ → ___ZnO(s) **[1 Mark]**

1.7 ___Na(s) + _____ → ___Na_2O(s) **[1 Mark]**

1.8 ___Fe(s) + _____ → ___Fe_2O_3(s) **[1 Mark]**

SECTION C

This is a revision question to consolidate your understanding.

You should aim to spend **10 minutes** answering this section.

1. A teacher extracted copper from copper oxide.
This is the method used.

1. Mix 1.30 g of zinc and 1.59 g of copper oxide.

2. Heat the mixture strongly.

3. When the mixture starts to glow, stop heating.

4. Let the glow spread through the mixture.

5. Leave the mixture to cool.

1.1 This reaction is exothermic.

Which part of the method shows the reaction is exothermic?

[1 mark]

Tick **one** box.

Mix zinc and copper oxide	☐
Heat the mixture	☐
Let the glow spread	☐
Leave to cool	☐

The equation for the reaction between zinc and copper oxide is:

$$\underset{1.30\ g}{Zn(s)} + \underset{1.59\ g}{CuO(s)} \rightarrow \underset{1.62\ g}{ZnO(s)} + Cu(s)$$

1.2 1.30 g of zinc fully reacted with 1.59 g of copper oxide to produce 1.62 g of zinc oxide.

What mass of copper was produced?

[1 mark]

.....

.....

Mass of Copper Produced = ... g

1.3 What is the physical state of zinc oxide in the reaction?

[1 mark]

Tick **one** box.

- Aqueous ☐
- Gas ☐
- Liquid ☐
- Solid ☐

1.4 Which substance has been oxidised in the reaction?

[1 mark]

Tick **one** box.

- Copper ☐
- Copper oxide ☐
- Zinc ☐
- Zinc oxide ☐

1.5 What type of reaction takes place when zinc reacts with copper oxide?

[1 mark]

Tick **one** box.

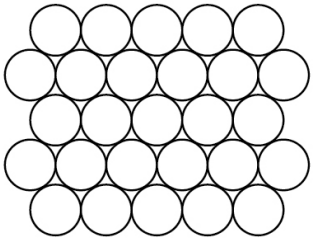
- Combustion ☐
- Crystallisation ☐
- Displacement ☐
- Neutralisation ☐

Copper is a metal.

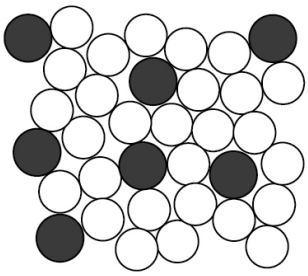
1.6 Which structure represents the arrangement of atoms in pure copper?

[1 mark]

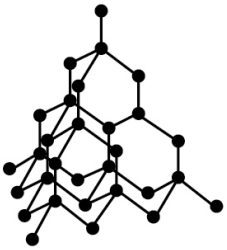
A



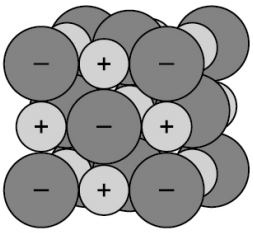
B



C



D



Tick **one** box.

A ☐

B ☐

C ☐

D ☐

1.7 Copper is used in electrical wiring.

Give **one** reason why.

[1 mark]

.....

.....

FEEDBACK SHEET

Overall Mark:	**/25**
Section A: Mark	/9
Section B: Mark	/9
Section C: Mark	/7

GRADE ACHIEVED:

5	☐	**1**	☐
4	☐	**U**	☐
3	☐		
2	☐		

Knowledge and understanding shown	Unsatisfactory	Satisfactory	Good	Outstanding

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☐ Include more key words in responses.	☐ Check your calculations.
☐ Attend departmental revision sessions.	☐ Revise the science investigative skills.
☐ Read the questions carefully.	☐ Revise the key concepts of the topics.
☐ Explain your answers in more detail.	☐ Thoroughly check your work for mistakes.
☐ Carry out revision on Seneca Learning.	Other:

Student response

TASK 3: REACTIVITY SERIES

SPEC CHECK

Content	Achieved?
When metals react with other substances the metal atoms form positive ions. The reactivity of a metal is related to its tendency to form positive ions. Metals can be arranged in order of their reactivity in a reactivity series. The metals potassium, sodium, lithium, calcium, magnesium, zinc, iron and copper can be put in order of their reactivity from their reactions with water and dilute acids.	
The non-metals hydrogen and carbon are often included in the reactivity series.	
A more reactive metal can displace a less reactive metal from a compound.	
Students should be able to: • Recall and describe the reactions, if any, of potassium, sodium, lithium, calcium, magnesium, zinc, iron and copper with water or dilute acids and where appropriate, to place these metals in order of reactivity • Explain how the reactivity of metals with water or dilute acids is related to the tendency of the metal to form its positive ion • Deduce an order of reactivity of metals based on experimental results.	
The reactions of metals with water and acids are limited to room temperature and do not include reactions with steam.	

Target Setting

In this assessed piece of work, what target should I look to achieve in completing this task? Please refer to your marking feedback for your target.

From your previous work, fill in the following boxes with your personal progress in Physics.

What Topics Do I Know Well?	What Topics Do I Need to Revise?

SECTION A

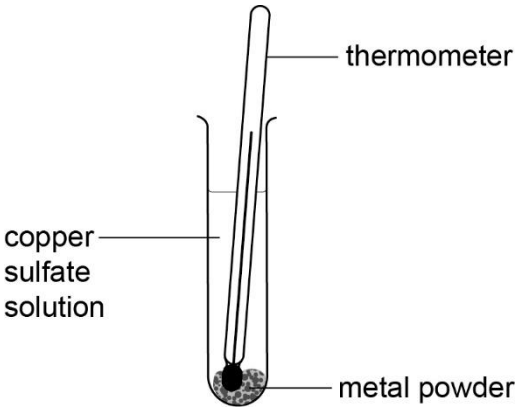
This is a revision question on a previous topic.

You should aim to spend **10 minutes** answering this section.

1. A student investigated the reactivity of metals.

Figure 1 shows the apparatus the student used.

Figure 1



The student:

Measured the temperature of the copper sulfate solution
Added metal powder
Measured the temperature of the mixture.

1.1 Complete the equation by adding state symbols.

[2 Marks]

zinc(.....) + copper sulfate(.....) → zinc sulfate(.....) + copper(.....)

silver blue solution colourless solution red brown

1.2 Give **two** changes the student would see during this reaction.

[2 Marks]

.....

.....

The student used the same volume of copper sulfate solution in each reaction.

1.3 What type of variable is the volume of copper sulfate solution?

[1 Mark]

A Categoric ☐

B Control ☐

C Dependent ☐

D Independent ☐

The student used a measuring instrument to measure the same mass of metal powder each time.

1.4 Which measuring instrument is used to measure the mass?

[1 Mark]

A Balance ☐

B Burette ☐

C Ruler ☐

D Stopwatch ☐

Table 1 shows the temperature rise for each metal the student added to copper sulfate.

Table 1

Metal	**Temperature rise in °C**
Magnesium	8.8
Silver	0.0
Tin	2.4
Zinc	7.3

1.5 Which is the most reactive metal?

Give a reason for your answer.

[2 Marks]

.....

.....

1.6 Why was there no temperature rise when silver was added?

[1 Mark]

.....

.....

SECTION B

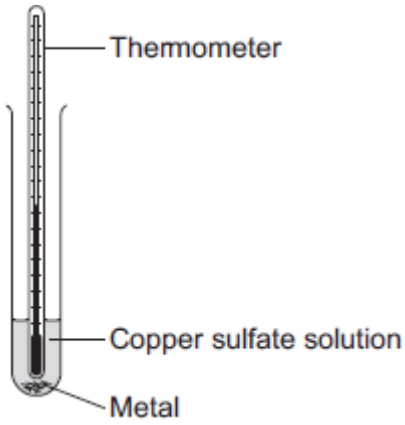
This is a question to revise understanding carried out in lesson.

You should aim to spend **10 minutes** answering this section.

1. A student investigated displacement reactions of metals.

The student added different metals to copper sulfate solution and measured the temperature change.
The more reactive the metal is compared with copper, the bigger the temperature change.
The apparatus the student used is shown in **Figure 5.**

Figure 5



The student repeated the experiment three times with each metal.
Table 2 shows the mean temperature change for each metal.

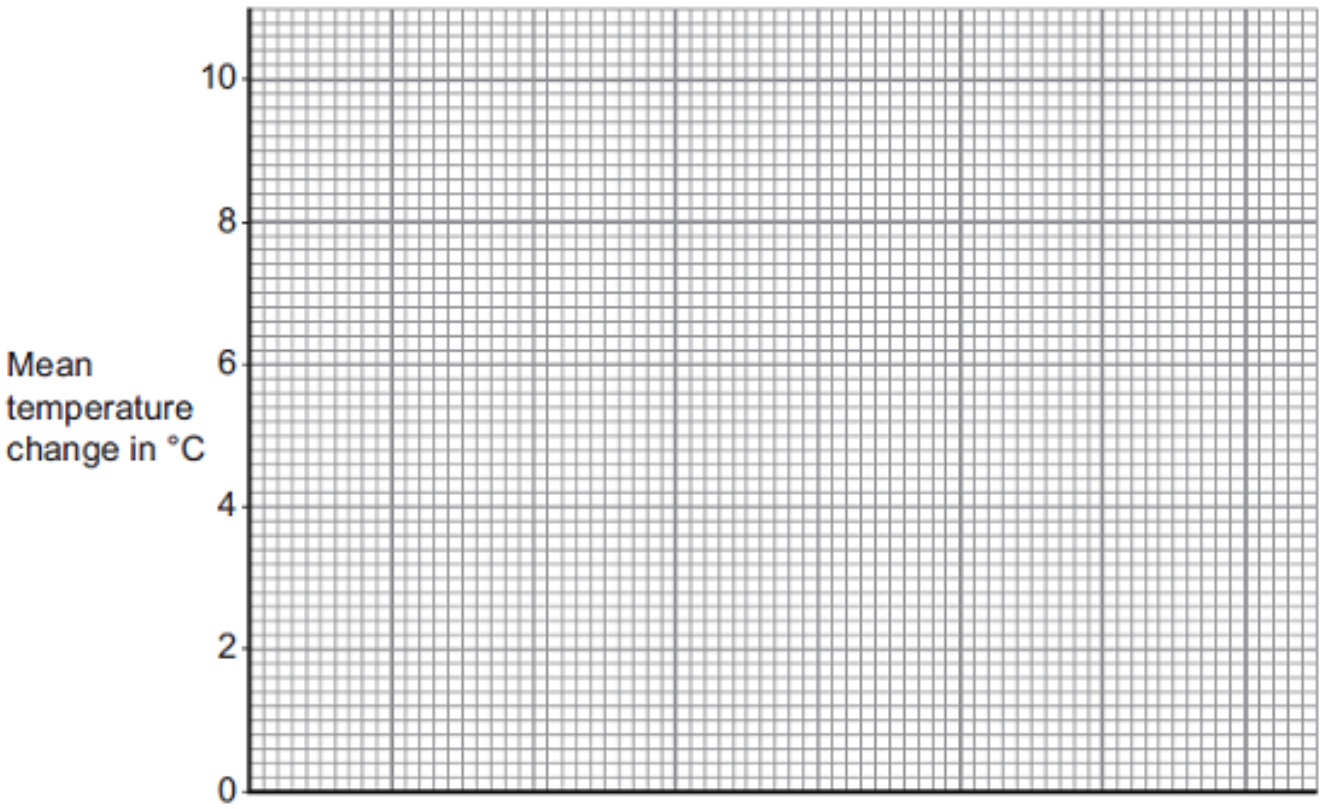
Table 2

Metal	**Mean temperature change in °C**
Copper	0.0
Iron	6.5
Lead	1.2
Magnesium	10.0
Silver	0.0
Zinc	7.8

1.1 On **Figure 6**, draw a bar chart to show the results.

[2 marks]

Figure 6



1.2 Why is a bar chart the most suitable way of showing the results?

[1 mark]

.....

.....

1.3 Explain how these results can be used to work out a reactivity series.

[1 mark]

.....

.....

1.4 Iron can be extracted by reacting iron oxide with carbon in a blast furnace.
What type of reaction produces iron from iron oxide?

[1 mark]

.....

.....

SECTION C

This is a revision question to consolidate your understanding.

You should aim to spend **10 minutes** answering this section.

1 A student investigated the reactivity of three different metals.

This is the method used.

1. Place 1 g of metal powder in a test tube.
2. Add 10 cm^3 of metal sulfate.
3. Wait 1 minute and observe.
4. Repeat using the other metals and metal sulfates.

The student placed a tick in the table below if there was a reaction and a cross if there was no reaction.

	Zinc	**Copper**	**Magnesium**
Copper sulfate	✓	x	✓
Magnesium sulfate	x	x	x
Zinc sulfate	x	x	✓

1.1 What is the dependent variable in the investigation?

[1 mark]

Tick **one** box.

Time taken ☐

Type of metal ☐

Volume of metal sulfate ☐

Whether there was a reaction or not ☐

1.2 Give **one** observation the student could make that shows there is a reaction between zinc and copper sulfate.

[1 mark]

.....

.....

1.3 The student used measuring instruments to measure some of the variables.

Draw **one** line from each variable to the measuring instrument used to measure the variable.

[2 marks]

Variable	Measuring instrument
	Balance
	Measuring cylinder
Mass of metal powder	
	Ruler
	Burette
Volume of metal sulfate	
	Theromometer
	Test tube

1.4 Use the results shown in table above to place zinc, copper and magnesium in order of reactivity.

[1 mark]

Most Reactive .....

.....

Least Reactive .....

1.5 Suggest **one** reason why the student should **not** use sodium in this investigation.

[1 mark]

.....

.....

1.6 Which metal is found in the Earth as the metal itself?

[1 mark]

Tick **one** box.

- Calcium ☐
- Gold ☐
- Lithium ☐
- Potassium ☐

1.7 Iron is found in the Earth as iron oxide (Fe_2O_3).

Iron oxide is reduced to produce iron.

Balance the equation for the reaction.

[1 mark]

___Fe_2O_3 + ___C → ___Fe + ___CO_2

1.8 Name the element used to reduce iron oxide.

[1 mark]

.....

.....

1.9 What is meant by reduction?

[1 mark]

Tick **one** box.

- Gain of iron ☐
- Gain of oxide ☐
- Loss of iron ☐
- Loss of oxygen ☐

FEEDBACK SHEET

Overall Mark:	**/24**
Section A: Mark	/9
Section B: Mark	/5
Section C: Mark	/10

GRADE ACHIEVED:

5	☐	**1**	☐
4	☐	**U**	☐
3	☐		
2	☐		

Knowledge and understanding shown	Unsatisfactory	Satisfactory	Good	Outstanding

Strengths:	☐ Basic Knowledge of Concepts ☐ Quality of Written Communication ☐ Working Scientifically ☐ Answering Examination Questions ☐ Analytical Skills **Others** (Topic Specific)	☐ Applications of Concepts ☐ Mathematical Skills ☐ Experimental Technique ☐ Previous Topics ☐ Problem Solving
Areas to Improve:	☐ Basic Knowledge of Concepts ☐ Quality of Written Communication ☐ Working Scientifically ☐ Answering Examination Questions ☐ Analytical Skills **Others** (Topic Specific)	☐ Applications of Concepts ☐ Mathematical Skills ☐ Experimental Technique ☐ Previous Topics ☐ Problem Solving

Progress:	Unsatisfactory	Satisfactory	Good	Outstanding
Working:	Below	In line with	Above	**(your target)**
Effort:	Poor	Inconsistent	Good	Excellent

To improve further you need to:

☐ Carry out **independent** revision. ☐ Complete outstanding work. ☐ Make corrections as indicated by the teacher. ☐ Attend intervention for this topic ☐ Include more information in responses. ☐ Include more key words in responses. ☐ Attend departmental revision sessions. ☐ Read the questions carefully. ☐ Explain your answers in more detail. ☐ Carry out revision on Seneca Learning.	☐ Revise the equations. ☐ Check the units on answers. ☐ Check the correct amount of sig figs on answers. ☐ Check to convert values correctly. ☐ Show your full working out. ☐ Check your calculations. ☐ Revise the science investigative skills. ☐ Revise the key concepts of the topics. ☐ Thoroughly check your work for mistakes. Other:

Student response

TASK 4: NEUTRALISATION

SPEC CHECK

Content	Achieved?
Acids are neutralised by alkalis (e.g. soluble metal hydroxides) and bases (e.g. insoluble metal hydroxides and metal oxides) to produce salts and water, and by metal carbonates to produce salts, water and carbon dioxide.	
The particular salt produced in any reaction between an acid and a base or alkali depends on: • The acid used (hydrochloric acid produces chlorides, nitric acid produces nitrates, sulfuric acid produces sulfates) • The positive ions in the base, alkali or carbonate.	
Students should be able to: • Predict products from given reactants • Use the formulae of common ions to deduce the formulae of salts.	
Soluble salts can be made from acids by reacting them with solid insoluble substances, such as metals, metal oxides, hydroxides or carbonates. The solid is added to the acid until no more reacts and the excess solid is filtered off to produce a solution of the salt.	
Salt solutions can be crystallised to produce solid salts.	
Students should be able to describe how to make pure, dry samples of named soluble salts from information provided.	
Required Practical 1: preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate using a Bunsen burner to heat dilute acid and a water bath or electric heater to evaporate the solution.	

Target Setting

In this assessed piece of work, what target should I look to achieve in completing this task? Please refer to your marking feedback for your target.

From your previous work, fill in the following boxes with your personal progress in Physics.

What Topics Do I Know Well?	What Topics Do I Need to Revise?

SECTION A

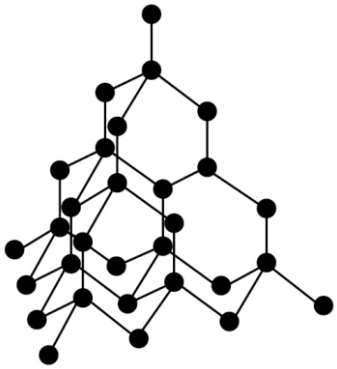
This is a revision question on a previous topic.

You should aim to spend **10 minutes** answering this section.

1. This question is about diamond and graphite.

Figure 10 shows part of the structure of diamond.

Figure 10



1.1 Complete the sentence.

Choose the answer from the box.

[1 mark]

calcium	**carbon**	**chromium**	**cobalt**

Diamond is a form of .....

1.2 Which two statements about diamond are correct?

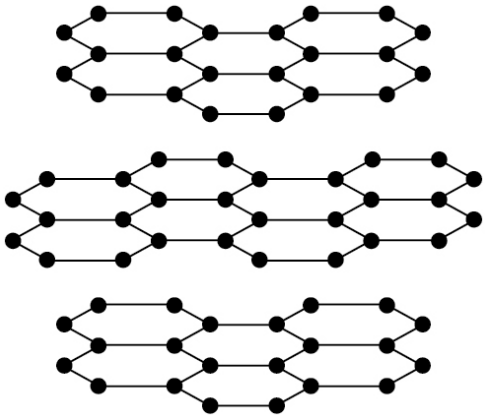
[2 marks]

Tick **two** boxes.

- Diamond has a giant structure. ☐
- Diamond has ionic bonds. ☐
- Diamond is made of layers. ☐
- Diamond has weak bonds. ☐
- Each atom is joined to four other atoms. ☐

Figure 11 shows part of the structure of graphite.

Figure 11



1.3 Explain why graphite is soft and slippery.

Use **Figure 11** and your own knowledge.

[3 marks]

.....

.....

.....

.....

.....

.....

1.4 Graphite has covalent bonds between the atoms.

How many covalent bonds does each atom form?

[1 mark]

Tick **one** box.

1 ☐ 2 ☐ 3 ☐ 4 ☐

1.5 Explain why graphite can conduct electricity.

You should include a reference to electrons in your answer.

[2 marks]

.....

.....

.....

.....

SECTION B

This is a question to revise understanding carried out in lesson.

You should aim to spend **10 minutes** answering this section.

1. A student plans a method to prepare pure crystals of copper sulfate.

The student's method is:

1. Add one spatula of calcium carbonate to dilute hydrochloric acid in a beaker.

2. When the fizzing stops, heat the solution with a Bunsen burner until all the liquid is gone.

The method contains several errors and does not produce copper sulfate crystals.

Explain the improvements the student should make to the method so that pure crystals of copper sulfate are produced.

[6 marks]

SECTION C

This is a revision question to consolidate your understanding.

You should aim to spend **10 minutes** answering this section.

1. Copper oxide is insoluble.

1.1 What type of substance is copper oxide?

[1 Mark]

A Acid ☐

B Alkali ☐

C Salt ☐

D Base ☐

Copper oxide, CuO, reacts with hydrochloric acid, HCl, to produce copper chloride, $CuCl_2$ and water.

1.2 Name the type of reaction taking place.

[1 Mark]

.....

.....

1.3 Write a balanced symbol equation for the reaction.

[2 Marks]

.....

.....

1.4 Describe how you could produce pure dry crystals of copper chloride from copper oxide and dilute hydrochloric acid.

[6 Marks]

.....

.....

.....

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.....

.....

.....

.....

FEEDBACK SHEET

Overall Mark:	**/25**	**GRADE ACHIEVED:**	
		5 ☐	**1** ☐
		4 ☐	**U** ☐
		3 ☐	
		2 ☐	
Section A: Mark	/9		
Section B: Mark	/6		
Section C: Mark	/10		

Knowledge and understanding shown	Unsatisfactory	Satisfactory	Good	Outstanding

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Student response

The Periodic Table of Elements

1	2											3	4	5	6	7	0
							1 H hydrogen 1										4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[97] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[267] Rf rutherfordium 104	[270] Db dubnium 105	[269] Sg seaborgium 106	[270] Bh bohrium 107	[270] Hs hassium 108	[278] Mt meitnerium 109	[281] Ds darmstadtium 110	[281] Rg roentgenium 111	[285] Cn copernicium 112	[286] Nh nihonium 113	[289] Fl flerovium 114	[289] Mc moscovium 115	[293] Lv livermorium 116	[293] Ts tennessine 117	[294] Og oganesson 118

Key

relative atomic mass
atomic symbol
name
atomic (proton) number

* The Lanthanides (atomic numbers 58 – 71) and the Actinides (atomic numbers 90 – 103) have been omitted.

Relative atomic masses for **Cu** and **Cl** have not been rounded to the nearest whole number.

Acknowledgements

This document has been produced by Mr J Turnbull.

All relevant information has been credited in the document.

This document has been produced for educational purposes only.

This document has been produced for the AQA GCSE Science Specification.