



For Supervisor's use only

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90171



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA



National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Level 1 Chemistry, 2004

90171 Describe chemical reactions

Credits: Four

9.30 am Wednesday 10 November 2004

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

If you need more space for any answer, use the page provided at the back of this booklet and clearly number the question.

A metal activity series, solubility rules, a table of ions and a periodic table are provided in the Resource Booklet in your Level 1 Chemistry package.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Achievement Criteria			<i>For Assessor's use only</i>		
Achievement		Achievement with Merit		Achievement with Excellence	
Describe chemical reactions.	<input type="checkbox"/>	Interpret information about chemical reactions.	<input type="checkbox"/>	Apply understanding of chemical reactions.	<input type="checkbox"/>
Overall Level of Performance					<input type="checkbox"/>

You are advised to spend 35 minutes answering the questions in this booklet.

QUESTION ONE

Classify the reactions in (a) to (d) below as

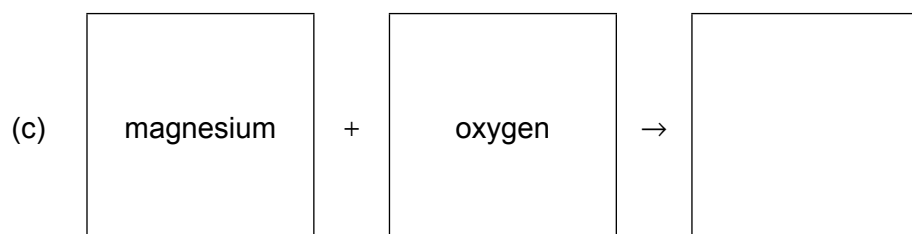
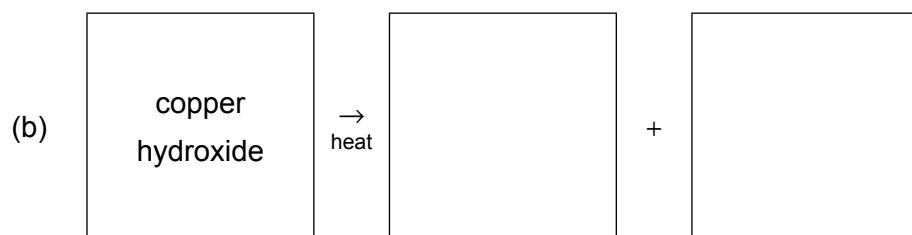
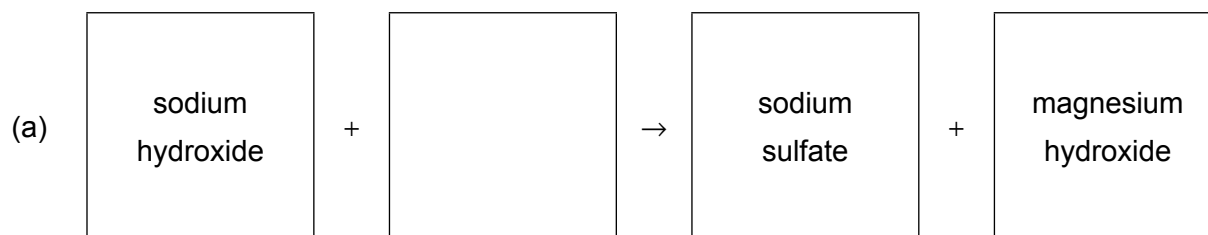
- oxidation–reduction (O)
- precipitation (P)
- thermal decomposition (T)

	Reaction	Reaction type
(a)	$\text{C (s)} + \text{O}_2 \text{ (g)} \rightarrow \text{CO}_2 \text{ (g)}$	
(b)	$\text{Ca(OH)}_2 \text{ (s)} \rightarrow \text{CaO (s)} + \text{H}_2\text{O (g)}$	
(c)	$\text{Fe (s)} + \text{CuSO}_4 \text{ (aq)} \rightarrow \text{FeSO}_4 \text{ (aq)} + \text{Cu (s)}$	
(d)	$\text{CuCl}_2 \text{ (aq)} + \text{K}_2\text{CO}_3 \text{ (aq)} \rightarrow \text{CuCO}_3 \text{ (s)} + 2\text{KCl (aq)}$	

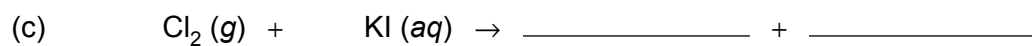
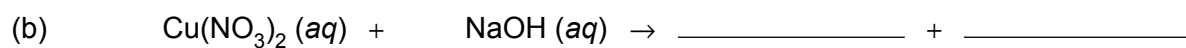
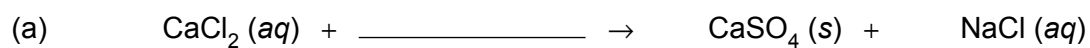
QUESTION TWO

Complete the table below by writing the **name of the precipitate**, or **no precipitate** if one is not formed. Use the Solubility Rules in the Resource Booklet.

	Solutions that are mixed	Name of precipitate, or no precipitate
(a)	magnesium sulfate and calcium nitrate	
(b)	lead nitrate and sodium chloride	
(c)	potassium carbonate and zinc sulfate	

QUESTION THREEComplete these **word equations**:**QUESTION FOUR**

Complete and balance the following equations:

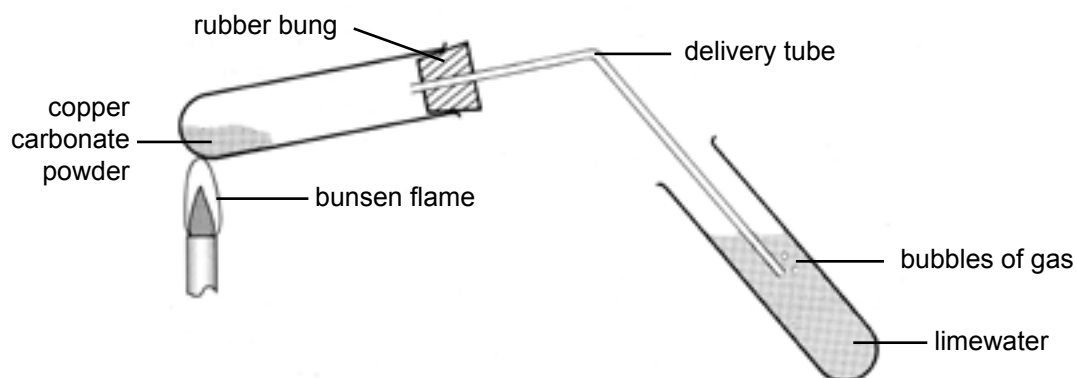


QUESTION FIVE

Three experiments, described below as **Experiment 1**, **Experiment 2** and **Experiment 3**, are carried out in the laboratory. Answer the questions about each experiment.

(a) Experiment 1

A sample of copper carbonate is heated strongly in a boiling tube fitted with a delivery tube. The gas formed is bubbled into limewater. (See the diagram below.)



- (i) Describe TWO observations, other than bubbles of gas, that would be made:

Observation 1:

Observation 2:

- (ii) Write a balanced equation for the reaction that occurs when copper carbonate is heated:

(b) Experiment 2

A solution of **sodium hydroxide** is added to a solution of **iron (III) chloride**.

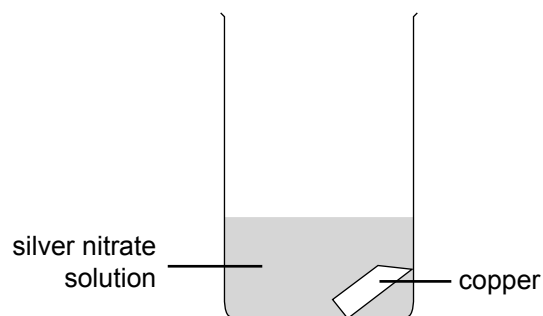
- (i) Describe ONE observation that would be made:

Observation:

- (ii) Write a balanced equation for this reaction:

(c) Experiment 3

A piece of **copper** is placed in a solution of **silver nitrate**.



- (i) Describe TWO observations that would be made.

Observation 1:

Observation 2:

- (ii) Explain why this reaction is an oxidation–reduction reaction. Use observations and relevant equations in your answer.

In Questions Six to Nine you must show working in all calculations. Use the atomic masses given on the Periodic Table in the Resource Booklet.

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QUESTION SIX

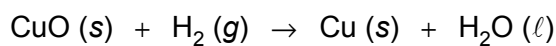
Calculate the relative molecular mass of the following two substances.

(a) Copper oxide CuO

(b) Copper (II) nitrate Cu(NO₃)₂

QUESTION SEVEN

Copper (II) oxide is reduced by excess hydrogen:

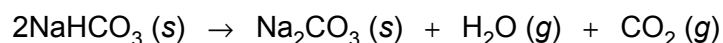


Calculate the **mass of copper (II) oxide** that will be needed to give **18.0 g of copper**.

Mass copper (II) oxide = _____

QUESTION EIGHT

Baking powder contains sodium hydrogen carbonate, NaHCO_3 . When it is heated it decomposes:



Calculate the mass of CO_2 formed when **12.6 g of NaHCO_3** is completely decomposed.

QUESTION NINE

- (a) Calculate the empirical formula of a compound that is **43.7% phosphorus** and **56.3% oxygen**.

- (b) Determine the **molecular formula** of the compound in (a) if its relative molecular mass is **284**.
