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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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Level 1 Chemistry, 2014

90934 Demonstrate understanding of aspects of chemical reactions

9.30 am Wednesday 19 November 2014
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of aspects of chemical reactions.	Demonstrate in-depth understanding of aspects of chemical reactions.	Demonstrate comprehensive understanding of aspects of chemical reactions.

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 attempt ALL the questions in this booklet.

A periodic table and other reference material are provided in the Resource Booklet L1–CHEMR.

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

Check that this booklet has pages 2–10 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.

TOTAL

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QUESTION ONE: METAL REACTIONS

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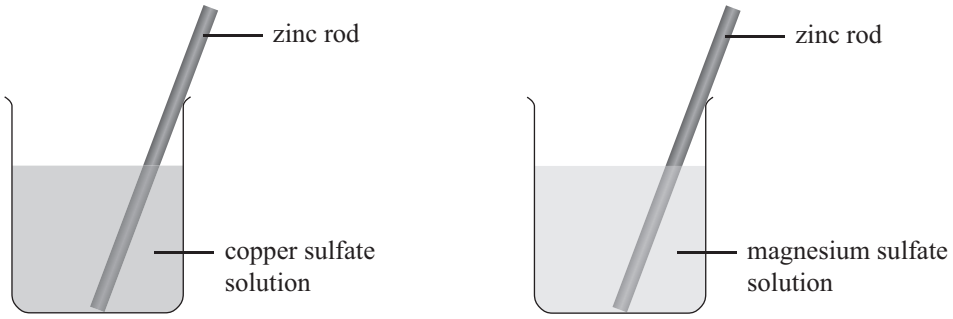
A zinc rod was placed in a solution of copper sulfate, and another zinc rod was placed in a solution of magnesium sulfate. Both were left for one week.

You may refer to the activity series in your Resource Booklet.



Beaker 1 Beaker 2

(a) Describe any observations that would be made for each beaker.

Beaker 1: _____

_____

_____

Beaker 2: _____

_____

_____

(b) (i) Identify the type of reaction that is occurring above.

_____

(ii) Explain any difference in the observations made in Beaker 1 and Beaker 2 by linking your observations to the type of reaction occurring, and the reactants and products involved.

_____

_____

_____

_____

_____

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_____

_____

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(c) Write ONE balanced ionic equation for a reaction from (a).

(d) In the laboratory the teacher made impure lead crystals by placing a metal in lead nitrate solution.

(i) Choose a suitable metal for this reaction and justify your choice.

(ii) Write a balanced ionic equation for the reaction you have chosen above.

QUESTION TWO: TEACHER DEMONSTRATIONS

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Two reactions that burn brightly were shown to a class.

In **Reaction 1**, the teacher demonstrated a strip of magnesium ribbon reacting with oxygen in air.

In **Reaction 2**, which was shown on a video, a grey powder, zinc, was mixed with yellow sulfur powder. The mixture was poured into a pile and heated. The mixed powders burst into flame and made a white powder.

Analyse these reactions by answering the following questions.

(a) Identify the type of reaction occurring, and state the condition that both reactions require for each to occur.

(b) **Reaction 1:** Magnesium metal reacting with oxygen gas in air.

(i) Describe the observations that would be made for this reaction.

(ii) Link these observations to the reactants and products involved in this reaction.

Reaction 2: Zinc metal reacting with sulfur.

(iii) Name the product formed when powdered sulfur reacts with powdered zinc metal.

(iv) Link the observations for this reaction, as given above, to the reactants and products involved.

(c) Explain the two reactions (magnesium ribbon with oxygen gas, and zinc powder with sulfur powder) in terms of electron transfer.

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(d) Write a balanced symbol equation for each reaction.

Reaction 1

Reaction 2

QUESTION THREE: DECOMPOSITION REACTIONS

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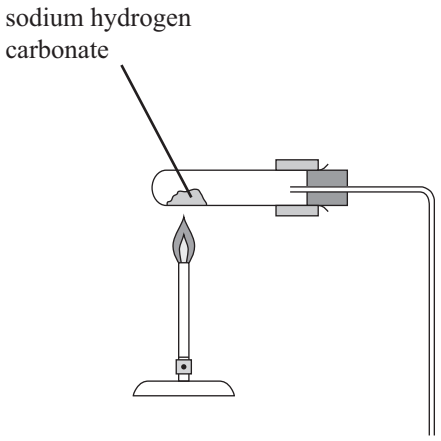
Two decomposition reactions were set up in the laboratory.

Reaction 1: Solid sodium hydrogen carbonate, $NaHCO_3$, was heated over a Bunsen burner flame.



(a) (i) Describe any observations that would be made as this reaction occurs, and link these to the reactants and products involved in the reaction.

(ii) Outline a test that could be used to confirm the presence of one of the products formed.

(b) Write a balanced symbol equation for the decomposition of sodium hydrogen carbonate, $NaHCO_3$.

Reaction 2: Test tube 1 and test tube 2 were both half-filled with hydrogen peroxide solution, H_2O_2. Some powdered manganese dioxide, MnO_2, was then added to test tube 1.

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Test tube 1 Test tube 2

(c) Compare the observations you would make for the reactions in the two test tubes.

Link these observations to the reactants and products involved in the reactions.

(d) Write a balanced symbol equation for the reaction in test tube 1.

(e) Compare and contrast the decomposition reactions shown in **Reaction 1** (sodium hydrogen carbonate, $NaHCO_3$) and **Reaction 2** (hydrogen peroxide, H_2O_2).

QUESTION FOUR: MIXING SOLUTIONS

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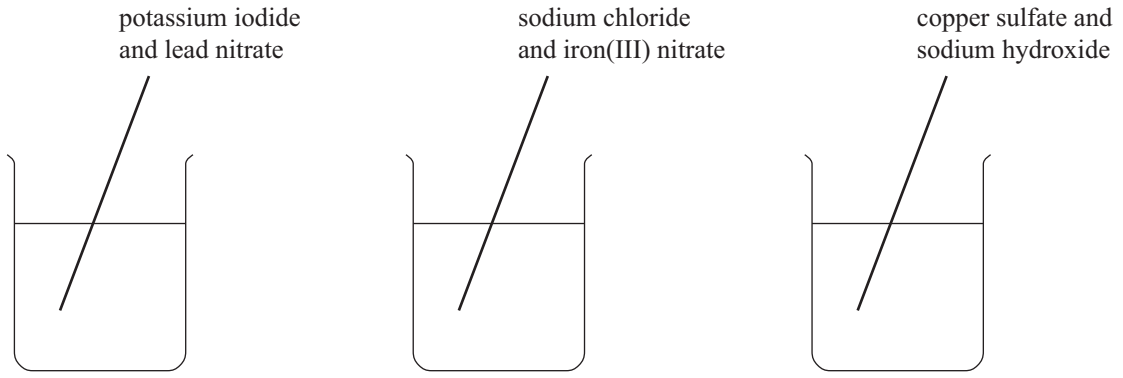
Various solutions were mixed in three separate beakers. Only two of the mixtures produced precipitates.



(a) Identify the name, formula and colour of any precipitate that may have formed in the beakers.

You may use the solubility rules provided in the Resource Booklet.

Beaker	Precipitate name	Formula	Colour
1			
2			
3			

(b) Justify the formation, or lack of formation, of precipitates in each of the three beakers.
In your answer you should:

- identify the ions present in each solution before they are mixed
- explain why precipitates form or do not form
- write a balanced ionic or symbol equation for each of the precipitates formed.

You may leave spectator ions out of your equations.

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Balanced ionic or symbol equations:

Extra paper if required.
Write the question number(s) if applicable.

QUESTION NUMBER

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