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NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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SUPERVISOR'S USE ONLY

Level 1 Chemistry, 2012

90933 Demonstrate understanding of aspects of selected elements

9.30 am Thursday 22 November 2012
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of aspects of selected elements.	Demonstrate in-depth understanding of aspects of selected elements.	Demonstrate comprehensive understanding of aspects of selected elements.

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 2–11 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

ASSESSOR'S USE ONLY

You are advised to spend 60 minutes answering the questions in this booklet.

QUESTION ONE: THE PERIODIC TABLE

The third row of the periodic table is made up of eight elements.

11 Na	12 Mg								
13 Al	14 Si	15 P	16 S	17 Cl	18 Ar				

- (a) Write the electron arrangement for each of the elements magnesium, aluminium and sulfur in the boxes below.

Magnesium

Aluminium

Sulfur

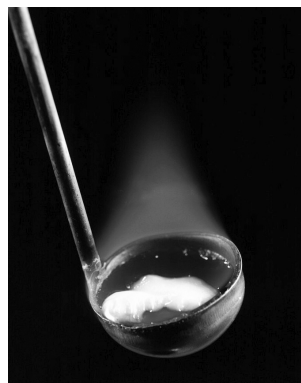
- (b) (i) For each element below, circle the correct answer to show whether the element is a **metal** or a **non-metal**.

Magnesium **metal** **non-metal**

Sulfur **metal** **non-metal**

- (ii) Explain how the elements magnesium and sulfur react to form the compound magnesium sulfide.

(c)

Magnesium burning in oxygen in air¹Sulfur burning in oxygen in air²

Compare and contrast the reaction of magnesium and oxygen with the reaction of sulfur and oxygen.

In your answer you should:

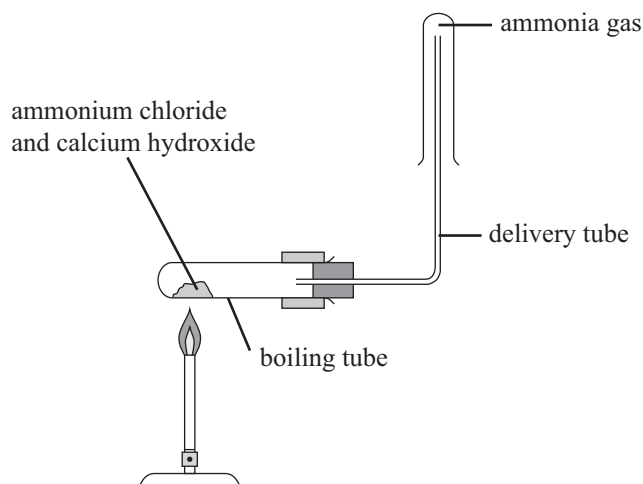
- identify any observations you would make for **each** reaction
- link each observation to the chemical species involved in each reaction
- write a balanced symbol equation for **each** reaction.

Balanced symbol equations:

1. http://fphoto.photoshelter.com/gallery-image/Exothermic-Reaction/G00000BctemRppYE/I00002sX.Kx_XIAI
 2. <http://fphoto.photoshelter.com/gallery-image/Feature-Exothermic-Reaction/G00000fhWQ..akQ0/I0000YsxbKYOvpeM>

QUESTION TWO: AMMONIA

Ammonia gas, NH_3 , is prepared in a school laboratory by heating a mixture of ammonium chloride and calcium hydroxide as shown in the diagram below. Two test tubes of **dry** ammonia gas are collected, stoppered and set aside for testing.



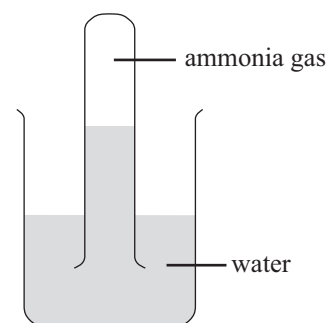
- (a) Write the word equation and the balanced symbol equation for the reaction between ammonium chloride and calcium hydroxide.

Word equation:

Balanced symbol equation:

- (b) Give a reason why ammonia can be collected in an upside down test tube, as shown in the diagram above.

- (c) A test tube of ammonia gas is placed upside down in a beaker of cold water, as shown in the diagram on the right. The water is seen to move up the test tube.



Explain why water moves up the test tube.

Your answer should include a balanced symbol equation.

Balanced symbol equation:

- (d) A piece of damp litmus paper is used to test the ammonia gas in the second test tube.
- (i) Describe an observation that would be made when the damp litmus paper is in the ammonia gas.

- (ii) Justify your reasoning for this observation by linking it to a chemical property of ammonia gas.

QUESTION THREE: CHLORINE

- (a) Chlorine water is formed by adding chlorine gas to water. Some of the chlorine dissolves in water and some reacts with water.

Explain what happens to a piece of blue litmus paper when it is used to test the chlorine water.

In your answer you should:

- describe the observations you would make of the blue litmus paper
- explain your observations by linking them to the properties of the chlorine water
- write a balanced symbol equation for the reaction of chlorine gas with water.

Balanced symbol equation:

- (b) In hospitals, chlorine-based solutions are used in cleaning and disinfecting to help protect patients from infection.

Justify why chlorine-based solutions are used in hospitals by explaining how the **chemical** properties of chlorine-based solutions make them suitable for cleaning and disinfecting.

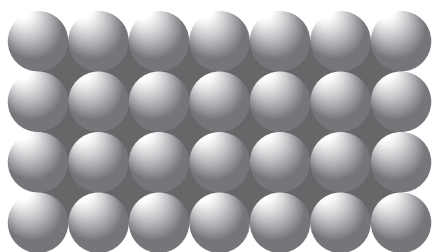
QUESTION FOUR: METAL ALLOYS

Developing alloys is an important industry worldwide.

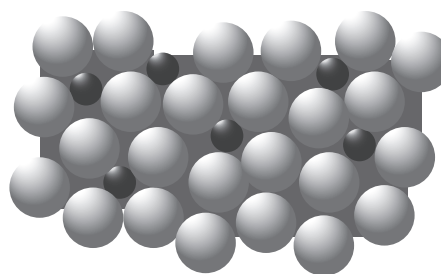
- (a) Define the term alloy.

- (b) Explain why an alloy is **harder** than a metal.

In your answer refer to the diagrams below.



Metal element structure



Alloy structure – harder than original metal

- (c) Sterling silver is an alloy made of 92.5% silver and 7.5% copper.

Metal	Colour	Melting Point (°C)	Hardness *
Copper	pink-brown	1084	3.0
Silver	lustrous white	962	2.5

* Hardness is measured with Moh's scale (0 – 10) where 10 is the hardest.

- (i) Describe ONE physical and ONE chemical property of pure **silver** that make it useful in the production of jewellery and other precious objects.

You may refer to the activity series provided in the resource booklet.

- (ii) Analyse the advantages and disadvantages of using sterling silver instead of pure silver in the production of jewellery and other precious objects.

In your answer you should include physical and chemical properties of each of the metals used to make sterling silver.

You may refer to the activity series provided in the resource booklet.

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There is more space for Question Four (c)(ii) on the following page.

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