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90189

NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 1 Science, 2008

90189 Describe aspects of chemistry

Credits: Five
2.00 pm Thursday 20 November 2008

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(s) provided at the back of this booklet and clearly number the question.

A Table of Ions and a Periodic Table are provided in RESOURCE BOOKLET 90189R attached in the centre of this booklet. You may detach the Resource Booklet.

Check that this booklet has pages 2–7 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.

For Assessor's use only	**Achievement Criteria**	
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe aspects of chemistry. ☐	Explain aspects of chemistry. ☐	Discuss aspects of chemistry. ☐
Overall Level of Performance ☐		

You are advised to spend 40 minutes answering the questions in this booklet.

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QUESTION ONE

Oxygen atoms are made of protons, neutrons, and electrons.

One type of oxygen atom can be represented as $^{18}_{8}\mathrm{O}$.

(a) (i) Draw a diagram to show the arrangement of the electrons, protons, and neutrons within the above oxygen atom:

(ii) Explain, with reference to the diagram, why the atom is neutral.

(b) Use the table of ions in the Resource Booklet 90189R to fill in the missing name or formula for each of the compounds below.

Scientific name	Formula
(i)	$FeSO_4$
Ammonium nitrate	(ii)
(iii)	KNO_3
Calcium hydrogen carbonate	(iv)

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(c) Both potassium and magnesium form compounds with hydroxide ions.

(i) Complete the table below for potassium and magnesium:

Element	Periodic Table Group Number	Electron arrangement of atom	Charge on ion that forms
Potassium			
Magnesium			

(ii) Discuss why potassium hydroxide has the formula KOH, while magnesium hydroxide has the formula $Mg(OH)_2$. Refer to:

- the information in part (i)
- the changes in the electron arrangements of potassium and magnesium when they react.

QUESTION TWO

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Metal	Use of Metal	Chemical Reactivity
Copper	Electrical wiring	Low
Magnesium	Fireworks and flares	Very high
Iron	Car bodies	Moderate
Zinc	Coating on iron to prevent rusting	High
Lead	Weights to sink fishing lines	Low

(a) State two **physical** properties that make copper suitable for use in electrical wiring.

Property 1: _____ Property 2: _____

(b) State two properties of **lead** that make it suitable for use as a weight for fishing lines and explain how ONE of these properties relates to this use.

Property 1: _____ Property 2: _____

Explanation: _____

_____

_____

_____

(c) Discuss the similarities **and** differences between the reactions of:

- iron with hydrochloric acid
- zinc with hydrochloric acid.

Support your answer with word equations.

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(d) Magnesium reacts with oxygen when magnesium is used in fireworks and flares.

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Discuss **why** these two elements react readily with each other. Include in your answer:

- observations of the reaction when a piece of magnesium is burnt
- the electron arrangement of magnesium and oxygen
- **how** the electron arrangement relates to the reactivity
- a **balanced** equation for the reaction of magnesium with oxygen.

QUESTION THREE

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An important part of keeping swimming pools safe is to keep the pH of the water balanced in the range 7.0 to 7.6.

Three chemicals used in pools are chlorine compounds (that react with water to produce hydrochloric acid), sodium hydrogen carbonate and aluminium sulfate.

(a) Complete the following table to show the characteristics of the solutions listed in the table below.

Solution	**Estimated pH**	**Colour when tested with Universal indicator**
Hydrochloric acid	1	(i)
Sodium hydrogen carbonate	(ii)	blue
Aluminium sulfate	5	(iii)
Water	(iv)	green

(b) The pool was tested and found to have a pH of 6.5. Sodium hydrogen carbonate was used to raise the pH of the water.

Discuss how sodium hydrogen carbonate raised the pH of the water, and include in your answer a word equation **and** a symbol equation for the reaction of sodium hydrogen carbonate with hydrochloric acid.

Extra paper for continuation of answers if required.
Clearly number the question.

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Question number	