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NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 1 Chemistry, 2007

90171 Describe chemical reactions

Credits: Four
9.30 am Monday 19 November 2007

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.

A metal activity series, solubility rules, a table of ions and a periodic table are provided in 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 2–8 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.

For Assessor's use only	**Achievement Criteria**		
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe chemical reactions. ☐	Interpret information about chemical reactions. ☐	Apply understanding of chemical reactions. ☐
Overall Level of Performance ☐		

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

Assessor's use only

QUESTION ONE: PRECIPITATION

The following pairs of solutions are mixed. Use the solubility rules in your Resource Booklet to identify if a **precipitate** is formed.

(a) Write the **name of the precipitate**. If none is formed, write **no precipitate.**

	Solutions that are mixed	**Name of the Precipitate, OR No Precipitate**
(i)	Silver nitrate + calcium chloride	
(ii)	Potassium sulfate + iron(II) nitrate	
(iii)	Calcium nitrate + sodium sulfate	

(b) Write a balanced equation for the formation of ONE precipitate identified in Question One (a) above. Spectator ions may be omitted from ionic equations.

QUESTION TWO: EQUATIONS

(a) Complete the following word equations.

(i) magnesium + oxygen $\xrightarrow{\text{heat}}$ _____

(ii) calcium carbonate $\xrightarrow{\text{heat}}$ _____ + _____

(iii) lead nitrate + potassium chloride $\longrightarrow$ _____ + _____

(b) Complete and balance the following equations.

(i) $I^-(aq) + Cl_2(aq) \longrightarrow$ _____ + _____

(ii) $Zn(s) + AgNO_3(aq) \longrightarrow$ _____ + _____

QUESTION THREE: OBSERVING CHEMICAL REACTIONS

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A small amount of zinc hydroxide is heated in a test tube over a Bunsen burner. The following reaction occurs.

$$Zn(OH)_2(s) \xrightarrow{heat} ZnO(s) + H_2O(g)$$

(a) State what **type** of reaction is occurring. _____

(b) Fully describe the **observations** that would be expected if this reaction was carried out in a school laboratory. Remember to **link** your observations to the substances involved.

_____

_____

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QUESTION FOUR: MOLAR MASSES

Calculate the relative molar masses of the following compounds. Use the relative atomic masses provided in the periodic table in the Resource Booklet.

(a) ZnO

_____

_____

(b) $CuSO_4$

_____

_____

(c) $Pb(NO_3)_2$

_____

_____

QUESTION FIVE: CALCULATING MASS

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(a) Calculate the mass of zinc hydroxide that must be heated to produce 1.00 gram of water. Use the equation below. Show all of your working clearly.

$$Zn(OH)_2(s) \longrightarrow ZnO(s) + H_2O(g)$$

(b) Calculate the mass of sodium hydrogen carbonate, $NaHCO_3$, required to form 5.40 grams of carbon dioxide, CO_2, when heated. Show all of your working clearly.

$$2NaHCO_3(s) \longrightarrow Na_2CO_3(s) + H_2O(g) + CO_2(g)$$

QUESTION SIX: CHEMICAL REACTIONS

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Part A

A colourless solution of barium nitrate is added to a pale green solution of iron(II) sulfate in a beaker. A reaction occurs.

(a) Describe the observations that would be expected for this reaction.

(b) State what type of reaction is occurring.

(c) Discuss the chemistry of this reaction. Your discussion should refer to the observations you made in part (a). Include a balanced equation in your answer. Spectator ions may be omitted.

Part B

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A strip of magnesium ribbon is heated over a Bunsen burner. It burns with a bright white light and forms a white ash.

Discuss the chemistry of this reaction in terms of oxidation and reduction. Write the appropriate half equations and overall balanced equation in your answer.

QUESTION SEVEN: MOLECULAR FORMULA

A compound was analysed and found to contain:

- 20.2% phosphorus
- 10.4% oxygen and
- 69.4% chlorine.

It has a relative molar mass of 153.5.

Determine the molecular formula of this substance. Show all of your working clearly.

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

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Question number