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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, 2005

90171 Describe chemical reactions

Credits: Four
9.30 am Wednesday 23 November 2005

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 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 2–7 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 chemical reactions.		Interpret information about chemical reactions.		Apply understanding of chemical reactions.	
Overall Level of Performance					

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

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QUESTION ONE: TYPES OF REACTION

Classify EACH of the reactions in the table below by writing the letter from the KEY LIST in the space provided.

Key list: oxidation-reduction – O
precipitation – P
thermal decomposition – T

		Type of Reaction (Choose from O, P or T)
(a)	$2AgNO_3(aq) + BaCl_2(aq) \rightarrow 2AgCl(s) + Ba(NO_3)_2(aq)$	
(b)	$MgCO_3(s) \rightarrow MgO(s) + CO_2(g)$	
(c)	$PbO(s) + C(s) \rightarrow Pb(s) + CO(g)$	
(d)	$CuCl_2(aq) + Zn(s) \rightarrow Cu(s) + ZnCl_2(aq)$	

QUESTION TWO: PRECIPITATION

(a) The following pairs of solutions are mixed. Use the solubility rules in your Resource Booklet to identify the **precipitate** (if any) that is formed. Write the **name of the precipitate** or, if none is formed, write **no precipitate.**

	Solutions that are mixed	**Name of precipitate, or no precipitate**
(i)	calcium nitrate and sodium sulfate	
(ii)	copper chloride and potassium hydroxide	
(iii)	magnesium sulfate and sodium chloride	

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

QUESTION THREE: WORD EQUATIONS

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Complete the following word equations.

(a) aluminium + silver nitrate $\rightarrow$ _____ + _____

(b) magnesium chloride + sodium hydroxide $\rightarrow$ _____ + _____

(c) lead hydroxide $\xrightarrow{\text{heat}}$ _____ + _____

QUESTION FOUR: OBSERVING REACTIONS

The following TWO experiments were carried out in the laboratory.

Answer the questions for each experiment.

(a) **Experiment One:**
Iron (II) nitrate solution is added to sodium hydroxide solution in a test tube.

(i) Describe ONE observation that you would make as the reaction occurs.

_____

_____

(ii) Explain why your observation occurred.

_____

_____

_____

_____

_____

(iii) Write a balanced ionic equation for this reaction.

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(b) **Experiment Two:**

A piece of zinc foil is added to copper (II) nitrate solution and left. It is checked after 10 minutes and then again after 24 hours.

(i) Describe ONE observation that you would expect to make after 10 minutes.

(ii) Describe a **different** observation that you would expect to make after 24 hours.

(iii) Explain why BOTH of your observations above have occurred.

(iv) Write a balanced equation for this reaction. Spectator ions may be omitted.

For the following Questions Five, Six and Seven, refer to the Resource Booklet provided. Show working for ALL answers.

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QUESTION FIVE: CALCULATING MOLAR MASSES

Calculate the relative molar masses of the following compounds.

(a) $CuSO_4$

(b) Na_2CO_3

(c) $Ba(NO_3)_2$

QUESTION SIX: CALCULATING MASS

In a reaction, 0.500 g of sodium hydrogen carbonate was decomposed in the following reaction, which went to completion:

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

Calculate the mass of sodium carbonate expected to form in this reaction.

Answer = _____ g

QUESTION SEVEN: DETERMINING A FORMULA

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Determine the formula of the compound made when 8.65 g of iron combines with 3.72 g of oxygen. The molar mass of the iron oxide is 159.6.

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

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Question number	