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1

90640

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Level 1 Chemistry, 2006

90640 Describe properties and reactions of metals, acids and bases

Credits: Four
9.30 am Monday 27 November 2006

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 characteristic properties and reactions of metals, acids and bases.	Explain characteristic properties and reactions of metals, acids and bases.	Apply an understanding of characteristic properties and reactions of metals, acids and bases.
Overall Level of Performance		

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

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QUESTION ONE: OBSERVING REACTIONS OF METALS

Magnesium is a metal often used in school laboratories because it is quite reactive.

(a) Magnesium burns well in air.

(i) Describe TWO things you would observe when a piece of magnesium is burned in air.

(1) _____

(2) _____

(ii) Write a balanced chemical equation for the reaction that occurs between magnesium and oxygen from the air.

(b) Magnesium also reacts well with acid.

(i) Describe TWO things you would observe when a piece of magnesium is placed in dilute nitric acid.

(1) _____

(2) _____

(ii) Write a balanced chemical equation for this reaction.

QUESTION TWO: PROPERTIES OF METALS

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You have been asked to design a long-lasting metal roofing system for a house. The metals that are available are copper and iron.

Discuss the suitability of each metal for a roofing system. Refer to relevant physical **and** chemical properties of each metal in your answer.

QUESTION THREE: RATES OF REACTION

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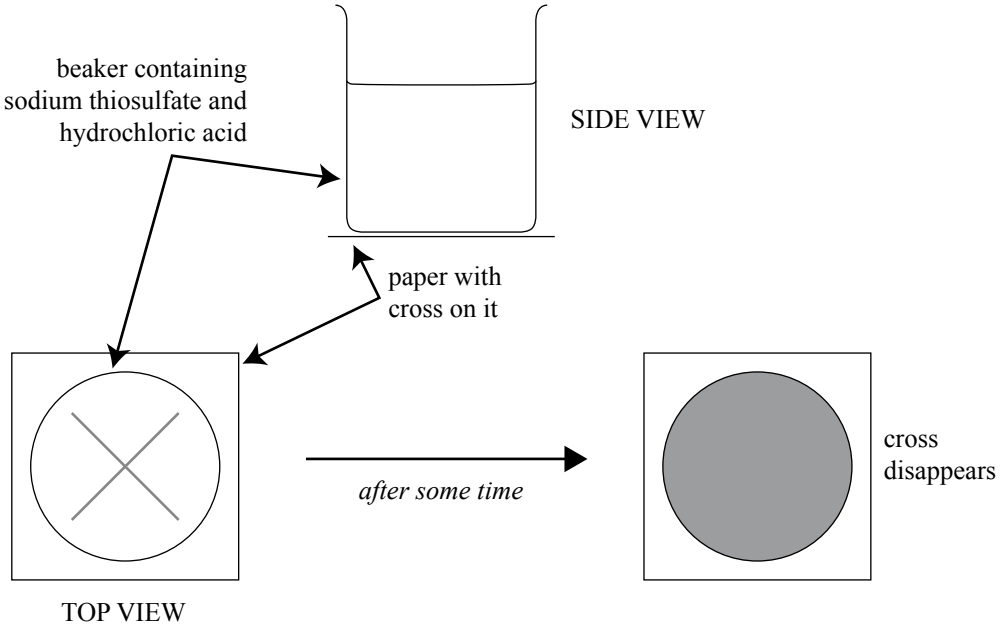
A class was investigating rates of reaction using the reaction between sodium thiosulfate and hydrochloric acid.

A pale yellow solid forms during the reaction. Over time, a cross on a piece of paper under the beaker gradually disappears when viewed from above.



The students record the **time taken in seconds for the cross to disappear**.

The experiment uses five different concentrations of sodium thiosulfate solution (**A, B, C, D** and **E**). The starting concentration of the hydrochloric acid is the same for all five solutions. All the experiments are carried out at **20°C**.

The table shows the average results of the class.

Sodium thiosulfate concentration	Time taken for cross to disappear (s)
A	142
B	55
C	124
D	63
E	13

(a) Refer to the table above.

(i) Which is the most concentrated solution of sodium thiosulfate?

Circle your answer. **A** **B** **C** **D** **E**

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(ii) Justify your answer to (i).

(b) State why the reaction will eventually stop.

(c) The rate of this reaction could also be increased if the temperature was increased.

(i) Describe a method that would allow the temperature of the reaction to be increased safely.

(ii) Discuss, in terms of the **particles** involved, why the reaction rate increases when the temperature is increased.

QUESTION FOUR: ACIDS AND ALKALIS

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Hydrochloric acid is found in the human stomach. If the acid of the stomach rises up the oesophagus, it causes a sharp pain called heartburn.

Heartburn can be treated with compounds called antacids. A common antacid is magnesium hydroxide.

The questions that follow relate to experiments carried out in the laboratory with this antacid and hydrochloric acid.

(a) Complete the following table:

	Colour when indicator added	
	Litmus	**Universal indicator**
HCl		
$Mg(OH)_2$		

(b) Magnesium hydroxide reacts with hydrochloric acid.

(i) Write a word equation for the reaction of magnesium hydroxide and hydrochloric acid.

(ii) Predict what colour the universal indicator would be at the end of this reaction.

(iii) Discuss fully why the reaction between magnesium hydroxide and hydrochloric acid can be called a **neutralisation reaction**.

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

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Question number	