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90173

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 1 Chemistry, 2005

90173 Describe selected non-metals and their compounds

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 2–8 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 the properties, preparations and reactions of selected non-metals and their compounds.	Link the properties, reactions and uses of selected non-metals and their compounds.	Apply an understanding of the properties, reactions and uses of selected non-metals and their compounds.
Overall Level of Performance		

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

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QUESTION ONE: NITROGEN

(a) **The Nitrogen Cycle**

**[FOR COPYRIGHT REASONS,
THIS RESOURCE CANNOT BE REPRODUCED HERE.
SEE BELOW.]**

Pam Hook, Peter Stannard, Ken Williamson, *Science World 10 for the New Zealand Curriculum*, MacMillan, Auckland, 1998, p 82.

Describe the role of a legume plant in the nitrogen cycle.

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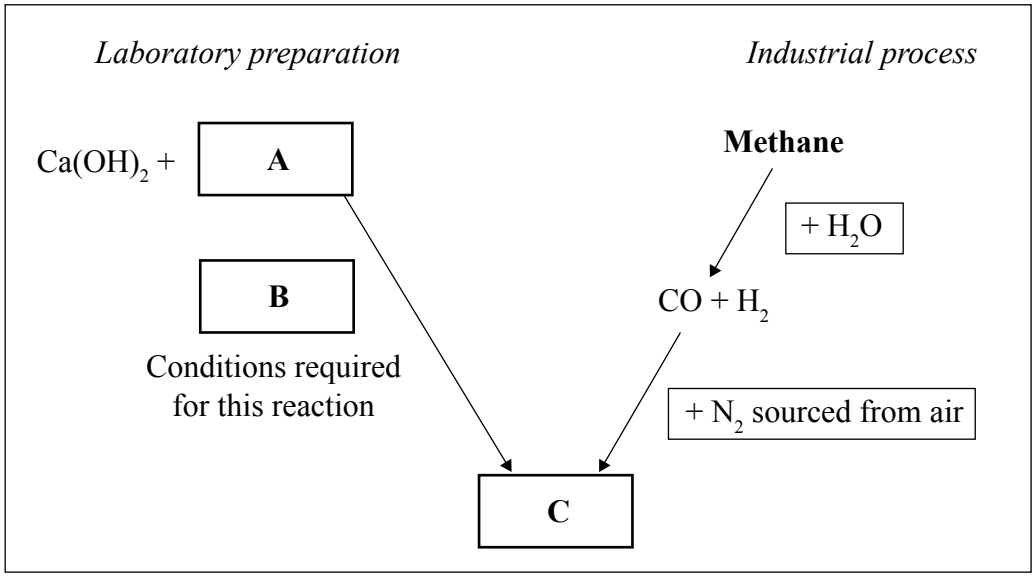
(b) **Preparation of Ammonia**

The flow chart below summarises how ammonia is produced in the laboratory and in industry.



(i) Write the chemical formula for **A**: _____

(ii) Write the conditions required for **B**: _____

(iii) Write the chemical formula for **C**: _____

(c) **Uses of Ammonia**

Ammonia is used in the industrial manufacture of nitric acid.

(i) Describe TWO observations that you would expect to make when a piece of copper metal is added to concentrated nitric acid.

_____

_____

_____

(ii) Write a balanced equation for the reaction of copper with concentrated nitric acid.

QUESTION TWO: CHLORINE

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(a) Describe TWO physical properties of chlorine at room temperature.

(b) Complete and balance the following equation for the formation of sodium hypochlorite from sodium hydroxide and chlorine.

$$NaOH + Cl_2 \rightarrow$$

(c) (i) Describe TWO uses of sodium hypochlorite.

(ii) Discuss the properties and reactions of sodium hypochlorite that relate to the **uses** named in (c)(i) above.

QUESTION THREE: OXYGEN AND SULFUR

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Oxygen and sulfur are both non-metal elements.

(a) Complete the following table for the physical properties of these elements.

Properties	Oxygen	Sulfur
State at room temperature		
Colour		
Solubility in water		

(b) (i) Describe why sodium sulfite, Na_2SO_3, is added to food.

(ii) Discuss why sodium sulfite, Na_2SO_3, works in the way you described in part (b)(i) above.

QUESTION FOUR: ACID RAIN

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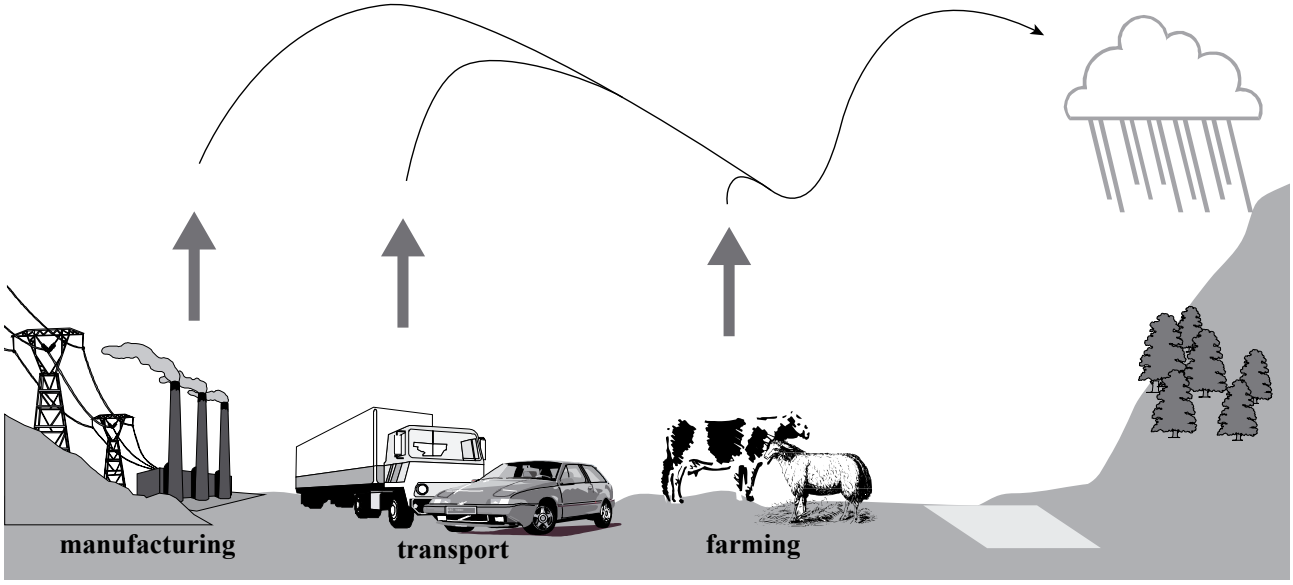

(a) Name TWO gases that contribute to the formation of acid rain, and are produced by the activities shown in the diagram above (manufacturing, transport, farming).

(b) Using ONE of the gases named in (a), write a balanced chemical equation to show the formation of acid rain.

(c) Discuss THREE effects of acid rain on the environment, using living **and** non-living examples.

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

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Question number