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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, 2006

90173 Describe selected non-metals and their compounds

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 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: PHYSICAL PROPERTIES

Complete the table below (the first line has been done for you).

	Element	State at room temperature	Colour	Solubility in water
	Nitrogen	gas	colourless	slightly soluble
(a)	Oxygen			
(b)	Sulfur			
(c)	Chlorine			

QUESTION TWO: OZONE

Ozone (O_3) is an allotrope of oxygen (O_2). Ozone is found naturally in the upper atmosphere.

(a) Describe how ozone is formed.

(b) Explain how ozone can be used as a disinfectant by referring to a chemical property of ozone.

(c) Jet aircraft release exhaust gases in the upper atmosphere. The nitrogen oxides in these gases can destroy ozone.

(i) Identify the important role of ozone in the upper atmosphere.

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(ii) Discuss the effects of ozone depletion from the upper atmosphere on people **and** other living things.

QUESTION THREE: PHOTOCHEMICAL SMOG

Nitrogen oxides (NO_x) can contribute to photochemical smog.

(a) Describe what you would see when photochemical smog is present.

(b) (i) Describe TWO conditions necessary to cause photochemical smog.

(1)

(2)

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(ii) Discuss the impact photochemical smog has on people **and** the environment.

(c) In the laboratory, nitrogen oxides are usually prepared from nitric acid HNO_3. Discuss how you would prepare a sample of nitrogen dioxide NO_2 in the laboratory, and what you would observe during the reaction. Write a balanced equation for this reaction.

QUESTION FOUR: SULFURIC ACID

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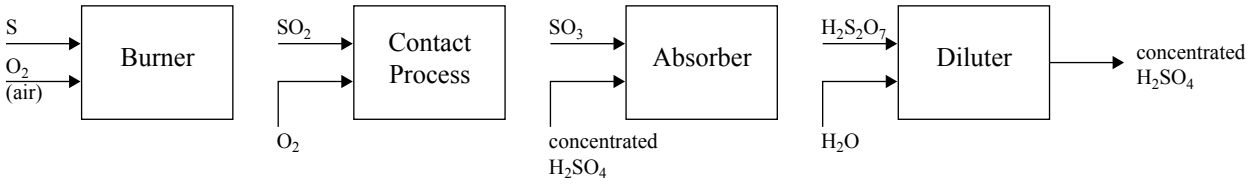
Sulfur is used in the production of sulfuric acid in the **Contact Process**. A brief summary of the whole procedure is shown in the flowchart below.



(a) Write a word equation to describe what happens inside the Burner.

The following questions refer to the Contact Process.

(b) (i) Name the catalyst used in the Contact Process.

(ii) Explain why this catalyst is required.

(c) Sulfuric acid is a widely-used chemical. State TWO important uses of sulfuric acid.

(1)

(2)

QUESTION FIVE: PREPARATION OF CHLORINE

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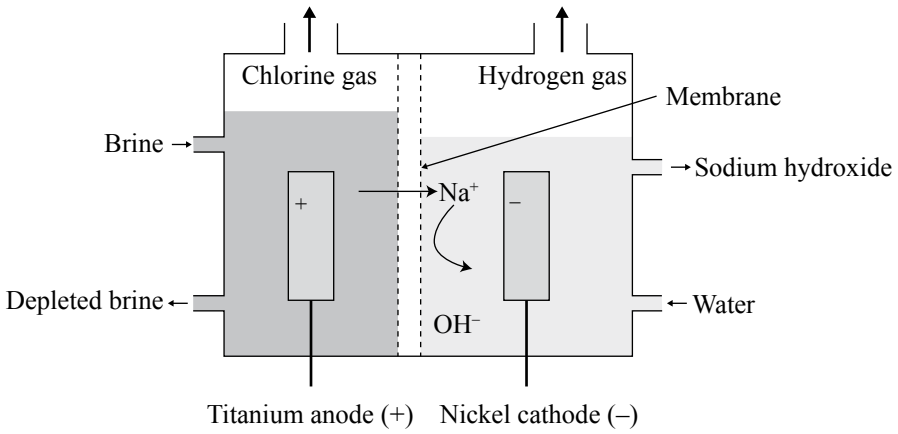
Industrial chlorine gas is formed by the electrolysis of brine.

(a) State the chemical name of brine.



(b) Refer to the diagram above to discuss how chlorine gas is formed in this process.

(c) One of the major uses of chlorine is the production of bleach (a dilute solution of sodium hypochlorite in water).

Explain how the electrolysis of brine, as described on the previous page, can also be used for the commercial production of sodium hypochlorite.

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

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Question number	