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NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 1 Chemistry, 2008

90173 Describe selected non-metals and their compounds

Credits: Four
9.30 am Friday 28 November 2008

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 periodic table is provided in the 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.

Assessor's use only

QUESTION ONE: NITROGEN

One use of nitrogen is in the Haber Process to prepare ammonia, NH_3.

(a) Describe TWO physical properties of nitrogen.

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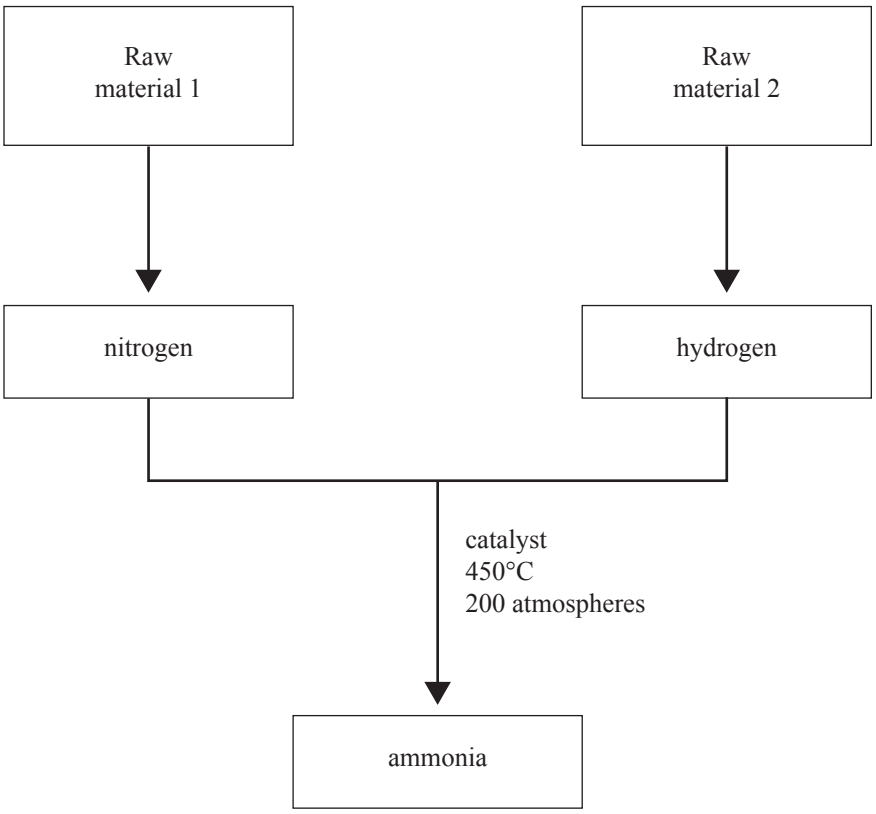
(b) A simplified version of the Haber Process is shown below.



Explain how nitrogen is converted to ammonia by the Haber Process.
Include in your answer

- the raw materials
- the catalyst used
- why the catalyst is required
- a balanced equation.

Assessor's use only

QUESTION TWO: CHLORINE

Assessor's use only

Chlorine is added to water supplies to make them safer for people to drink.

Discuss the chemistry involved in this process.
Take into account the following:

- the reaction of chlorine with water
- the nature of the aqueous solution formed
- the properties of chlorine that make it useful to add to drinking water.

Include an appropriate balanced equation in your answer.

QUESTION THREE: SULFUR

Assessor's use only

Most hydrocarbon fuels naturally contain some sulfur compounds. When fuel burns, the sulfur it contains is oxidised to sulfur dioxide.

$$S(s) + O_2(g) \rightarrow SO_2(g)$$

When sulfur dioxide dissolves in water droplets in clouds, it makes the rain more acidic than normal.

Discuss the chemistry involved in the formation of acid rain.

Include in your answer:

- equation(s) that shows the reaction(s) that occur to form acid rain
- an explanation for TWO effects on people **and** the environment.

QUESTION FOUR: OXYGEN AND OZONE

Assessor's use only

(a) Oxygen has two allotropes.

Describe what the term **allotrope** means, with reference to the two allotropes of oxygen.

http://www.esrl.noaa.gov/csd/assessments/2006/chapters/twentyquestions.pdf

Ozone is found in the Earth's atmosphere. The graph above shows that about 10% of ozone is found near the Earth's surface and about 90% of ozone is found in the stratosphere.

(b) Discuss the effect of ozone in the stratosphere on people **and** the environment.

Assessor's use only

(c) Near the Earth's surface, ozone is a major component of photochemical smog.

Discuss an effect of photochemical smog on people **and** the environment.

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

Assessor's use only

Question number