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MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 2 Science, 2008

90766 Describe the chemical properties and effects of fertilisers

Credits: Four
9.30 am Thursday 20 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.

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 2–7 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 the properties and effects of fertilisers.	Explain the effects of fertilisers in terms of their properties.	Discuss the effects of fertilisers in terms of their properties.
Overall Level of Performance		

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

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QUESTION ONE

(a) Describe the reaction of calcium carbonate, $CaCO_3$, in an acidic soil.
An equation may be used to support your answer.

(b) Adding a fertiliser such as ammonium sulfate, $(NH_4)_2SO_4$, helps keep the pH of soil below 7.

Discuss how ammonium sulfate has this effect, using equations to support your answer.

QUESTION TWO

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Nitrogen-rich fertilisers are used in farming to improve plant growth. Two nitrogen-rich fertilisers are ammonium sulfate, $(NH_4)_2SO_4$, and urea, $CO(NH_2)_2$.

Ammonium sulfate contains 21.2% nitrogen.
(molecular masses: N = 14.0, H = 1.0, C = 12.0, O = 16.0.)

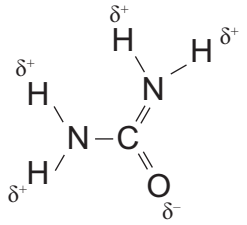
(a) Calculate the percentage of nitrogen in urea and explain which of the two fertilisers (ammonium sulfate and urea) has the higher nitrogen percentage.

(b) Justify which fertiliser, ammonium sulfate or urea, would be more suitable as a nitrogen source for a paddock of grass.

Base your justification on:

- the nitrogen percentage of each fertiliser
- solubility
- the role of nitrogen in plant growth.

(c) Urea, $CO(NH_2)_2$, can be dissolved in water and used as a liquid fertiliser. The structure of urea is:



Use the polarity of urea and water to discuss how urea is soluble in water. Support your answer with diagrams.

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QUESTION THREE

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(a) Clover seeds are often included in farmers' grass seed mixes.

Discuss the advantages of using clover seeds in a grass seed mix.

In your discussion consider:

- the process of nitrogen fixation
- the form of nitrogen involved in the nitrogen cycle
- the availability of nitrogen to plants.

Question Three continues on the following page.

(b) Eutrophication is a process whereby bodies of water, such as lakes or slow-moving streams, receive excess nutrients that build up and stimulate excessive plant growth.

Discuss how this excessive plant growth affects water quality.

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

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Question number