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90766

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 2 Science, 2005

90766 Describe the chemical properties and effects of fertilisers

Credits: Four
2 pm Friday 18 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.

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 ☐		

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

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QUESTION ONE: NPK

Bags of fertilisers are stamped with an NPK rating.

What does NPK stand for?

N =

P =

K =

QUESTION TWO: COMMON FERTILISERS

The table below shows the NPK rating of six common fertilisers.

Fertiliser	N	P	K
A	13	2	0
B	0	10	0
C	7	7	7
D	20	0	20
E	12	10	10
F	10	4	8

(a) Which fertiliser in the above table is likely to be superphosphate?

Fertiliser: _____

(b) Which fertiliser would you use on a stunted plant with pale yellow leaves? Explain your reason for choosing this fertiliser.

Fertiliser: _____

Reason: _____

_____

_____

(c) What percentage of potassium (K^+) is in potassium sulfate (K_2SO_4)?
Molecular weights are K = 39, S = 32, O = 16.

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_____ %

QUESTION THREE: IONS AND FERTILISERS

Plants take in nutrients in their ionic form, eg calcium becomes the Ca^{2+} ion.

(a) Describe how an element becomes an ion.

(b) The two common ionic forms of nitrogen are the ammonium ion and the nitrate ion. Show the charges (+ or –) of the two ions next to their formulas below.

Ammonium ion formula	Ion charge
NH_4	

Nitrate ion formula	Ion charge
NO_3	

(c) Clay particles are negatively charged. Which of the ions you identified above will bind to the clay particles?

(d) Discuss how plants take in their nutrients.

(e) Discuss the problems associated with fertilisers when they have been applied to the soil, **and** how these problems can be minimised.

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QUESTION FOUR: CLOVERS

On New Zealand farms clover is an important plant because it naturally fixes nitrogen. Clover requires the trace element molybdenum to be added with the fertilisers.

(a) Describe what a trace element is.

(b) Explain why plants need trace elements.

QUESTION FIVE: SLOW RELEASE FERTILISERS

In New Zealand there has been a drive towards the use of slow release fertilisers, especially nitrogenous fertilisers, by farmers and horticulturists.

Explain why slow release nitrogenous fertilisers are now being used.

Please turn over.

QUESTION SIX: PROBLEMS WITH USING NITROGENOUS FERTILISERS

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Eutrophication is a major problem associated with using nitrogenous fertilisers.

(a) Describe what eutrophication is.

(b) Explain how nitrogenous fertilisers contribute to eutrophication.

(c) Discuss THREE **different** ways to minimise eutrophication in our waterways.

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

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Question number	