90766

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 2 Science, 2006

90766 Describe the chemical properties and effects of fertilisers

Credits: Four
2.00 pm Tuesday 28 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.

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.

QUESTION ONE: TWO FERTILISERS

A local garden shop has two bags of fertiliser. One is a general garden fertiliser (2.6.8.3) and one is blood and bone fertiliser (15.5.4.0)

(a)   Which fertiliser is the inorganic fertiliser?

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(b)   Give a reason for your answer.

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(c)   Explain what the (2.6.8.3) stands for with the general garden fertiliser.

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The active components of the general garden fertiliser account for 19% of the total chemical makeup.

(d)   Explain what the other 81% of the fertiliser is.

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Blood and bone fertiliser (15.5.4.0) is recommended for a plant that is stunted and has pale leaves.

(e)   Explain the chemical reasons for using blood and bone on this plant.

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QUESTION TWO: THE BEST NITROGEN FERTILISER

A nitrogen-rich fertiliser is needed to fertilise a lawn. Two nitrogen-rich fertilisers are ammonium nitrate, NH_4NO_3, and urea, $CO(NH_2)_2$. The fertiliser with the higher percentage of nitrogen would be the better to fertilise a lawn.

(a)   Calculate the percentage of nitrogen in each fertiliser. Show all working.
(N = 14, H = 1, C = 12, O = 16)

NH_4NO_3 _____

_____

_____

_____ % N

$CO(NH_2)_2$ _____

_____

_____

_____ % N

Urea is a good fertiliser to use because it is **neutral** when applied to farms.

(b)   Describe what is meant by the term **neutral** in relation to fertilisers.

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QUESTION THREE: FERTILISERS AND IONS

Plants take in nutrients in their ionic form. For example, plants take in magnesium as the Mg^{2+} ion.

(a)   Describe how magnesium becomes the Mg^{2+} ion.

_____

(b)   Two common ions are the potassium ion and the phosphate ion. On the table below, show the charges (+ or −) of the two ions.

Potassium ion formula	Ion charge	Phosphate ion formula	Ion charge
K		PO_4	

(c)   Discuss why nutrients **must** be in their ionic form before plants can take them in and use them.

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QUESTION FOUR: GROWING HAZELNUTS

Below is some information about fertilisers used by hazelnut trees.

Nutrient demand by hazelnut trees $(kg\ ha^{-1})$			
Nitrogen ions	Potassium ions	Phosphorus ions	Calcium ions
19	12	9	16

(a) If a fertiliser was produced to exactly meet the demand of hazelnuts, what would the NPK rating be?

_____

(b) Explain TWO things that could happen to the hazelnut trees if a farmer does **not** apply any fertilisers for 5 years.

_____

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_____

(c) What substance can the hazelnut farmer use to supply plenty of Ca^{2+} ions to the trees?

_____

QUESTION FIVE: PROBLEMS WITH PHOSPHATE FERTILISERS

Eutrophication is a major problem for our local lakes. It is associated with the use of phosphate fertilisers.

(a)   Name a fertiliser rich in phosphates.

_____

(b)   Explain how phosphate fertilisers lead to eutrophication.

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(c)   Discuss THREE different ways a farmer could minimise phosphate eutrophication occurring in the local lakes.

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

Question
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Question
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