See back cover for an English translation of this cover

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90944M

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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

SUPERVISOR'S USE ONLY

Pūtaiao, Kaupae 1, 2011

90944 Te whakaatu māramatanga ki ngā āhuatanga o te waikawa me te pāpāhua[1]

9.30i te ata Rāhina 21 Whiringa-ā-rangi 2011
Whiwhinga: Whā

Paetae	Paetae Kaiaka	Paetae Kairangi
Te whakaatu māramatanga ki ngā āhuatanga o te waikawa me te pāpāhua.	Te whakaatu māramatanga hōhonu ki ngā āhuatanga o te waikawa me te pāpāhua.	Te whakaatu maramatanga matawhānui ki ngā āhuatanga o te waikawa me te pāpāhua.

Tirohia mehemea e ōrite ana te Tau Ākonga ā-Motu kei tō pepa whakauru ki te tau kei runga ake nei.

Me whakautu e koe ngā pātai KATOA kei roto i te pukapuka nei.

Tangohia te Pukaiti Rauemi 90944MR i waenganui o tēnei pukapuka.

Whakaaturia ngā mahinga KATOA.

Ki te hiahia koe ki ētahi atu wāhi hei tuhituhi whakautu, whakamahia te wāhi wātea kei muri i te pukapuka nei.

Tirohia mehemea kei roto nei ngā whārangi 2–19 e raupapa tika ana, ā, kāore hoki he whārangi wātea.

HOATU TE PUKAPUKA NEI KI TE KAIWHAKAHAERE HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.

TAPEKE

[1]kawakore

MĀ TE KAIMĀKA ANAKE

© Mana Tohu Mātauranga o Aotearoa, 2011. Pūmau te mana.
Kia kaua rawa he wāhi o tēnei tuhinga e tāruatia ki te kore te whakaaetanga a te Mana Tohu Mātauranga o Aotearoa.

Kia 60 meneti hei whakautu i ngā pātai o tēnei pukapuka.

MĀ TE KAIMĀKA ANAKE

PĀTAI TUATAHI: NGĀ KATOTE ME NGĀ TURE TĀTAI KATOTE

(a) Whakamāramahia mai he aha i **ōrite** ai te whakanaha irahiko o ngā katote e hangaia mai ana e te konutai me te hāora.

I tō tuhinga me:

- whakaahua i te katote
- whakaahua i ngā hanganga ngota o te katote konutai me te katote ōkai
- tuhi i te hihiko kei te katote konutai **me** te katote ōkai
- whakamārama i ngā hihiko kei ngā katote **e rua** e ai ki te whakanaha irahiko **me** te maha o ngā iraoho.

You are advised to spend 60 minutes answering the questions in this booklet.

ASSESSOR'S USE ONLY

QUESTION ONE: IONS AND IONIC FORMULAE

(a) Explain why the ions formed by sodium and oxygen both have the **same** electron arrangement.

In your answer you should:

- describe an ion
- describe the atomic structures of a sodium ion and an oxide ion
- state the charge on the sodium ion **and** the oxide ion
- explain the charges on **both** ions in terms of electron arrangement **and** number of protons.

(b) Kei waenga a pūmotu X i ngā tau 11 me te 18 i te Taka Pūmotu.

Ka hanga tētahi ngota o te pūmotu X i tētahi katote. Ka tūhono tēnei katote ki te katote waihā hei hanga i tetāhi pūhui ngū, $X(OH)_3$.

Whakatauhia he aha te pūmotu X me te parahau i tō whakautu.

I tō tuhinga me:

- whai whakaaro ki te ōwehenga o ngā katote X ki ngā katote waihā
- whakamahi i te ture tātai $X(OH)_3$ hei whakatau i te hihiko o te katote X
- whakamārama ka pēhea tō whakamahi i te Taka Pūmotu i tō Pukaiti Rauemi ki te kimi ki tēhea rōpū te pūmotu X
- whakaingoa i te pūmotu X.

MĀ TE KAIMĀKA ANAKE

(b) Element X is between numbers 11 and 18 on the Periodic Table.

An atom of element X forms an ion. This ion combines with the hydroxide ion to form a neutral compound, $X(OH)_3$.

Determine what element X is and justify your answer.

In your answer you should:

- consider the ratio of X ions to hydroxide ions
- use the formula $X(OH)_3$ to determine the charge of the X ion
- explain how you would use the Periodic Table in your Resource Booklet to find out which group element X is in
- name element X.

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PĀTAI TUARUA: TE TERENGA O TE TAUHOHENGA

MĀ TE KAIMĀKA ANAKE

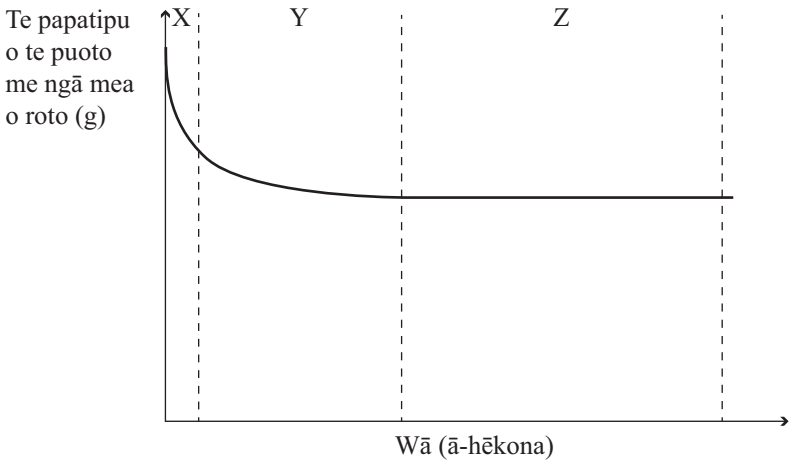
Ka tauhohe te konupūmā pākawa waro (mara māpere) me te waikawa pūhaumāota ki roto i tētahi puoto kakiroa.

Ko te whārite ā-kupu mō tēnei tauhohenga ko:

konupūmā pākawa waro + waikawa pūhaumāota → konupūmā pūhaumāota + wai + hauhā

(a) Whakaahuatia tētahi mātakinga āu ina pā mai tēnei tauhohenga.

Ko te papatipu o te puoto me ngā mea i roto ka inea ki tētahi inetaumaha i roto i te wā me te tuhi ki te kauwhata i raro.



(b) Whakamāramahia mai he aha i heke ai te papatipu i roto i te wā.

I tō tuhinga me:

- whai whakaaro ki ngā huanga katoa ka hangaia mai
- whakamārama mai kei te aha, e ai ki ngā korakora ME te tere o te tauhohenga, i **ia** wāhanga o te kauwhata.

Ka iti iho te papatipu i roto i te wā nā te mea: _____

I te wāhanga X: _____

I te wāhanga Y: _____

I te wāhanga Z: _____

MĀ TE KAIMĀKA ANAKE

(c) Ina whakamahia te waikawa pūhaumāota e nui ake ai te **kukūtanga**, ka tere ake te tauhohenga.

Whakamāramahia te rerekētanga i roto i te tere o te tauhohenga.

I tō whakautu me kōrero koe mō:

- ngā korakora
- ngā tukinga
- te tere o te tauhohenga.

QUESTION TWO: RATES OF REACTION

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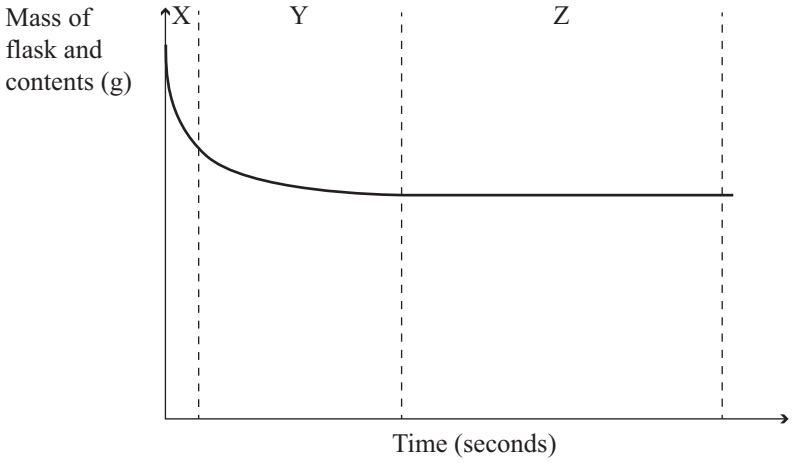
Calcium carbonate (marble chips) and hydrochloric acid react together in a conical flask.

The word equation for this reaction is:

calcium carbonate + hydrochloric acid → calcium chloride + water + carbon dioxide gas

(a) Describe an observation you would make when this reaction occurs.

The mass of the flask and contents is measured on a scale over time and recorded on the graph shown below.



(b) Explain why the mass decreases with time.

In your answer you should:

- consider all the products being formed
- explain what is happening, in terms of particles AND the rate of reaction, in **each** section of the graph.

The mass decreases with time because:

In section X:

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In section Y: _____

In section Z: _____

(c) When more **concentrated** hydrochloric acid is used, the reaction is faster.

Explain the difference in the rate of reaction.

In your answer you should refer to:

- particles
- collisions
- reaction rate.

PĀTAI TUATORU: TE HANGA PĀHARE

MĀ TE KAIMĀKA ANAKE

I te hiahia tētahi ākonga ki te hanga i te pāhare **konupora pūhaumāota**.

Matapakihia he pēhea te mahi a te ākonga i te pāhare **konupora pūhaumāota** mai i te **waikawa pūhaumāota** me te **konupora ōkai**.

I tō tuhinga me:

- tuhi he aha te **momo** tauhohenga ka pā
- tuhi tētahi whārite ā-kupu ME tētahi whārite tohu taurite mō te tauhohenga i waenga i te waikawa pūhaumāota me te konupora ōkai
- whakamārama ka pēhea tō hanga konupora pūhaumāota i roto i tētahi **taiwhanga kura** mai i te waikawa pūhaumāota me te konupura ōkai totoka (ka taea tēnei mā te tuhi hoahoa whai tapanga).

Te momo tauhohenga: _____

Whārite ā-kupu

Whārite tohu taurite

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Ngā hoahoa

QUESTION THREE: MAKING A SALT

MĀ TE KAIMĀKA ANAKE

A student wanted to make the salt, **magnesium chloride**.

Discuss how the student would make **magnesium chloride** salt from **hydrochloric acid** and **magnesium oxide**.

In your answer you should:

- state what **type** of reaction occurs
- write a word equation AND a balanced symbol equation for the reaction between hydrochloric acid and magnesium oxide
- explain how you would make magnesium chloride in a **school lab** from hydrochloric acid and solid magnesium oxide (this can be done by drawing labelled diagrams).

Type of reaction: _____

Word equation

Balanced symbol equation

ASSESSOR'S USE ONLY

Diagrams

PĀTAI TUAWHĀ: pH ME NGĀ TOHU

MĀ TE KAIMĀKA ANAKE

Ka raua e tētahi ākonga he 10 ritamano (ml) o te waikawa hauota waimeha ki roto i tētahi ipuipu koropupū me ngā pata e rima o te ranunga taetohu. Kātahi ka tāpirihia atu te konutai waihā he ōrite te kukūtanga. I tuhia ngā mātakinga e whai ake.

Te tapeke o te konutai waihā i te tāpirihia (ml)	Te tae o te mehanga
0	whero
10	kākāriki
20	waiporoporo

Matapakihia te tauhohe e pā mai ana i te wā e tāpirihia atu te konutai waihā ki te waikawa hauota.

I tō tuhinga me:

- whakamārama i te hononga i waenga i ngā tae i mātakinga me te pH o te mehanga
- whakamārama ko ēhea ngā katote te pūtake o ngā tae rerekē o te mehanga
- tuhi i tētahi whārite ā-kupu mo te tauhohenga ME tētahi whārite tohu taurite mo te tauhohenga.

MĀ TE KAIMĀKA ANAKE

Whārite ā-kupu

Whārite tohu taurite

QUESTION FOUR: pH AND INDICATORS

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A student put 10 ml of dilute nitric acid in a boiling tube with five drops of universal indicator. Sodium hydroxide of the same concentration was then added. The following observations were recorded.

Amount of sodium hydroxide added (ml)	Colour of solution
0	red
10	green
20	purple

Discuss the reaction occurring as sodium hydroxide is added to the nitric acid.

In your answer you should:

- explain the relationship between the colours observed and the pH of the solution
- explain which ions cause the different colours of the solution
- write a word equation for the reaction AND a balanced symbol equation for the reaction.

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Word equation

Balanced symbol equation

He wāhi anō mēnā ka hiahiatia.
Tuhia te (ngā) tau pātai mēnā e hāngai ana.

TAU PĀTAI

MĀ TE KAIMĀKA ANAKE

Extra space if required.
Write the question number(s) if applicable.

QUESTION NUMBER

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English translation of the wording on the front cover

Level 1 Science, 2011

90944 Demonstrate understanding of aspects of acids and bases

9.30 am Monday 21 November 2011
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of aspects of acids and bases.	Demonstrate in-depth understanding of aspects of acids and bases.	Demonstrate comprehensive understanding of aspects of acids and bases.

90944M

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 attempt ALL the questions in this booklet.

Pull out Resource Booklet 90944R from the centre of this booklet.

Show ALL working.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–19 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.

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