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90944M



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NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

SUPERVISOR'S USE ONLY

## Pūtaiao, Kaupae 1, 2014

### 90944M Te whakaatu māramatanga ki ngā āhuatanga o te waikawa me te pāpāhua

9.30 i te ata Rāhina 10 Whiringa-ā-rangi 2014  
Whiwhinga: Whā

Paetae	Kaiaka	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 māramatanga matawhānui ki ngā āhuatanga o te waikawa me te pāpāhua.

Tirohia mehemea e ōrite ana te Tau Ākongā ā-Motu (NSN) 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 waenga o tēnei pukapuka.

Ki te hiahia koe ki ētahi atu wāhi hei tuhituhi whakautu, whakamahia te (ngā) whārangi kei muri i te pukapuka nei, ka āta tohu ai i ngā tau pātai.

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

MĀ TE KAIMĀKA ANAKE

## PĀTAI TUATAHI: NGĀ NGOTA, NGĀ KATOTE ME NGĀ TIKANGA TĀTAI

(a) Tuhia ngā tikanga tātai mō ēnei pūhui katote.

Tirohia te Taka Katote kei te Pukaiti Rauemi hei āwhina i a koe.

(i) Konupūmā pūhaumāota \_\_\_\_\_

(ii) Konutai pākawa ota \_\_\_\_\_

(iii) Konutea pākawa ota \_\_\_\_\_

(b) Whakaotihia te papatau i raro nei mō ngā katote ka hangaia e te konupora, te konumohe, me te hāora.

Whakamahia te taka pūmotu kei te Pukaiti Rauemi hei āwhina i a koe.

Ngota	Tau iraoho	Whakanahatanga irahiko o te ngota	Whakanahatanga irahiko o te katote	Te whana kei te katote
Mg				
Al				
O	8	2,6	2,8	2 <sup>-</sup>

(c) Ko te ture tātai mō te konupora ōkai ko MgO. Ko te ture mō te konumohe ōkai ko Al<sub>2</sub>O<sub>3</sub>.

Whakamāramahia he aha i rerekē ai ngā tikanga tātai e rua.

Ki tō whakautu, me:

- whai whakaaro ki te ōwehenga o ngā katote kei ia tikanga tātai me te whakamārama anō he pēhea te hono o te ōwehenga ki te whana kei ngā katote
- whakahāngai te ōwehenga o ngā katote i roto i te tikanga tātai ki te maha o ngā irahiko ka ngaro, ka whiwhi rānei i ia ngota.

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**He wāhi anō mō tō whakautu  
ki tēnei pātai kei te whārangi 4.**

**QUESTION ONE: ATOMS, IONS, AND FORMULAE**

(a) Write the formulae for the following ionic compounds.

Use the Table of Ions in your Resource Booklet to help you.

(i) Calcium chloride \_\_\_\_\_

(ii) Sodium nitrate \_\_\_\_\_

(iii) Zinc nitrate \_\_\_\_\_

(b) Complete the table below for the ions formed by magnesium, aluminium, and oxygen.

Use the periodic table in your Resource Booklet to help you.

Atom	Atomic number	Electron arrangement of atom	Electron arrangement of ion	Charge on ion
Mg				
Al				
O	8	2,6	2,8	2 <sup>-</sup>

(c) The formula for magnesium oxide is MgO. The formula for aluminium oxide is Al<sub>2</sub>O<sub>3</sub>.

Explain why the two formulae are different.

In your answer:

- consider the ratio of ions in each formula and explain how the ratio is related to the charge on the ions
- relate the ratio of ions in the formula to the number of electrons lost or gained by each atom.

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**There is more space for your answer to this question on page 5.**

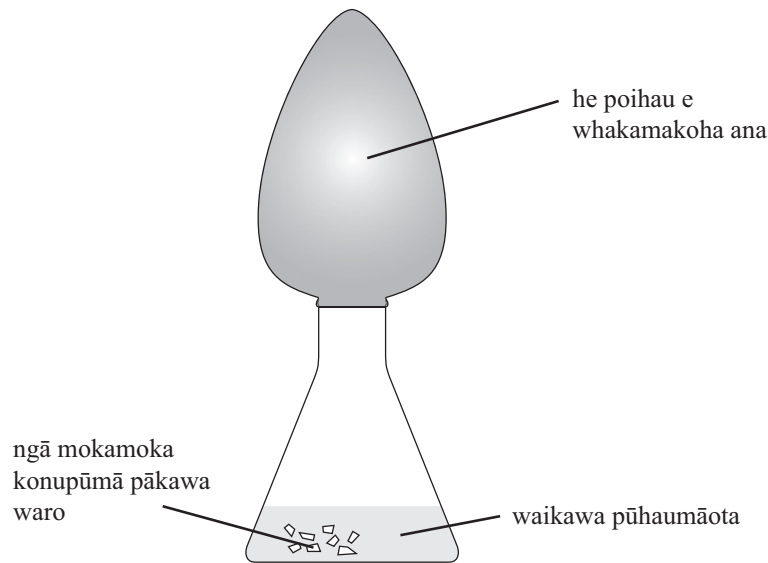


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A small empty square box located at the bottom right of the page, likely for a signature or score.

## PĀTAI TUARUA: NGĀ POIHĀU

- (a) Ka raua ngā maramara konupūmā pākawa waro ki tētahi puoto, ā, ka tāpirihia atu anō he waikawa pūhaumāota. Ka raua wawehia atu anō he poi hau ki runga o te puoto. Kātahi ka whakamakoha haere te poi hau.



- (i) Whakamāramahia he aha te poi hau i whakamakoha haere ai.

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I roto i te whakamātau tuarua, ka whakamahia anō ko taua papatipu konupūmā pākawa waro ēngari he paura kē.

- (ii) Whakamāramahia he aha i tere ake ai te whakamakoha o te poi hau ina whakamahia te paura konupūmā pākawa waro.

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- (b) Mā te whakamahi i ngā matū ōrite (konupūmā pākawa waro me te waikawa pūhaumāota), matapakihia tētahi tikanga rerekē e tere ake ai te whakamakoha.

I roto i tō whakautu me kōrero koe mō ngā pāpātanga tauhohenga me ngā tuinga korakora.

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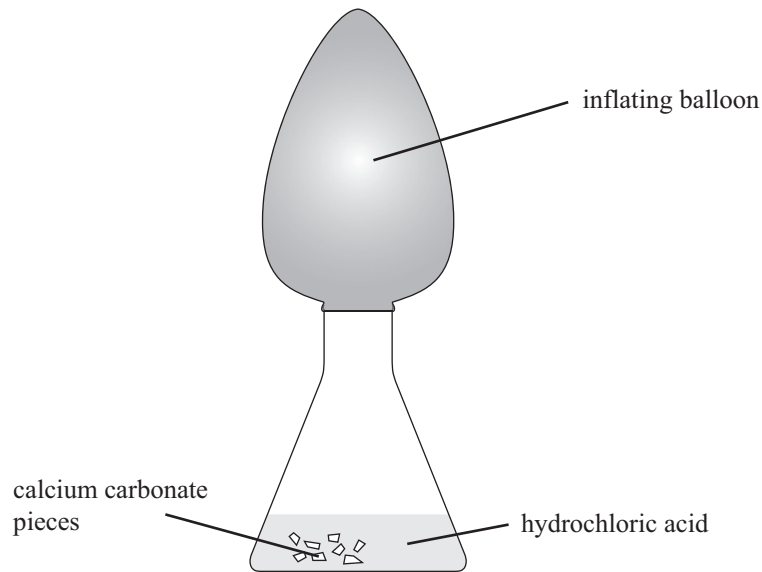
- (c) Tuhia tētahi whārite kupu ME tētahi whārite tohu taurite mō te tauhohenga i waenga i te konupūmā pākawa waro me te waikawa pūhaumāota.

Whārite kupu:

Whārite tohu taurite:

**QUESTION TWO: BALLOONS**

- (a) Calcium carbonate pieces are placed in a flask and hydrochloric acid is added. Immediately a balloon is placed over the top of the flask. The balloon then starts to inflate.



- (i) Explain why the balloon inflates.

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In a second experiment, the same mass of calcium carbonate in a powdered form is used.

- (ii) Explain why the balloon inflates faster when powdered calcium carbonate is used.

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- (b) Using the same chemical substances (calcium carbonate and hydrochloric acid), discuss a different way to make the balloon inflate faster.

In your answer you should refer to rates of reaction and particle collisions.

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- (c) Write a word equation AND a balanced symbol equation for the reaction between calcium carbonate and hydrochloric acid.

Word equation:

Balanced symbol equation:

## PĀTAI TUATORU: NGĀ RANUNGA TAETOHU ME TE pH

E toru ngā ipurau kore tapanga a tētahi ākonga me te wē kanokore kei roto i tēnā me tēnā. He **wai** kei tētahi, he mehanga pēkena houra (**konutai hauwai pākawa waro**) kei tētahi, ā, he winika mā (he mehanga o te **waikawa ewaro**) kei tētahi.

Hei whiriwhiri he aha ngā wē, ka tukuna e te ākonga he pata mai i ia ipurau ki tētahi pepa tohu waikawa kikorangi me tētahi pepa tohu waikawa wheno. Kātahi ka tāpirihia e ia te ranunga taetohu ki ia ipurau.

I riro mai ēnei kitenga e whai ake ana:

	<b>Te tae o te tohu waikawa kahurangi</b>	<b>Te tae o te tohu waikawa wheno</b>	<b>Te tae me te ranunga taetohu</b>	<b>Te ingoa o te wē</b>
<b>Ipurau 1</b>	ka noho hei kahurangi	ka noho hei wheno	ka huri ki te kākāriki	
<b>Ipurau 2</b>	ka huri ki te wheno	ka noho hei wheno	ka huri ki te ārani	
<b>Ipurau 3</b>	ka noho hei kahurangi	ka huri ki te kahurangi	ka huri ki te kahurangi	

- (a) Whakaotihia te poutū whakamutunga o te ripanga i runga ake hei tautohu i ngā wē e toru.
- (b) Whakamahia ngā kōrero i roto i te ripanga hei whakaatu he pēhea te tautohu i ia wē.

I tō whakautu, me:

- whakamahi ngā tirotirohanga katoa mō ia ipurau
- tuhi te pH āwhiwhi mai i te tae o te ranunga taetohu.

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**QUESTION THREE: INDICATORS AND pH**

A student has three unlabelled beakers each containing a colourless liquid. One contains **water**, one contains a solution of baking soda (**sodium hydrogen carbonate**), and one contains white vinegar (a solution of **ethanoic acid**).

To work out which liquid is which, the student put a drop from each beaker onto a piece of blue litmus paper and a piece of red litmus paper. She then added universal indicator to each beaker.

The following results were obtained:

	<b>Colour of blue litmus paper</b>	<b>Colour of red litmus paper</b>	<b>Colour with universal indicator</b>	<b>Name of liquid</b>
<b>Beaker 1</b>	stays blue	stays red	turns green	
<b>Beaker 2</b>	turns red	stays red	turns orange	
<b>Beaker 3</b>	stays blue	turns blue	turns blue	

(a) Complete the last column of the table above to identify the three liquids.

(b) Use the information in the table to show how each of the liquids can be identified.

In your answer you should:

- use all of the observations for each beaker
- state the approximate pH from the colour of the universal indicator.

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- (c) Explain the relationship between the changing **pH** of the solution and the **ions** in the solution as the sulfuric acid is added to the beaker.

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He puka anō mēnā ka hiahiatia.  
Tuhia te (ngā) tāu pātai mēnā e hāngai ana.

TAU PĀTAI

MĀ TE  
KAIMĀKA  
ANAKE

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

QUESTION  
NUMBER

ASSESSOR'S  
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*English translation of the wording on the front cover*

## Level 1 Science, 2014

### 90944 Demonstrate understanding of aspects of acids and bases

9.30 am Monday 10 November 2014  
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.

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 2–19 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.**