SUPERVISOR'S USE ONLY

90944



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.

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 2–10 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.

TOTAL

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

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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)	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 .	ASSESSOR'S USE ONLY					
	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.						

QUESTION TWO: RATES OF REACTION

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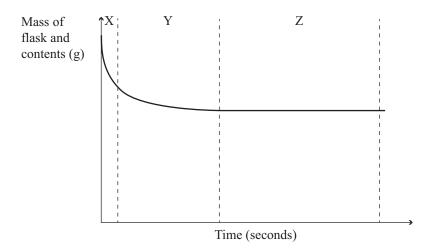
Calcium carbonate (marble chips) and hydrochloric acid react together in a conical flask.

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.

ne mass decreases with time because:
section X:

In section Z:		
When more conce r	atrated hydrochloric acid is used, the reaction	n is faster.
Explain the differe	nce in the rate of reaction.	
In your answer you	should refer to:	
• particles		
 collisions 		
• reaction rate.		

QUESTION THREE: MAKING A SALT

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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
Word equation
Balanced symbol equation

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			1
agrams			

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

write a word equat	non for the react	ion in the decour	aneed symbol	equation for t	110 104011011.

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		Extra space if required.	
UESTION		Write the question number(s) if applicable.	
QUESTION NUMBER		(1)	