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NZQA

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Level 1 Science, 2018

90944 Demonstrate understanding of aspects of acids and bases

9.30 a.m. Thursday 15 November 2018
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.

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

Check that this booklet has pages 2–8 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

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QUESTION ONE

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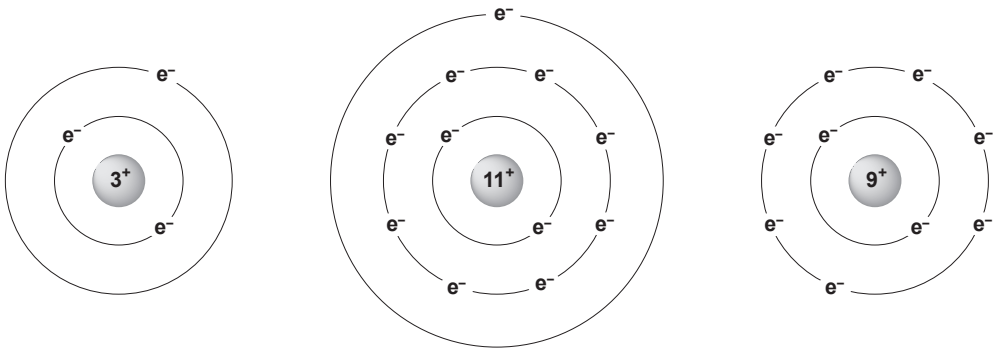
The diagrams show models of three different atoms:



Lithium Sodium Fluorine

Use the diagrams to answer parts (a), (b), and (c).

(a) Why are lithium and sodium in the same group (column) of the Periodic Table, but in different periods (rows)?

(b) Sodium and fluorine form ions that both have the same electron arrangement.

How can sodium and fluoride ions have the same electron arrangement but different charges?

In your answer you should refer to the number of protons, charge, and electron arrangement of the two atoms and ions.

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(c) Magnesium fluoride has the formula MgF_2.

Explain how the ratio of ions in the formula is linked to the charge on the ions.

In your answer you should include the number of electrons gained or lost by each atom as it forms the ionic compound.

A diagram may assist your answer.

QUESTION TWO

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Solutions of potassium hydroxide, KOH, and sulfuric acid, H_2SO_4, are added together in a beaker.

(a) Name the type of reaction occurring.

(b) Write the word equation and the balanced symbol equation for this reaction.

Word equation

Balanced symbol equation

(c) A solution of potassium hydroxide is placed in a beaker. Universal indicator is added to it. The solution is purple, as shown in the diagram below.

Sulfuric acid is slowly added to the beaker until **no more colour changes are seen**.

Explain in detail what happens to the **colour** of the solution while the sulfuric acid is being added to the potassium hydroxide.

Link your answer to the concentration of **ions** and the changing **pH** of the solution.

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QUESTION THREE

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Some magnesium carbonate powder is added to dilute nitric acid in an open conical flask. The flask is on an electronic balance, as shown in the illustration.

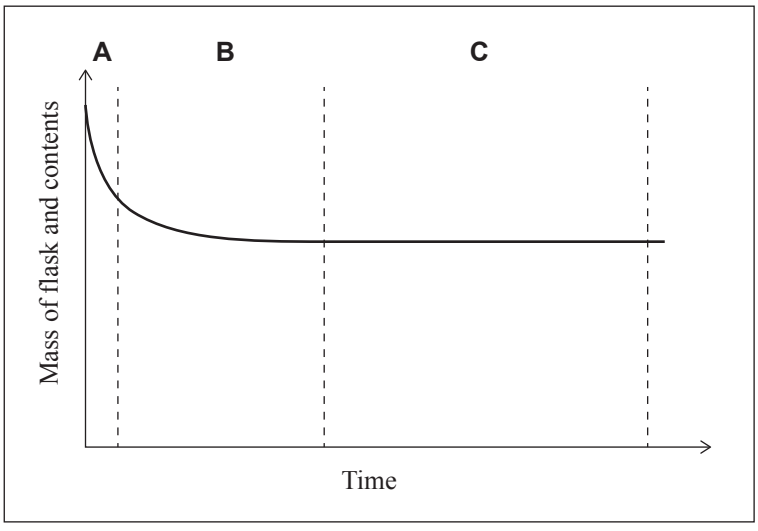
(a) Write the word equation AND the balanced symbol equation for the reaction between the nitric acid and magnesium carbonate.

Word equation

Balanced symbol equation

The total mass of the flask and its contents is measured over time and recorded on the graph below.

Change in mass over time



(b) (i) Why does the mass of the flask and its contents decrease during the reaction?

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(ii) Explain what is happening in sections A, B, and C of the graph.

Link your answer to rates of reaction and particle collisions.

(c) Explain how increasing the **temperature** will make the reaction between magnesium carbonate and nitric acid faster.

Link your answer to rates of reaction and particle collisions.

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

QUESTION NUMBER

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