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Level 1 Chemistry, 2015

90933 Demonstrate understanding of aspects of selected elements

9.30 a.m. Tuesday 24 November 2015
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of aspects of selected elements.	Demonstrate in-depth understanding of aspects of selected elements.	Demonstrate comprehensive understanding of aspects of selected elements.

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.

A periodic table and other reference material are provided in the Resource Booklet L1–CHEMR.

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 2–12 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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QUESTION ONE

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(a) Draw the electron arrangement for the atoms sodium and fluorine in the boxes below.
You may refer to the periodic table in the resource booklet.

sodium	fluorine

(b) Explain why the electron arrangements for the sodium atom and the fluorine atom are different, but the electron arrangements for the sodium ion and the fluoride ion are the same.

In your answer, you should:

- give the electron arrangements for both ions
- relate your explanation to the positions of the atoms on the periodic table
- explain how the charges form on each of the ions.

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(c) Sodium and lithium are both Group 1 elements. You may have seen your teacher demonstrate reactions of these elements when added to water, or you may have seen videos of these reactions on the internet.

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Compare and contrast the reactivity of these two elements.

In your answer, you should:

- give any observations seen when these elements are added (separately) to troughs of water
- link the observations to the reactants and products involved in the reaction of these elements with water
- predict how each of these elements would react with dilute sulfuric acid, and relate this to their positions on the periodic table
- write a word equation and a balanced symbol equation for the reaction of ONE of the elements with water.

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Word equation:

Balanced symbol equation:

QUESTION TWO

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(a) Some physical and chemical properties of three different metals A, B, and C are given in the table below.

Metal	Physical Properties	Chemical Properties
Metal A	It is a high density, soft and malleable metal. It is a relatively poor conductor of electricity.	It does not react with water.
Metal B	It is red-brown in colour, and an excellent conductor of heat and electricity.	It does not react with water or dilute hydrochloric acid.
Metal C	It is silver-grey in colour.	It does not react with water, but reacts slowly with dilute hydrochloric acid.

(i) Complete the table below to show the identity of metals A, B, and C. Choose from the following list of metals.

copper **silver** **lead** **magnesium** **zinc**

Metal A	
Metal B	
Metal C	

(ii) Give a use for each of the metals A and B and explain why they are used this way by linking to a relevant physical AND chemical property for each of the metals.

Metal A

Use: _____

Explanation: _____

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Metal B

Use: _____

Explanation: _____

(b) Silver and magnesium are both shiny grey metals. However, only silver is used to make jewellery.

Justify why silver is used to make jewellery, but magnesium is not.

In your answer, you should refer to chemical AND physical properties of both metals.

(c) Steel is an alloy composed of iron and carbon, alloyed with certain additional elements such as chromium and copper.

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Explain why alloys can be more useful than pure metals.

In your answer, you should explain how the properties of steel can be affected by the addition of other elements.

QUESTION THREE

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Iron metal and carbon (charcoal), can both react with oxygen when they are held in a blue Bunsen flame.

(a) (i) Complete the following word equation and balanced symbol equation for the reaction of iron with oxygen.

Word equation:

iron + oxygen →

Balanced symbol equation:

$Fe + O_2 \rightarrow$

(ii) Write a word equation and a balanced symbol equation for the reaction of carbon with oxygen.

Word equation:

Balanced symbol equation:

(b) Chlorine is added to water supplies to make the water safer for people to drink.

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Explain the chemistry involved in this process.

In your answer, you should:

- describe the reaction of chlorine with water
- explain the nature of the aqueous solution formed
- link the properties of chlorine to making water safer for people to drink
- include a balanced symbol equation for the reaction of chlorine with water.

Balanced symbol equation:

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(c) Sulfur dioxide, SO_2, is often added to foods such as dried fruit, sausages, and wine to preserve them. The images below show dried apricots with and without sulfur dioxide added.

http://fyi.uwex.edu/safepreserving/files/2014/04/ApricotsSulfurDioxide.jpg

Explain how sulfur dioxide preserves food.

You should refer to the chemical properties of sulfur dioxide in your answer.

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

QUESTION NUMBER

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