



General Certificate of Secondary Education
2011

Science: Chemistry

Paper 1
Foundation Tier

[G1401]

FRIDAY 27 MAY, MORNING

StudentBounty.com

71

Candidate Number



G1401

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Answer **all five** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 90.

Quality of written communication will be assessed in question 4(a)(iii).

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

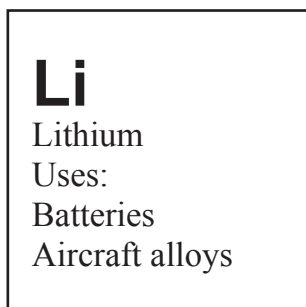
A Data Leaflet which includes a Periodic Table of the Elements is provided.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
Total Marks	



6343.04R

- 1 Periodic Tables are available which show the symbol of each element and some of its uses. Two elements from such a Periodic Table are shown below.



- (a) Complete the table below by inserting the name of the element beside its use and state the group number for the group to which the element belongs.

Use	Element name	Group number
Gas used in balloons		
Metal used in distress flares		
Gas used in food packaging		
Bleach for cotton and linen		

[8]

Examiner Only	
Marks	Remark

(b) Elements in the Periodic Table are arranged in groups and periods.

(i) The table below gives details of some of the groups of the Periodic Table. Complete the table.

Group number	Name of group	Number of electrons in the outer shell of an atom
I		
	the halogens	
		8

[6]

(ii) Name the element found in Period IV (4) and Group VII (7).

_____ [1]

(c) Complete the table below by placing a tick (✓) in the correct column, to identify the element as a metal or a non-metal. Place only one tick per row.

Element	Metal	Non-metal
Sodium		
Bromine		
Phosphorus		

[3]

(d) Choose words from the box below to complete the sentence.

hydroxides acidic neutral oxides basic

Most metals burn in oxygen to form _____ which are _____.

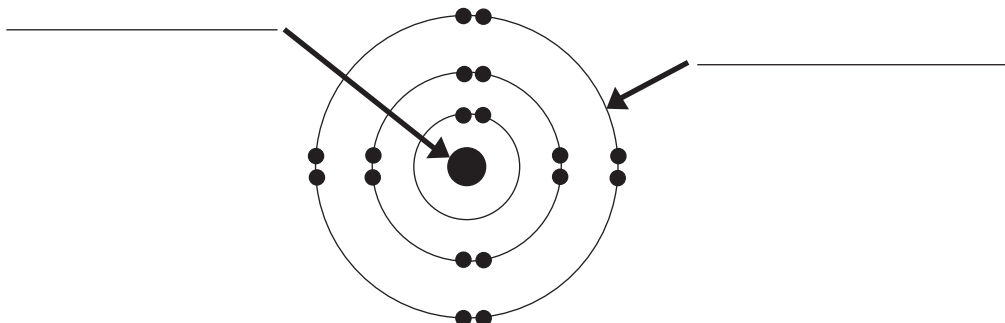
[2]

Examiner Only

Marks Remark

- 2 The reactivity of atoms depends on the arrangement of their electrons. Argon atoms are unreactive whereas atoms of sodium and chlorine are very reactive.

(a) The diagram below shows an atom of argon. Atoms are electrically neutral.



(i) Complete the two labels on the diagram above. [2]

(ii) Explain why atoms are electrically neutral.

_____ [2]

(iii) Using the diagram above, explain why atoms of argon are unreactive.

_____ [1]

Examiner Only

Marks Remark

(iv) Complete the table below with the missing details of the subatomic particles.

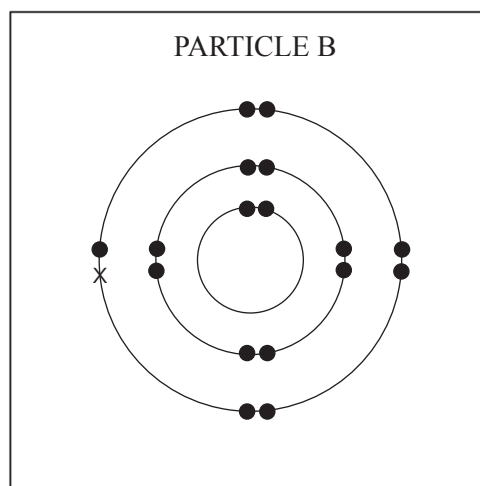
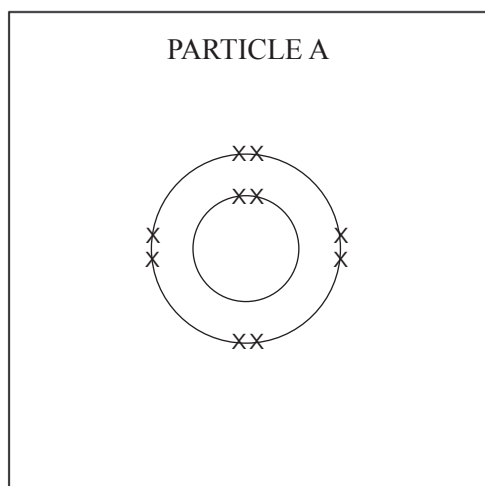
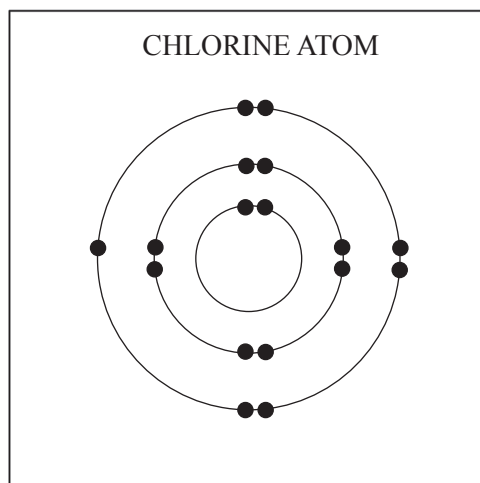
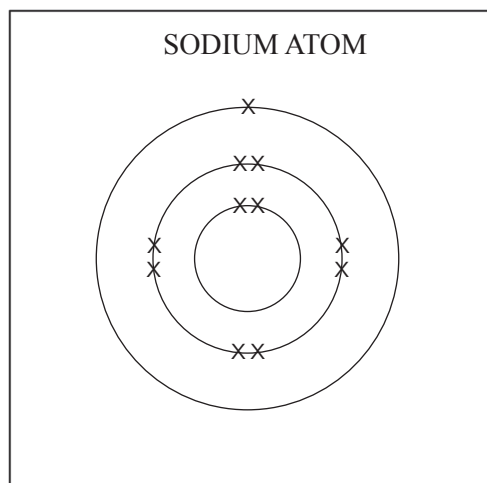
Relative mass	Relative charge	Name of subatomic particle
	0	
$\frac{1}{1840}$	-1	
1		

[5]

Examiner Only	
Marks	Remark

- (b) The scheme below shows how atoms of sodium react with atoms of chlorine to form particles A and B. The bonding between particles A and B is ionic.

Examiner Only	
Marks	Remark



- (i) Write the electronic configurations of the particles shown above. The sodium atom has been completed for you.

Sodium atom 2, 8, 1

Chlorine atom _____

Particle A _____

Particle B _____ [3]

- (ii) Name particles A and B

Particle A _____

Particle B _____ [2]

(iii) Write the symbol including charges for particles A and B.

Particle A _____

Particle B _____ [2]

(iv) Explain what you understand by the term ionic bonding.

_____ [2]

(v) From the list below select one other substance in which the bonding is ionic.

magnesium oxide sulphur dioxide calcium chloride

carbon dioxide methane sodium iodide water

_____ [1]

Examiner Only

Marks Remark

3 Most of the elements in the Periodic Table are metals.

(a) Use your Periodic Table to complete the table below.

Name of metal	Symbol
Sodium	
	Pb

[2]

(b) Some of the characteristic physical properties and related uses of three metals are given in the table below. Complete the table.

Metal	Physical property	Related use of metal
Silver	Shiny	Jewellery
Copper	Conducts heat	
Aluminium		Overhead power cables

[2]

(c) Magnesium metal burns in air with a brilliant white flame. Write a balanced symbol equation for this reaction.

_____ [3]

(d) (i) Magnesium metal reacts very slowly with cold water but readily with steam. Draw a labelled diagram of the assembled apparatus used to react magnesium with steam **and** to collect the gaseous product.

[5]

Examiner Only	
Marks	Remark

(ii) Write a balanced symbol equation for the reaction of magnesium with steam.

_____ [2]

(iii) Name a metal which **does not** react with cold water but does react with steam.

_____ [1]

(e) (i) Describe what is observed when a strip of magnesium metal is added to dilute hydrochloric acid.

_____ [3]

(ii) When magnesium reacts with dilute hydrochloric acid a compound and an element are formed. Name the compound and the element.

Compound: _____

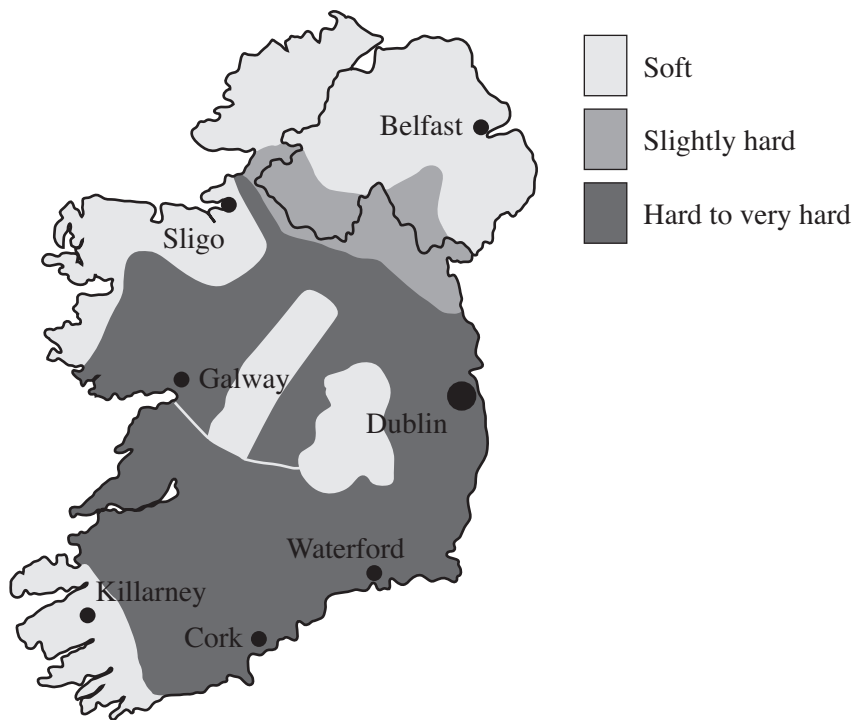
Element: _____ [2]

Examiner Only

Marks

Remark

- 4 (a) Various regions of Ireland have hard water. The map below shows the hardness of water throughout Ireland.



- (i) What is meant by the term hard water?

_____ [2]

- (ii) Name two physical features you would expect to find in a hard water region.

_____ [2]

Examiner Only	
Marks	Remark

(iii) Explain, giving practical details, how you would test a sample of tap water to prove that it was hard water.

[3]

Quality of Written Communication

[2]

(iv) State one disadvantage of hardness in water.

[1]

(b) Hard water is used for brewing beer. In soft water regions a soluble calcium compound is added to the water used for brewing to make it hard.

Due to copyright, an image of a beer bottle has been removed which is not essential to answer the question.

(i) Name one calcium compound which could be added to the soft water to make it hard.

[1]

Examiner Only	
Marks	Remark

- (ii) Complete the following passage using the words below. Each word may be used once, more than once or not at all.

solute

hydrated

solvent

solution

dissolves

saturated

The soluble calcium compound _____ in the water to form a _____.

The soluble calcium compound is the _____ and the water is the _____. [4]

- (iii) Apart from brewing beer, state another advantage of hardness in water.

_____ [1]

- (c) Hardness in water can be either temporary or permanent.

- (i) State one method which will only remove temporary hardness from water.

_____ [1]

- (ii) Name a chemical which will remove hardness when added to both types of hard water.

_____ [1]

Examiner Only

Marks

Remark

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(Questions continue overleaf)

5 (a) Fill in the gaps in the following sentence.

The masses of all atoms are compared to the mass of a single isotope of the element _____ which has a mass of _____. [2]

(b) Most metals are found naturally in rocks called ores. Some examples are shown in the table below.

Metal ore	Formula of ore
Galena	PbS
Haematite	Fe ₂ O ₃
Chalcocite	Cu ₂ S

Calculate the relative formula mass (RFM) of each of the ores below. (Relative atomic masses: O = 16; S = 32; Fe = 56; Pb = 207)

(i) Galena

RFM _____ [1]

(ii) Haematite

RFM _____ [1]

(c) Chalcocite contains the element copper. Copper has two stable isotopes, ${}^{63}_{29}\text{Cu}$ and ${}^{65}_{29}\text{Cu}$.

(i) What is meant by the term isotopes?

_____ [2]

(ii) How many neutrons are there in an atom of ${}^{63}_{29}\text{Cu}$?

_____ [1]

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Marks Remark

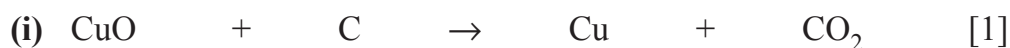
- (d) (i) The relative formula mass of another metal ore was calculated to be 102.
The molecular formula of this ore can be represented as X_2O_3 . Use this information to calculate the relative atomic mass of metal X.

Relative atomic mass = _____ [2]

- (ii) Use your Periodic Table to identify metal X.

_____ [1]

- (e) The equations below are for reactions involved in the extraction of metals from their ores. Balance the equations.



THIS IS THE END OF THE QUESTION PAPER

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