

New Specification



Rewarding Learning

General Certificate of Secondary Education
2012–2013

Centre Number

71	
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Candidate Number

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Double Award Science: Chemistry

Unit C1

Foundation Tier

[GSD21]

TUESDAY 13 NOVEMBER 2012, MORNING



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 nine** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 70.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in Question 5.
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	
6	
7	
8	
9	
Total Marks	



1 A new type of **hazard symbol** will soon be used on containers of all dangerous substances. These symbols have been internationally agreed.

(a) Why do hazard symbols need to be internationally agreed?

_____ [1]

(b) Give two **other** reasons why containers of certain substances are labelled using hazard symbols.

1. _____

2. _____

_____ [2]

Examiner Only	
Marks	Remark

2 Some golf clubs are made from steel, which is an alloy of iron and carbon, and from the metallic elements titanium and tungsten.

(a) Complete the sentence below to explain the meaning of the term alloy.

Circle the correct words.

An alloy is a

compound

mixture

molecule

of two or more

atoms

substances

elements

one of which is a

metal

non-metal

solid.

[3]

(b) Explain why titanium, tungsten, iron and carbon can be described as elements.

_____ [1]

(c) Give **two** properties you would expect titanium, tungsten and iron to have.

1. _____

2. _____ [2]

(d) Complete the table below which gives information about an atom of iron.

Name of element	Mass number	Atomic number	Number of protons	Number of neutrons	Number of electrons
iron	56		26		

[3]

Examiner Only

Marks

Remark

3 Carbon dioxide (CO₂) is a gas at room temperature and is made from two different elements covalently bonded together.

(a) How many carbon atoms are there in a molecule of carbon dioxide?

_____ [1]

(b) Place a tick (✓) in the box beside the phrase which best describes a single covalent bond.

one electron shared between 2 atoms

attraction between 2 atoms

a shared pair of electrons

the transfer of a pair of electrons [1]

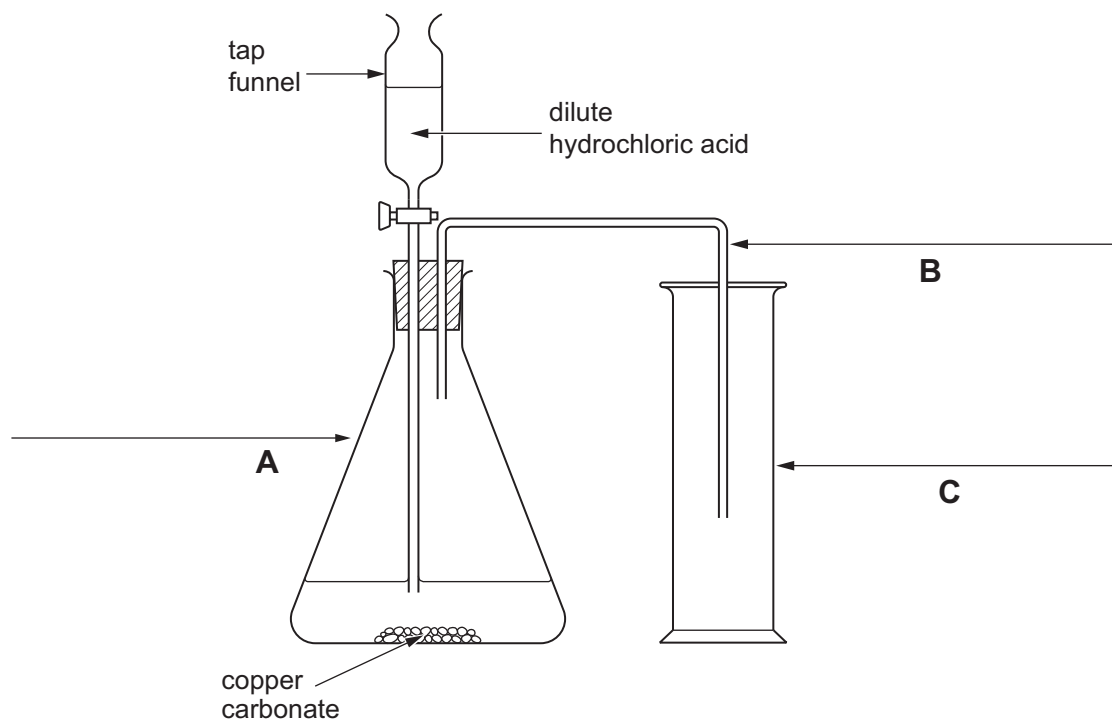
(c) Carbon dioxide dissolves in water to produce an acidic solution.

Describe how you would test a solution of carbon dioxide to find the strength of the acid.

_____ [2]

Examiner Only	
Marks	Remark

Carbon dioxide can be produced using the apparatus drawn below.



conical flask	beaker	gas jar
filter funnel	delivery tube	test tube

(d) Choose from the terms in the box above to complete the labels **A**, **B** and **C** on the diagram.

[3]

(e) Describe how you would carry out a test for carbon dioxide.

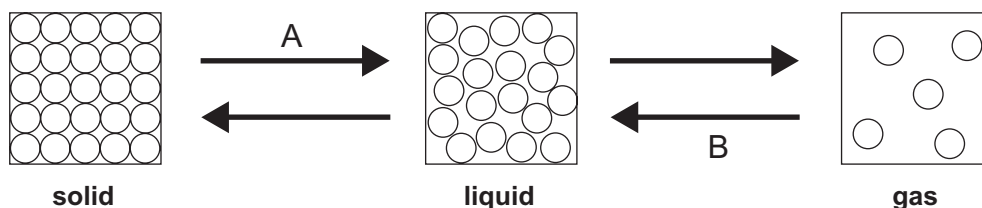
[3]

(f) Carbon dioxide sublimes. Suggest why solid carbon dioxide is also called 'dry ice'.

[1]

Examiner Only	
Marks	Remark

- 4 Zinc is a grey solid at room temperature. It has a melting point of 420°C and a boiling point of 907°C . The diagrams below show the arrangement of particles in zinc when it is a solid, a liquid and a gas.



- (a) Name the changes of state labelled A and B.

A _____

B _____ [2]

- (b) How would you produce liquid zinc from solid zinc?

_____ [2]

- (c) Complete the sentence below to explain what is meant by the term boiling point.

Circle the correct words.

Boiling point is the

temperature
time
volume

 at which a

solid
liquid
gas

 changes to a

solid
liquid
gas

 .

[3]

Examiner Only

Marks Remark

6 In the 1860s, John Newlands and Dmitri Mendeleev were two of the scientists who tried to bring order to the vast amount of information known at that time about the elements.

(a) Newlands stated that when the elements were arranged in order of atomic mass similar properties occurred every 8th element.

(i) What is the name of this law stated by Newlands?

_____ [1]

(ii) Give **one** reason why this pattern was not taken seriously by many scientists.

_____ [1]

Mendeleev also arranged the elements in order of atomic mass but his pattern was taken more seriously than that of Newlands.

(b) Give **two** reasons why the table of elements prepared by Mendeleev was better than the one prepared by Newlands.

1. _____

2. _____
_____ [2]

The modern Periodic Table contains more elements than the Periodic Table developed by Mendeleev.

(c) Give **two** other differences between the modern Periodic Table and Mendeleev's Periodic Table.

1. _____

2. _____
_____ [2]

Examiner Only	
Marks	Remark

Part of the modern Periodic Table is shown below.

H						He
	Be				O	Ne
Na			Si		S	Cl
K						

(d) Use **only** the elements shown above to answer the following questions.

(i) Give the **symbol** for a non-metal element which is a gas at room temperature and is green in colour.

_____ [1]

(ii) Which **two** elements are stored under oil?

_____ and _____ [1]

(iii) Name the element which has four electrons in its outer shell.

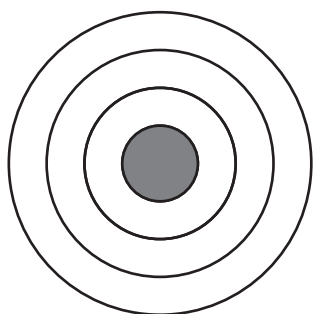
_____ [2]

Examiner Only

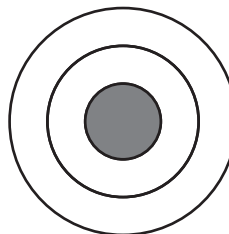
Marks Remark

7 Sodium oxide is an ionic compound which can be formed by the reaction between sodium and oxygen.

(a) Complete the diagrams below to show **all** the electrons in a sodium atom and an oxygen atom.



sodium atom



oxygen atom

[2]

(b) Explain how an oxide ion is formed from an oxygen atom.

[2]

(c) What is the charge on a sodium ion?

[1]

(d) How many sodium atoms react with one atom of oxygen?

[1]

(e) Use your answer to part (d) to write the formula for the compound sodium oxide.

[1]

(f) How are the ions held together in the compound?

[1]

Examiner Only

Marks Remark

(g) Sodium oxide is a typical ionic solid.

Give **two** physical properties you expect sodium oxide to have.

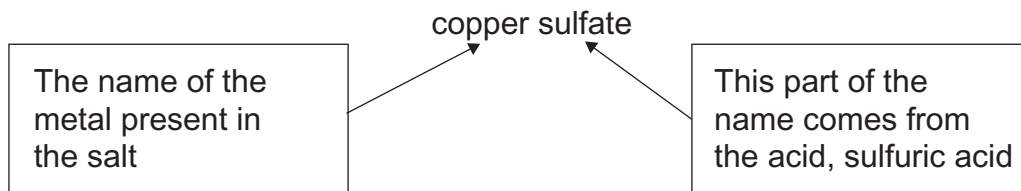
1. _____

2. _____ [2]

Examiner Only	
Marks	Remark

8 Read the following information carefully.

Copper oxide, a black solid, reacts with sulfuric acid and ethanoic acid to form two different salts. Salt is a general name given to one of the compounds formed when an acid is neutralised. The salt formed between copper oxide and sulfuric acid is called copper sulfate.



Name of acid	Name of salt produced when the acid reacts
hydrochloric acid	chloride
nitric acid	nitrate
sulfuric acid	sulfate
phosphoric acid	phosphate
ethanoic acid	ethanoate

(a) Name the salt formed when copper oxide reacts with ethanoic acid.

_____ [1]

(b) What is the name given to the type of reaction between an acid and a base to form a salt and water only?

_____ [1]

(c) Write a balanced symbol equation for the reaction between copper oxide and sulfuric acid.

_____ [2]

(d) Describe what you would observe when copper oxide reacts with sulfuric acid.

_____ [2]

Examiner Only	
Marks	Remark

(e) Name the acid which will react with copper oxide to form copper nitrate.

_____ [1]

Copper oxide reacts faster with 1 mol/dm³ of sulfuric acid than with 1 mol/dm³ of ethanoic acid.

(f) What does this tell you about the strength of sulfuric acid and ethanoic acid of the same concentration?

_____ [2]

Examiner Only	
Marks	Remark

9 Lithium chloride conducts electricity when it is molten but sulfur does not.

(a) Draw a labelled diagram of apparatus that can be used in a school laboratory to test if a molten compound conducts electricity.

[4]

(b) Why can molten lithium chloride conduct electricity?

[1]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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