



General Certificate of Secondary Education  
2010–2011

Centre Number

71

Candidate Number

## Science: Double Award (Modular)

Using Materials and Understanding Reactions  
End of Module Test

Foundation Tier

# B

[GDB01]



THURSDAY 24 FEBRUARY 2011, MORNING

### TIME

45 minutes.

### 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 thirteen** questions.

### INFORMATION FOR CANDIDATES

The total mark for this paper is 50.  
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 your use.

For Examiner's  
use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	

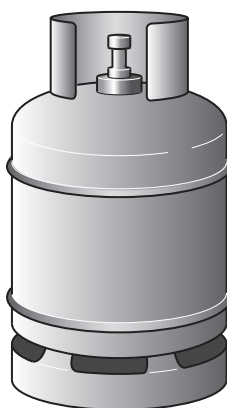
Total  
Marks



- 1 The picture below shows a cylinder of hydrogen gas and a cylinder of helium gas. There is a hazard symbol on the cylinder of hydrogen but not on the helium cylinder.



hydrogen



helium

- (a) Give **two** reasons why **hazard symbols** are used on some gas cylinders.

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[2]

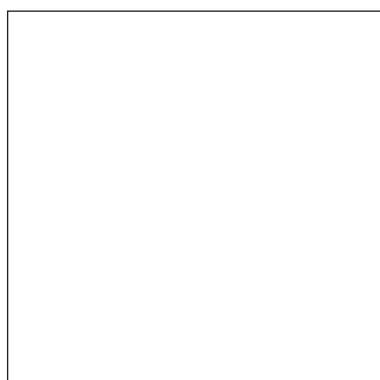
- (b) Why is the hazard symbol shown on the cylinder of hydrogen **not** shown on the cylinder of helium?

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[1]

Many gas cylinders can explode if they are punctured.

- (c) In the box below draw the hazard symbol which is displayed on a cylinder of an **explosive** gas.



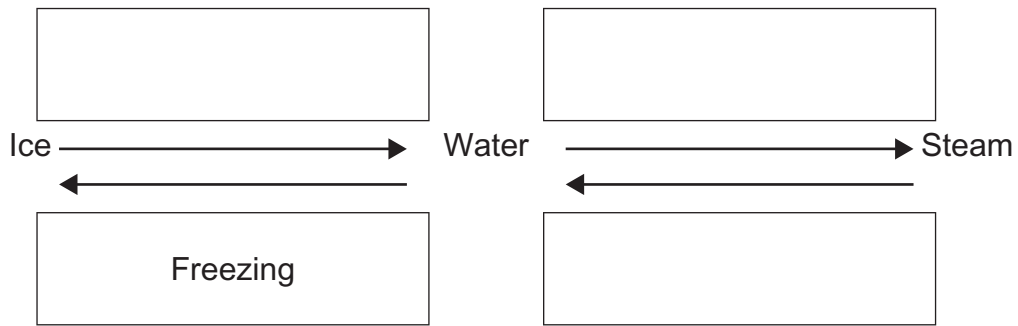
[1]

Examiner Only

Marks Remark

2 There are **three** states of matter. The diagram below shows the changes of state of water.

Complete the diagram below which shows these changes of state.



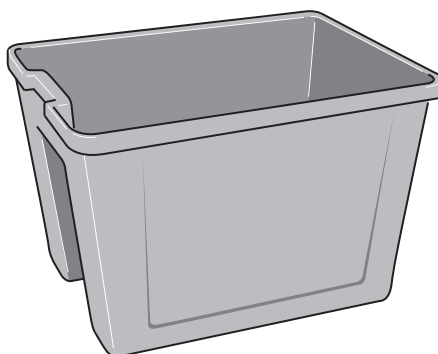
[3]

Examiner Only	
Marks	Remark

- 3 Recycling boxes are a familiar sight in many towns and cities. They are used to recycle man-made materials.



Box 1



Box 2

- (a) Complete the table below to show the types of man-made material recycled in Box 1. One has been done for you.

Object in Box 1	Type of man-made material
shopping bags	plastic
bottles	
fizzy drinks cans	

[2]

Box 2 is used to recycle man-made fibres.

- (b) Give an example of a man-made fibre.

\_\_\_\_\_ [1]

- (c) What **type** of man-made material is transparent and brittle?

\_\_\_\_\_ [1]

Examiner Only

Marks Remark



- 5 Many people take tablets at different times. Soluble tablets are dropped into a glass of water and dissolved.



- (a) Give three ways of helping a tablet to dissolve in water.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_ [3]

- (b) Circle the word from the list below which describes a tablet which is soluble.

solvent      solute      solution      saturated      [1]

Examiner Only	
Marks	Remark

6 Read the following passage carefully and answer the questions below.

Car engines burn petrol or diesel. These fuels can produce gases which pollute the air. Car manufacturers are developing car engines which will be able to use hydrogen as a fuel. Hydrogen burns to produce water which will not cause air pollution.

(a) Explain why hydrogen is an **element**.

\_\_\_\_\_  
\_\_\_\_\_ [1]

(b) Explain why water is a **compound**.

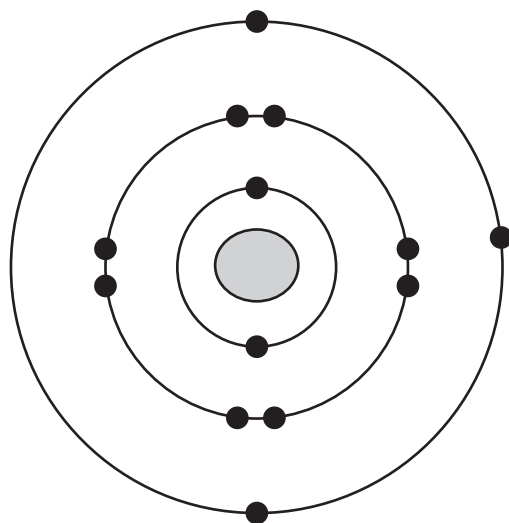
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

(c) Why can air **not** be described as a **compound**?

\_\_\_\_\_  
\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

- 7 The diagram below shows the electronic structure of an atom of aluminium.



- (a) Complete the table below to show the number of electrons, protons and neutrons in an atom of aluminium. You may find your Data Leaflet helpful.

Name of particle	Number present in an atom of aluminium
proton	
electron	
neutron	

[3]

- (b) How many **shells** are there in an atom of aluminium?

\_\_\_\_\_ [1]

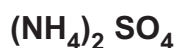
Examiner Only

Marks

Remark



8 The chemical formula for ammonium sulphate is:



(a) How many **different** elements are there in this compound?

\_\_\_\_\_ [1]

(b) How many hydrogen atoms are there in one molecule of ammonium sulphate?

\_\_\_\_\_ [1]

(c) What is the total number of atoms in one molecule of ammonium sulphate?

\_\_\_\_\_ [1]

9 Oxygen is a mixture of  $^{16}\text{O}$  and  $^{18}\text{O}$ .

You may find your Data Leaflet helpful.

(a) Explain, in terms of particles, how the nucleus of  $^{16}\text{O}$  is different from the nucleus of  $^{18}\text{O}$ .

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

(b) Complete the sentence below using a phrase from the list.

**just as reactive as      more reactive than      less reactive than**

Atoms of  $^{16}\text{O}$  are \_\_\_\_\_ atoms of  $^{18}\text{O}$ . [1]

Examiner Only

Marks Remark

**10** When sulphuric acid is added to copper carbonate a chemical reaction occurs.

**(a) (i)** Complete the symbol equation for the reaction of copper carbonate with dilute sulphuric acid.



**(ii)** What colour change would you observe during this reaction?

\_\_\_\_\_ to \_\_\_\_\_ [2]

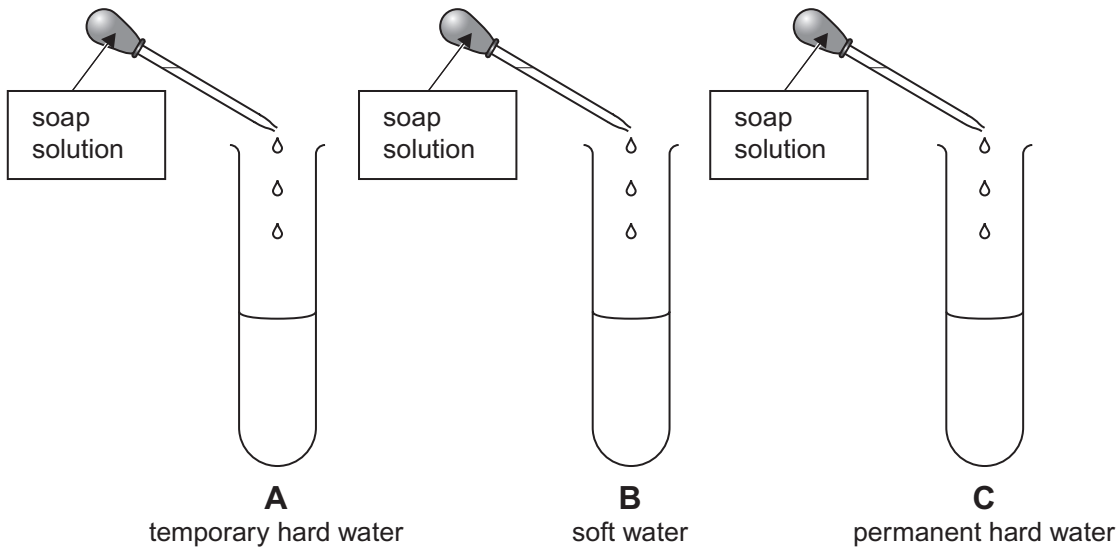
**(b)** If hydrochloric acid is added to copper carbonate, what gas would be produced?

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

11 An experiment was carried out to investigate the effect of soap and detergent on three different water samples **A**, **B** and **C**.

Examiner Only	
Marks	Remark



Each test tube was shaken after the three drops of soap solution were added. The experiment was then repeated with fresh water samples, using detergent instead of soap.

(a) Complete the results table below to show what would be observed for each water sample.

Water sample	Observation with soap	Observation with detergent
<b>A</b> temporary hard	no lather	
<b>B</b> soft		lather
<b>C</b> permanent hard		

[2]

(b) Explain what is meant by the term **temporary** hard water.

\_\_\_\_\_

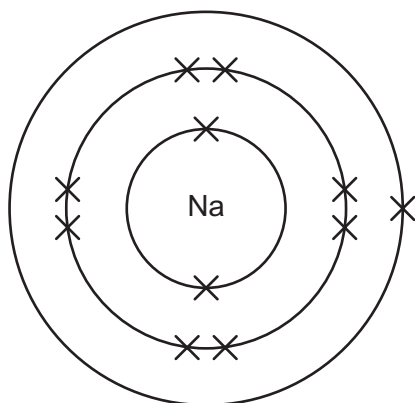
\_\_\_\_\_ [1]

(c) Give one advantage and one disadvantage of hard water.

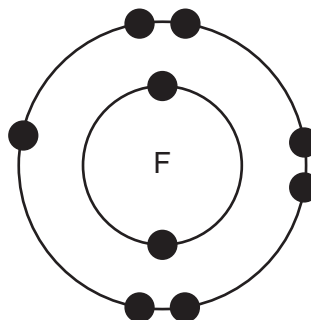
Advantage \_\_\_\_\_

Disadvantage \_\_\_\_\_ [2]

- 12 When sodium reacts with fluorine it forms a compound called sodium fluoride. The electronic structures of a sodium atom and fluorine atom are shown below.



sodium atom



fluorine atom

- (a) Draw the electronic structures for the **ions** produced from these atoms in the space below and include their charges.

**sodium ion**

**fluoride ion**

[2]

Charge on sodium ion \_\_\_\_\_

Charge on fluoride ion \_\_\_\_\_ [1]

- (b) The force joining these ions together is described as:

**electrostatic**

**electronic**

**magnetic**

Circle the correct answer.

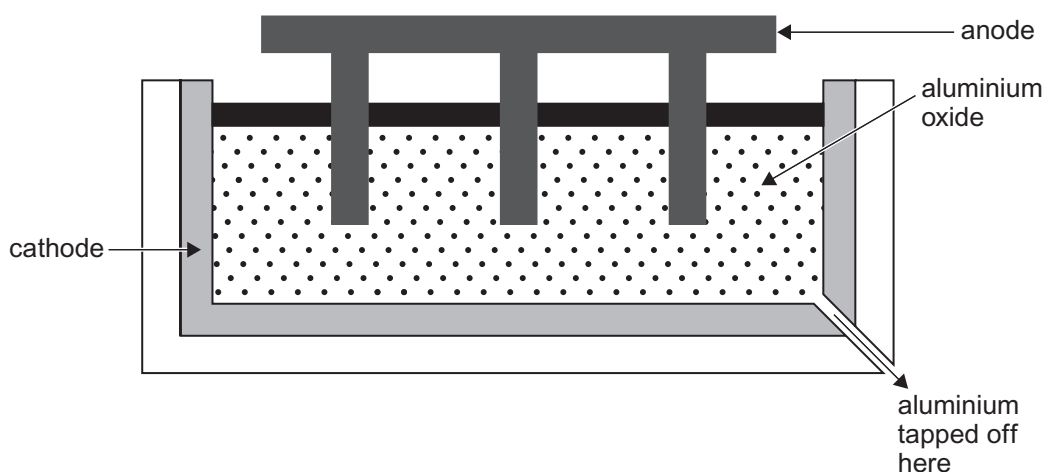
[1]

Examiner Only

Marks

Remark

- 13 Aluminium metal is produced by passing electricity through a cell containing molten aluminium oxide.



The aluminium is formed at the cathode.

- (a) What is the meaning of the term **cathode**?

\_\_\_\_\_  
\_\_\_\_\_ [1]

- (b) Name the substance which is used to make the **anode**.

\_\_\_\_\_ [1]

- (c) What substance is formed at the **anode** during this reaction?

\_\_\_\_\_ [1]

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**THIS IS THE END OF THE QUESTION PAPER**

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Marks Remark





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