CCEA GCSE SCIENCE: DOUBLE AWARD (MODULAR)

SCIENCE



EXAM QUESTION PACK

END OF MODULE TEST B FOUNDATION TIER GDB01 PAPERS

STEMUP

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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Using Materials and Understanding Reactions
End of Module Test

Foundation Tier

B

[GDB01]

GDB01

MONDAY 21 MAY 2012, 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 twelve** 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.

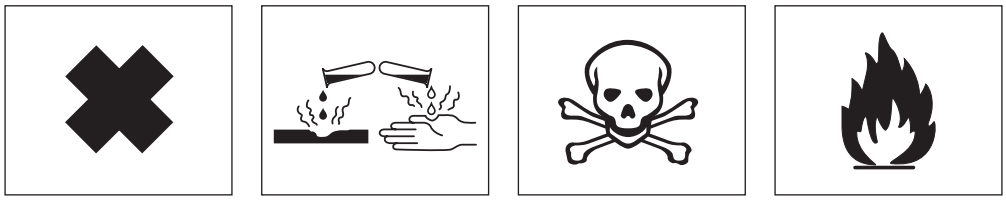
For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total Marks	

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Examiner Only	
Marks	Remark

1 Containers of dangerous chemicals must display a hazard symbol.

(a) Four hazard symbols are shown below.



A **B** **C** **D**

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(i) Explain why these symbols are called **hazard** symbols.

_____ [1]

(ii) Why is it better to use hazard **symbols** rather than words?

_____

_____ [1]

(b) **(i)** Which of the hazard symbols, **A**, **B**, **C** or **D** should be placed on a can of petrol?

_____ [1]

(ii) Sulphuric acid is a corrosive chemical. Which of the hazard symbols, **A**, **B**, **C** or **D** should be placed on a bottle of sulphuric acid?

_____ [1]

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2 The table below gives 3 different properties of materials.

(a) Place a tick (✓) in the spaces to show properties of ceramics, fibres and glass. Properties of metals have been completed for you.

Property	metal	ceramic	fibre	glass
electrical insulator				
brittle				
malleable	✓			

[3]

(b) Plastics are another type of man-made material. Plastics can be **thermosetting** or **thermosoftening**.

(i) Explain what is meant by the term **thermosoftening**.

_____

_____ [1]

(ii) Give **one** example of a **thermosoftening** plastic.

_____ [1]

Examiner Only

Marks	Remark

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3 Choose from the following words to complete the sentences below.

Examiner Only	
Marks	Remark

solution **solvent** **solubility** **melts**

dissolves **saturated** **solute**

When salt is added to water it _____ .

A _____ of salty water is formed.

The water is called the _____ .

If the temperature is raised the _____ of the salt increases. [4]

Examiner Only	
Marks	Remark

4 You may use your Data Leaflet to help you answer this question. Circle the correct answer. One has been done for you.

The element with the symbol S is:

(sulphur) sodium selenium

(a) The correct symbol for the aluminium **ion** is:

Al Al^{3-} Al^{3+} [1]

(b) **Ca** is the chemical symbol for the element:

californium calcium caesium [1]

(c) The correct chemical formula for **magnesium sulphate** is:

$MGSO_4$ $MgSo_4$ $MgSO_4$ [1]

(d) The name of the compound with the formula $\mathbf{K_2CO_3}$ is:

potassium cobalt | potassium carbon dioxide | potassium carbonate [1]

(e) $2Mg + O_2 \longrightarrow 2MgO$ is an example of a:

word equation symbol equation ionic equation [1]

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5 This question is about chemical terms and their meanings. Choose from the chemical terms below to complete the table. The first one has been done for you.

element	**saturated**	**neutralisation**
proton	**compound**	**electron**
hydrated	**reduction**	**neutron**

Meaning	Chemical term
the particle in an atom which can be found in shells around the nucleus	electron
two or more types of atom which are chemically combined	
a salt which contains water of crystallisation	
the particle in an atom that has no charge	
the reaction of an acid and a base	

[4]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

6 People use materials for different reasons.

(a) Give **two** reasons why copper is used to make coins.

1. _____

_____

2. _____

_____ [2]

(b) Give **two** reasons why plastic is used to make milk cartons.



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1. _____

_____

2. _____

_____ [2]

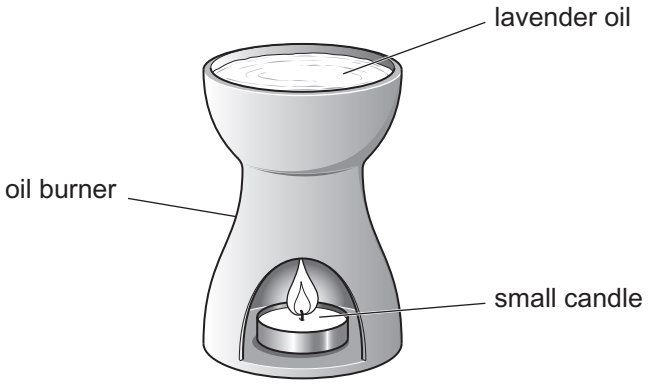
7 The table below shows some information about three elements. Complete the table by filling in the missing information. You may find your Data Leaflet useful.

Element	Number of protons	Number of neutrons	Number of electrons	Electronic configuration
	5	6		2,3
sodium	11		11	2,8,1
phosphorus	15	16	15	

[4]

Examiner Only	
Marks	Remark

8 Oil burners are used with oils, such as lavender oil, to give the air in a room a pleasant scent.



When the lavender oil is poured into the top of the burner the scent spreads around the room. When the candle is lit the scent becomes stronger.

(a) Name the process by which the scent spreads around the room.

_____ [1]

(b) Using the idea of particles, explain why the scent is stronger when the candle is lit.

_____

_____

_____

_____

_____ [2]

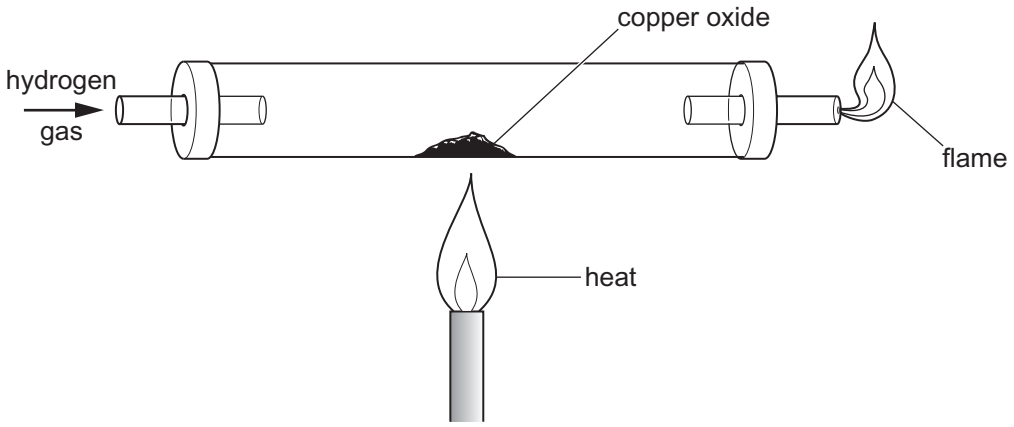
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

9 Hydrogen gas is passed over heated copper oxide as shown in the diagram below.



copper oxide + hydrogen ⟶ copper + water

In this reaction one substance has been oxidised and one substance has been reduced.

(a) What is the name given to this **type** of reaction?

_____ [1]

(b) Which substance has been **oxidised** in this reaction?

_____ [1]

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

_____ [2]

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10 This question is about electrolysis.

Examiner Only	
Marks	Remark

(a) Complete the passage below.

Some substances can be broken down into simpler substances using _____ . This is called electrolysis and can happen when the substance is _____ or _____ . [3]

(b) In electrolysis what is the **cathode**?

_____ [1]

(c) Name a **metal** which is produced by the electrolysis of the metal oxide.

_____ [1]

11 The following experiment was carried out to investigate the hardness of **two** samples of hard water.

Step 1 Place the two water samples into separate test tubes.

Step 2 Add 1 cm^3 of soap solution to each test tube and shake.

Step 3 Repeat Step 2 until a permanent lather is formed.

(a) How can you ensure that this is a fair test?

_____ [1]

(b) How would you use the results of this experiment to compare the hardness of the two samples?

_____

_____

_____ [1]

(c) Name the type of hardness which can be removed by boiling. Give a disadvantage of this type of hardness.

Type of hardness _____

Disadvantage _____

_____ [2]

Examiner Only	
Marks	Remark

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12 Calcium reacts with chlorine to form the compound calcium chloride.

Explain fully, in terms of electrons, how the compound calcium chloride is formed from calcium and chlorine. You may use diagrams if you wish.

[4]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Using Materials and Understanding Reactions End of Module Test

Foundation Tier

[GDB01]

MONDAY 21 MAY 2012
9.15 am–10.00 am

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	**(i)**	Idea of warning of danger [1]	
		(ii)	Idea of more eye-catching/idea of ease of recognition if a person cannot read/or does not speak the language [1]	
	(b)	**(i)**	Symbol D [1]	
		(ii)	Symbol B [1]	4

2 **(a)**

Property	**metal**	**ceramic**	**fibre**	**glass**
electrical insulator		✓	✓	✓
brittle		✓		✓
malleable				

[1] for each correct column [3]

(b) **(i)** Idea that the plastic softens when heated/can be reshaped when heated [1]

(ii) Polythene/PVC/polystyrene or other correct [1] 5

3 dissolves [1]
solution [1]
solvent [1]
solubility [1] 4
(in this order)

4 **(a)** Al^{3+} [1]

(b) Calcium [1]

(c) $MgSO_4$ [1]

(d) Potassium carbonate [1]

(e) Symbol equation [1] 5

5 compound [1]
hydrated [1]
neutron [1]
neutralisation [1] 4

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		AVAILABLE MARKS
6	**(a)** Any **two** of hard/unreactive/sonorous/durable/shiny or other correct accept idea of malleable (2 × [1]) [2]	
	(b) Any **two** of unreactive, low density, cheap, easily moulded or other correct (2 × [1]) [2]	4

7

Element	Number of protons	Number of neutrons	Number of electrons	Electronic configuration
boron	5	6	**5**	2,3
sodium	11	**12**	11	2,8,1
phosphorous	15	16	15	**2,8,5**

[4] 4

8 **(a)** Diffusion [1]

(b) Idea of particles gaining energy **or** move faster [1]
idea that **more** particles have the energy to change from liquid to gas leave the liquid and go into the air [1] 3

9 **(a)** redox **not** R**a**dox [1]

(b) Hydrogen [1]

(c) $CuO + H_2 \longrightarrow Cu + H_2O$
[1] [1] [2] 4

10 **(a)** Some substances can be broken down into simpler substances using **electricity** [1]. This is called electrolysis and can happen when the substance **is molten** [1]/**or in solution** [1]. (Any order)
Accept dissolved **or** aqueous [3]

(b) The **negative electrode** [1]

(c) Any suitable metal, e.g. aluminium [1] 5

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			AVAILABLE MARKS
11	**(a)**	Idea of the same volume of water sample used [1]	
	(b)	Idea that the more soap solution needed to produce a permanent lather the harder the water or the less soap solution needed to form a permanent lather the softer the water **not** idea of time [1]	
	(c)	Temporary [1] Produces scale when heated/wastes soap/may lead to blocked hot water pipes/idea that scale can form on heating elements of kettles reducing efficiency/or other suitable, e.g. formation of scum with soap [1]	4
12		Candidate indicates by drawing, by use of electronic configurations or by statement the following points: Calcium loses two electrons [1] Chlorine atoms each gain 1 electron [1] 2:1 ratio [1] Ionic bond/electrostatic attraction/oppositely charged ions [1] [4]	4
		Total	**50**

Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Using Materials and Understanding Reactions
End of Module Test
Foundation Tier

[GDB01]

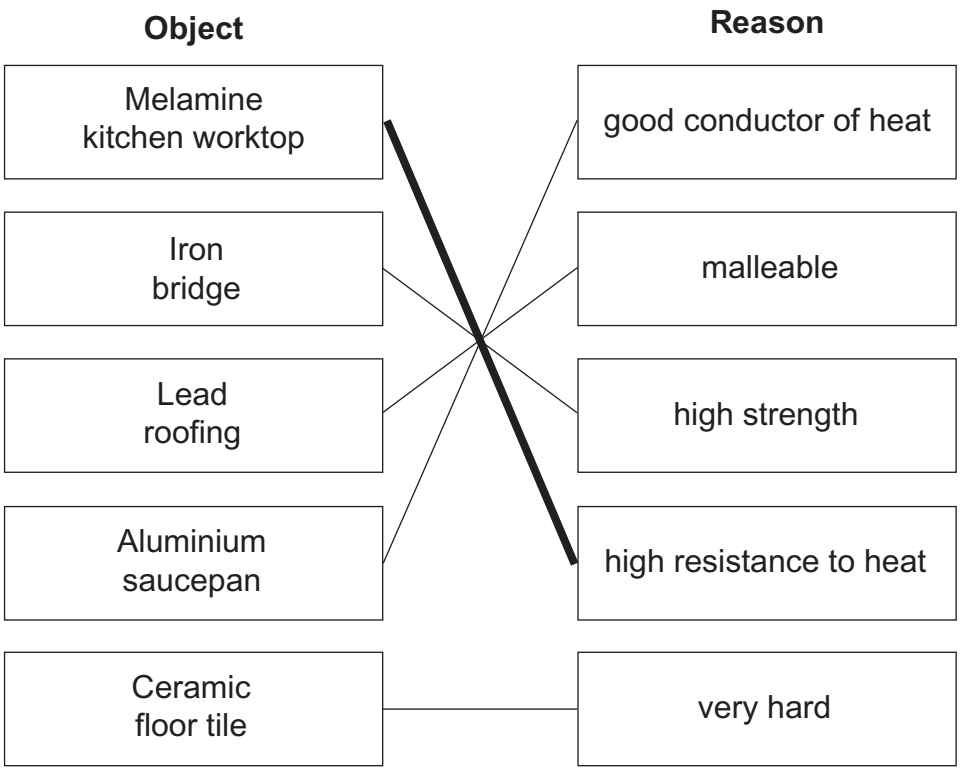
TUESDAY 28 FEBRUARY 2012
11.00 am–11.45 am

MARK SCHEME

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					AVAILABLE MARKS
1	**(a)**	**(i)**	Harmful/irritant	[1]	
		(ii)	Toxic/poisonous	[1]	
	(b)	Students tick the boxes beside the following statements. They are eye-catching they warn of danger they can be understood by people who cannot read All 3 correct 2 marks 2 correct 1 mark 1 correct 0 marks		[2]	4

2 **(a)**



4 correct 3 marks
3 correct 2 marks
2 correct 1 mark [3]

(b) **(i)** Ceramic/floor tiles [1]

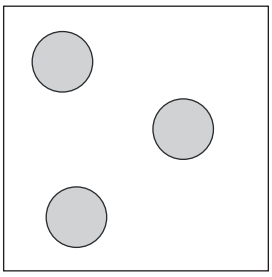
(ii) aluminium/lead/iron Ignore mention of object [1] 5

3 **(a)** **(i)** Mixture [1]

(ii) Compound [1]

(b) Paint is not soluble in water [1] 3

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			AVAILABLE MARKS
4	**(a)** Ca	[1]	
	(b) H_2O	[1]	
	(c) H^+	[1]	3
5	**(a)** **(i)** Zinc chloride	[1]	
	(ii) Sulphuric acid	[1]	
	(b) **(i)** base	[1]	
	(ii) salt	[1]	4
6	**(a)** B evaporating/boiling D condensing	[1] [1]	
	(b)  3 or more particles well spaced No apparent pattern	[1]	3
7	**(a)** Water which does not form a lather **with soap**	[1]	
	(b) Good taste/good for heart/tanning/beer/good for teeth and bones NOT healthier unqualified; NOT contains calcium ions	[1]	
	(c) Scale in pipes/scum **with soap**/wastes soap	[1]	
	(d) Ion exchange/adding washing soda/boiling	[1]	4
8	**(a)** **(i)** $NaHCO_3$	[1]	
	(ii) $FeSO_4$	[1]	
	(b) 6	[1]	
	(c) Zinc carbonate	[1]	4

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				AVAILABLE MARKS
9	**(a)**	Number of protons and neutrons [1] in (the nucleus of) an atom [1] or in the nucleus unless wrongly qualified	[2]	
	(b)	protons 15	[1]	
		electrons 15	[1]	
		neutrons 31 − 15 = 16	[1]	5
10	**(a)**	2,8 arrangement for sodium	[1]	
		2,8 arrangement for oxygen	[1]	
	(b)	Na_2O	[1]	3
11	**(a)**	metal oxide, non-metal oxide	[2]	
	(b)	hydrogen oxide/any suitable e.g. carbon monoxide	[1]	
	(c)	alkalis	[1]	4
12	**(a)**	nitrogen	[1]	
	(b)	as temperature increases solubility decreases [1] for (all) gases [1]	[2]	
	(c)	there is less oxygen (dissolved) in the water	[1]	4
13	**(a)**	electrolysis	[1]	
	(b)	cathode NOT negative	[1]	
	(c)	oxygen, carbon dioxide	[2]	4
			Total	**50**

Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

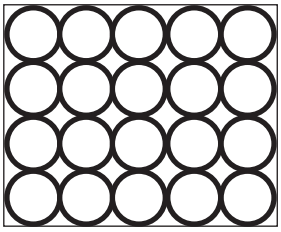
Using Materials and Understanding Reactions
End of Module Test
Foundation Tier

[GDB01]

WEDNESDAY 9 NOVEMBER 2011
9.15 am–10.00 am

MARK SCHEME

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			AVAILABLE MARKS
1	(a)	Hazard [1]	
	(b)	Idea of warning of danger or idea that people who cannot read will recognise the symbol [1] Do not allow the idea of eye-catching or different spoken languages	
	(c) (i)	Idea that the fuel is flammable [1]	
	(ii)	Idea that the plant food is harmful (allow irritant) [1]	4
2	(a)	high melting point [1]	
	(b)	metal/glass [1]	
	(c)	malleable [1] unreactive [1]	4
3	(a)	liquid to a gas [1]	
	(b)	saturated [1]	
	(c)	 [1]	
	(d)	chlorine *(**not** chloride)* [1]	4
4	(a)	low melting point dull low density brittle 3 correct = 2 2 correct = 1 [2]	
	(b)	magnesium hydroxide [1] sodium nitrate [1] [2]	4
5	(a) (i)	zinc chloride [1]	
	(ii)	sulphuric acid [1] [2]	
	(b) (i)	copper sulphate/zinc chloride [1]	
	(ii)	copper oxide [1]	4

			AVAILABLE MARKS
6	**(a)**	Any **two** from: sugar citric acid carbon dioxide [2]	
	(b)	water [1]	
	(c)	cola (drink) allow fizzy drink or sugar solution or citric acid solution [1]	
	(d)	carbon dioxide (gas) causes the drink to be fizzy [1] idea that the solubility of gases decreases as the temperature increases [1] [2]	6
7	**(a)**	3 different elements [1]	
	(b)	2 oxygen atoms [1]	
	(c)	5 [1]	
	(d)	1^- or -1 [1] *(**not** negative or −)*	
	(e)	hydrogen (ion) [1] allow H^+ *(**not** H)*	5
8	**(a)**	Idea that the brown colour has spread throughout the gas jars [1]	
	(b)	(3rd option) some of the oxygen moved into the lower jar and some of the bromine moved into the top gas jar [1]	
	(c)	diffusion [1]	3

9

Particle	Relative charge	Relative mass	Position in atom: shells/nucleus
proton	+1	1 [1]	nucleus [1]
electron	−1 [1]	$\frac{1}{1840}$	shells
neutron	0	1 [1]	nucleus

[4] 4

10	**(a)**	Soap (solution) [1]	
	(b)	Idea it takes most soap solution to produce a lather [1]	
	(c)	A [1]	
	(d)	C [1]	4

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	AVAILABLE MARKS

11

Mass number	Number of protons	Number of neutrons	Number of electrons
206	82	124	82
207	82	125	82
208	82	126	82
[1]	[1]	[1]	[1]

[4] 4

12 **(a)** False [1]

(b) True [1]

(c) True [1]

(d) True [1] 4

Total **50**

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Using Materials and Understanding Reactions
End of Module Test

Foundation Tier

B

[GDB01]

GDB01

THURSDAY 19 MAY 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

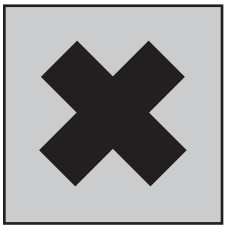
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
A Data Leaflet, which includes a Periodic Table of the elements, is provided for your use.

For Examiner's use only	
Question Number	Marks
1	
2	
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11	
12	
13	
Total Marks	

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Examiner Only	
Marks	Remark

1 The cleaners in the bucket shown below all have the same **hazard symbol** printed on their container.





(a) Give two reasons why **hazard symbols** are printed on containers of cleaners.

1. _____

_____

2. _____

_____ [2]

(b) What does the hazard symbol shown tell you about the substances used to make the cleaners?

_____ [1]

The substance used to make the cleaners is also poisonous.

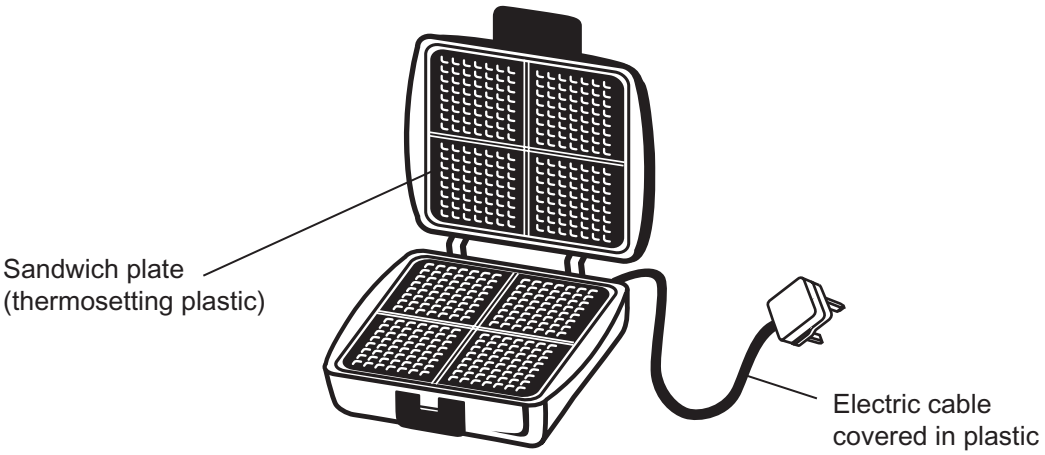
(c) In the box below, draw the hazard symbol for a poisonous substance.

[1]

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Examiner Only	
Marks	Remark

2 Plastic and metal are used to make this toasted sandwich maker.



(a) Why is a thermosetting plastic used to make the sandwich plate?

_____ [1]

(b) Why is the electric cable covered in plastic?

_____ [1]

The electric cable is made from copper which is a good conductor of electricity.

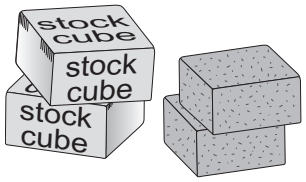
(c) What other property of copper makes it useful for making electrical wires?

_____ [1]

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Examiner Only	
Marks	Remark

3 The stock cubes shown in the photograph below can be dissolved in water and used to make soups.



(a) Give three ways in which the stock cubes can be helped to dissolve quickly.

1. _____

2. _____

3. _____ [3]

(b) Explain how you could make a **saturated** solution using stock cubes.

_____

_____

_____ [2]

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Examiner Only	
Marks	Remark

4 Use your Data Leaflet to help you answer this question.

Circle the correct answer in each part.

(a) The chemical symbol for potassium is:

Po K P [1]

(b) The formula for the sulphate ion is:

SO_3^{-2} SO_4 SO_4^{-2} [1]

(c) Cu is the chemical symbol for:

calcium copper carbon [1]

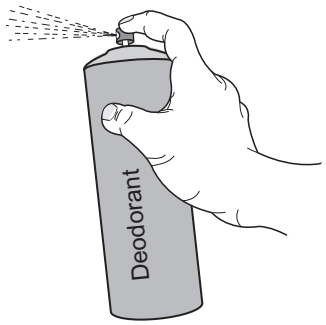
(d) Which of the following statements is true?

All ammonium salts are soluble. | All ammonium salts are insoluble. | Some ammonium salts are soluble. [1]

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Examiner Only	
Marks	Remark

5 Some deodorants are sold in an aerosol spray, similar to the one shown in the diagram below. Aerosols contain a **compressed** gas. When the button is pressed the gas is released carrying the deodorant with it.



(a) Explain, in terms of particles, why gases can be compressed.

_____

_____ [1]

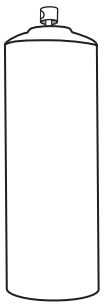
(b) The following warning is printed on aerosol cans.

Do not expose to temperatures above 50 °C

What happens to the volume of the gas in the aerosol can when the temperature is increased?

_____ [1]

(c) When the aerosol can is "empty", a small number of gas particles remain. Shade in the aerosol can below to show the position of the remaining gas particles in the container.



[1]

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Examiner Only	
Marks	Remark

6 This question is about atoms. Place a tick (✔) in the box beside each correct answer.

(a) Which one of the following statements about atoms is correct?

The number of protons, electrons and neutrons are always equal ☐

The number of protons and electrons are equal ☐

The number of protons and electrons always adds up to 8 ☐

[1]

(b) What name is given to a group of **different types** of atoms which are joined together?

a mixture ☐

an element ☐

a compound ☐

[1]

(c) Where can the neutrons in an atom be found?

in the nucleus ☐

in the shells around the nucleus ☐

in both the nucleus and the shells around the nucleus ☐

[1]

(d) What name is given to an atom which has lost or gained an electron?

a molecule ☐

a compound ☐

an ion ☐

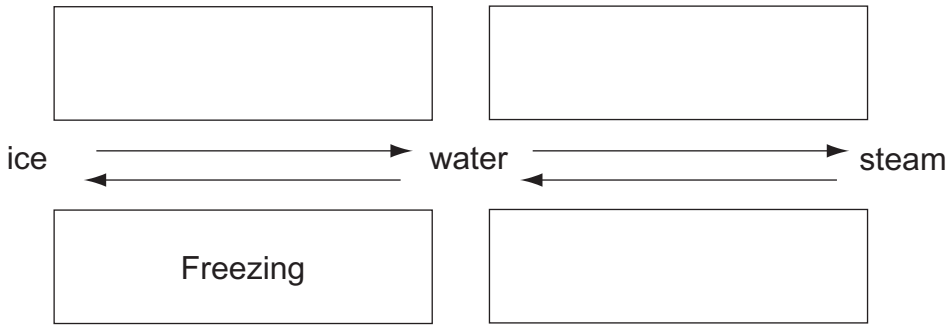
[1]

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Examiner Only	
Marks	Remark

7 Water changes to steam when it is heated. When water is cooled it eventually turns to ice.

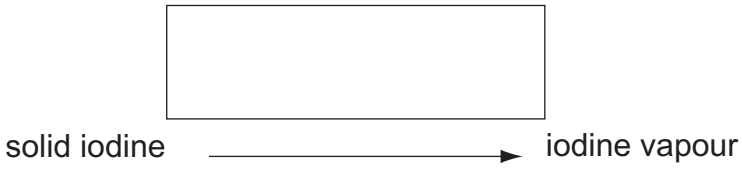
(a) Complete the diagram below to name these changes of state.



[3]

Iodine changes from the solid state to a gas without becoming a liquid.

(b) Complete the diagram below to name this change of state.



[1]

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8 The picture below shows some chips.



The smell from hot chips can quickly fill a room.

(a) Name the process which allows the smell to reach your nose.

_____ [1]

(b) Explain, with reference to the particles involved, why the smell from hot chips reaches your nose so quickly.

_____

_____ [2]

Examiner Only	
Marks	Remark

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9 This question is about chemical formulae.

You may find your Data Leaflet helpful.

(a) How many different **elements** are there in the compound Na_2CO_3?

_____ [1]

(b) Name the **compound** $KHCO_3$.

_____ [1]

(c) How many **atoms** are there in a $Cu(OH)_2$ molecule?

_____ [1]

(d) What is the correct formula for magnesium nitrate?

_____ [1]

Examiner Only	
Marks	Remark

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10 The table below has a list of oxides. Some of these react with acids to form salts.

(a) Complete the table by putting YES or NO in the appropriate boxes. The first one has been done for you.

name of oxide	**reacts with acids to form salts YES or NO**
zinc oxide	YES
nitrogen dioxide	
sodium oxide	
carbon dioxide	
calcium oxide	

[2]

(b) **(i)** What other compound, apart from a salt, is formed when an acid reacts with an oxide?

_____ [1]

(ii) What name is given to this **type** of chemical reaction?

_____ [1]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

11 The table below gives information about the atomic structure of five elements.

Use this information and your Data Leaflet to answer the questions which follow.

	number of electrons		
element	**1st shell**	**2nd shell**	**3rd shell**
A	2	1	
B	2	6	
C	2	4	
D	2	8	1
E	2	8	8

(a) Which element A, B, C, D or E has an atomic number of 6?

_____ [1]

(b) Which element A, B, C, D or E has a noble gas structure?

_____ [1]

(c) Which two of the elements A, B, C, D or E are **very** reactive?

_____ and _____ [1]

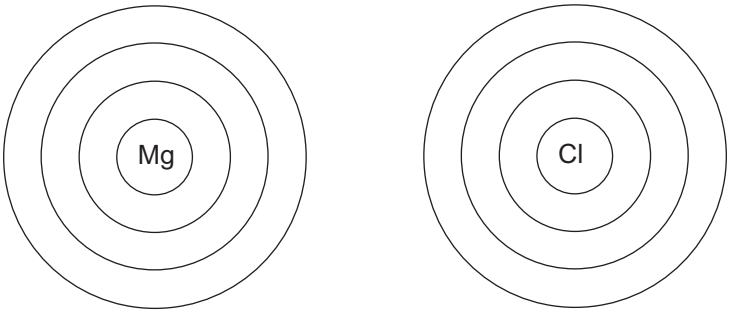
(d) Give the **name** of element D.

_____ [1]

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12 When magnesium reacts with chlorine it forms a compound called magnesium chloride.

(a) On the diagrams below show how **all** the electrons are arranged in a magnesium atom and in a chlorine atom.



magnesium atom

chlorine atom

[2]

(b) Use words or a diagram to explain how the electrons are rearranged to form magnesium chloride.

_____

_____

_____

_____

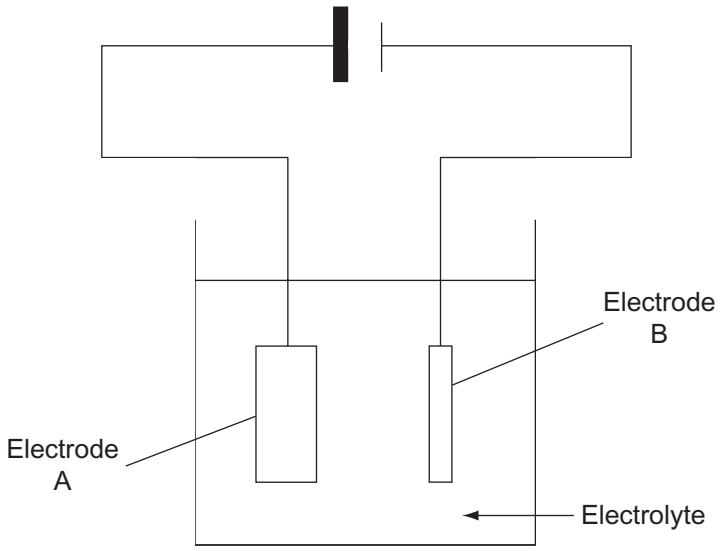
_____ [3]

Examiner Only

Marks	Remark

13 Copper metal is purified by the process of electrolysis.

Examiner Only	
Marks	Remark



(a) Name a suitable electrolyte for the purification of copper.

_____ [1]

(b) What material is used to make electrode B?

_____ [1]

(c) What happens to the mass of electrode A during the electrolysis?

_____ [1]

THIS IS THE END OF THE QUESTION PAPER

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111908

Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Double Award (Modular)

Using Materials and Understanding Reactions End of Module Test

Foundation Tier

[GDB01]

THURSDAY 19 MAY 2011, MORNING

MARK SCHEME

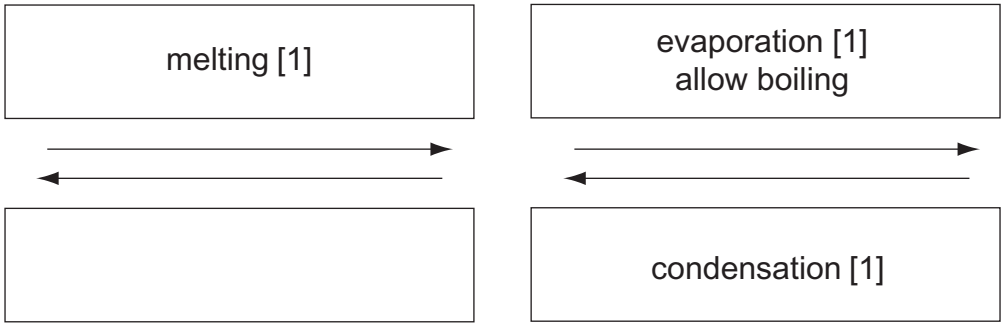
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			AVAILABLE MARKS
1	**(a)**	Hazard symbols are used to warn of the dangers of the chemical/are eye-catching/can be understood by people who cannot read/or those who speak different languages (any 2 × [1]) [2]	
	(b)	Harmful or irritant [1]	
	(c)	Poisonous  [1]	4
2	**(a)**	Idea of the plate retaining shape (when heated)/plate does not melt when heated **NOT** heat resistant [1]	
	(b)	The plastic covering does not conduct electricity/idea of protection against electric shock [1]	
	(c)	Copper is ductile/can be drawn into wires/unreactive/flexible **NOT** malleable [1]	3
3	**(a)**	Use hot/warm water/crush the cube/stir/use a large volume of water (any 3 × [1]) [3]	
	(b)	Continue to add cubes to the water [1] until there is solid left in the bottom of the solution [1] [2]	5
4	**(a)**	K [1]	
	(b)	SO_4^{-2} [1]	
	(c)	Copper [1]	
	(d)	All ammonium salts are soluble [1]	4
5	**(a)**	Idea that the particles are far apart as a gas. (The particles can be pressed closer together.) [1]	
	(b)	The volume does not change but allow idea that volume of the gas will increase (when the temperature is increased) allow idea of exploding [1]	
	(c)	Candidates must shade in all of the space [1]	3

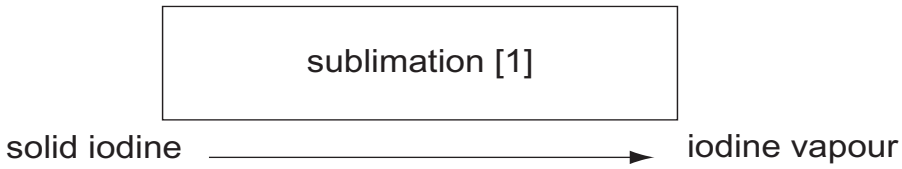
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				AVAILABLE MARKS
6	**(a)**	The number of protons and electrons are equal	[1]	
	(b)	a compound	[1]	
	(c)	In the nucleus	[1]	
	(d)	ion	[1]	4

7 **(a)**



(b)



[1] 4

8 **(a)** Diffusion [1]

(b) Idea that particles have energy from the heat [1]
Idea of fast particle movement [1] [2] 3

9 **(a)** 3 [1]

(b) potassium hydrogen carbonate [1]

(c) 5 [1]

(d) $Mg(NO_3)_2$ [1] 4

10 **(a)** sodium oxide, calcium oxide YES
nitrogen dioxide, carbon dioxide NO
4 correct = [2]; 2 or 3 correct = [1] [2]

(b) water [1]

(c) neutralisation [1] 4

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				AVAILABLE MARKS
11	**(a)**	C	[1]	
	(b)	E	[1]	
	(c)	Any 2 of A, B and D	[1]	
	(d)	sodium	[1]	4
12	**(a)**	magnesium 2, 8, 2 [1] chlorine 2, 8, 7 [1]	[2]	
	(b)	Mg loses 2 electrons [1] chlorine gains 1 electron [1] Idea that 2 chlorine atoms are needed [1] Idea of sharing loses first two marking points	[3]	5
13	**(a)**	copper sulphate	[1]	
	(b)	**pure** copper	[1]	
	(c)	goes down	[1]	3
			Total	**50**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Using Materials and Understanding Reactions
End of Module Test

Foundation Tier

B

[GDB01]

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

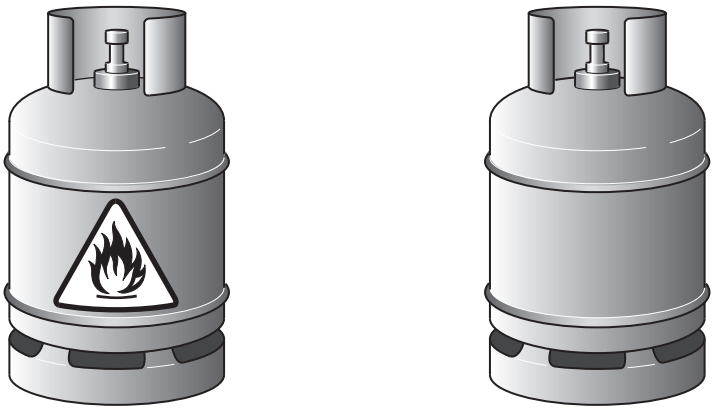
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
A Data Leaflet, which includes a Periodic Table of the elements, is provided for your use.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
Total Marks	

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Examiner Only	
Marks	Remark

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.

_____

_____

_____

_____ [2]

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

_____ [1]

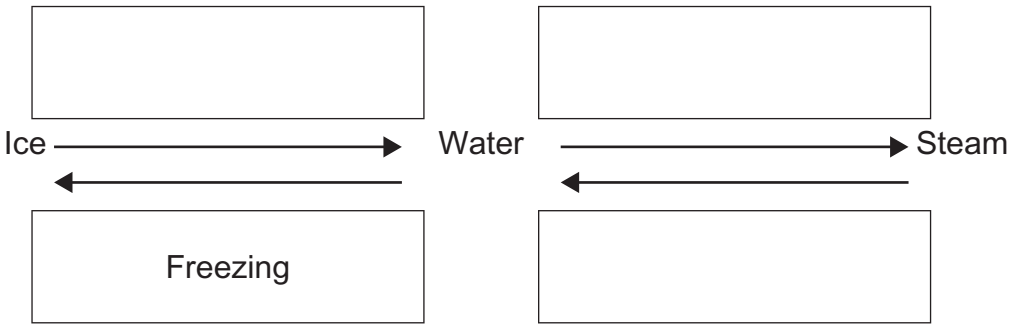
Many gas cylinders can explode if they are punctured.

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

[1]

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]

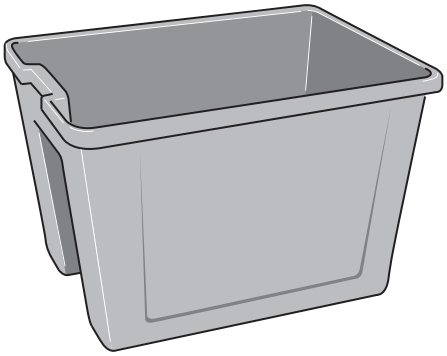
Examiner Only	
Marks	Remark

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

4 Use your **Data Leaflet** to help you answer this question.

Circle the correct answer in each part.

(a) The chemical symbol for iron is:

I Fe F [1]

(b) The formula of the hydroxide ion is:

OH OH^- OH_2^- [1]

(c) C is the chemical symbol for:

calcium copper carbon [1]

(d) Boron has:

a mass number of 5 | an atomic number of 5 | 5 neutrons [1]

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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]

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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]

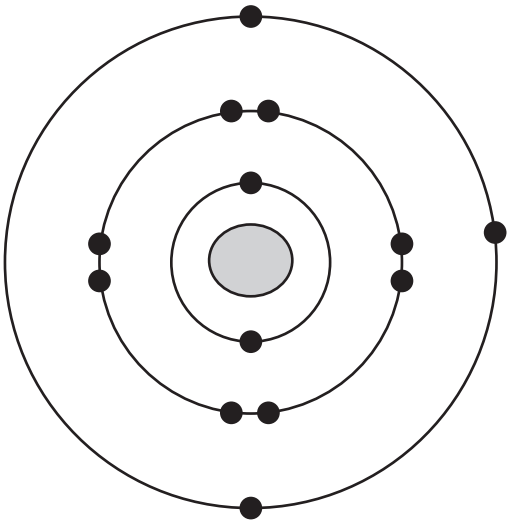
(c) Why can air **not** be described as a **compound**?

_____

_____ [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]

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Examiner Only	
Marks	Remark

8 The chemical formula for ammonium sulphate is:

$$(NH_4)_2\ SO_4$$

(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}O and ^{18}O.

You may find your Data Leaflet helpful.

(a) Explain, in terms of particles, how the nucleus of ^{16}O is different from the nucleus of ^{18}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}O are _____ atoms of ^{18}O. [1]

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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.

$CuCO_3 + H_2SO_4 \longrightarrow$ _____ + _____ + CO_2 [2]

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

_____ to _____ [2]

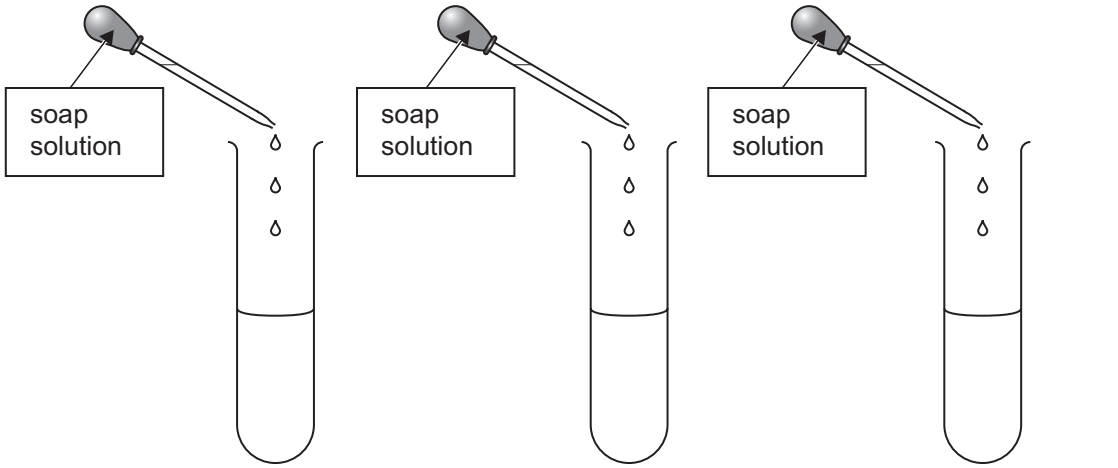
(b) If hydrochloric acid is added to copper carbonate, what gas would be produced?

_____ [1]

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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**.



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
A temporary hard	no lather	
B soft		lather
C permanent hard		

[2]

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

_____

_____ [1]

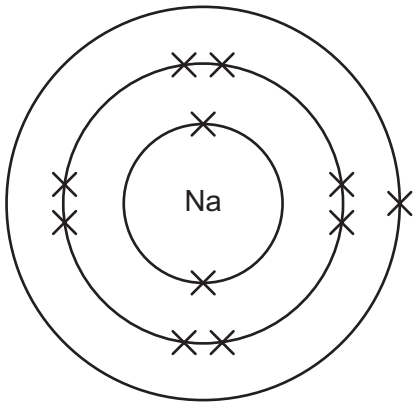
(c) Give one advantage and one disadvantage of hard water.

Advantage _____

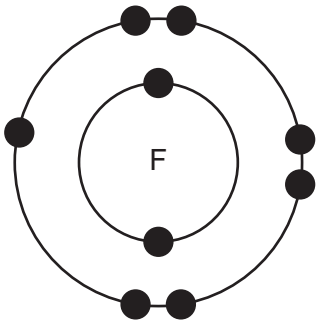
Disadvantage _____ [2]

Examiner Only	
Marks	Remark

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:

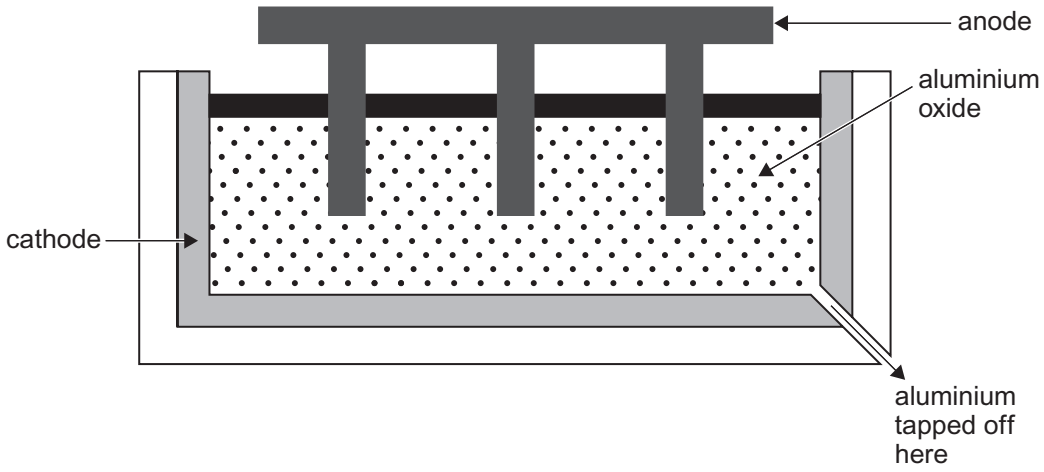
electrostatic **electronic** **magnetic**

Circle the correct answer. [1]

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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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Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Using Materials and Understanding Reactions
End of Module Test

Foundation Tier

[GDB01]

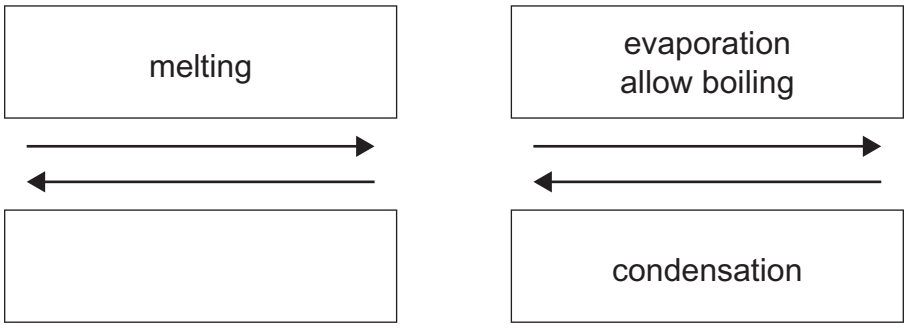
THURSDAY 24 FEBRUARY 2011, MORNING

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	Idea that symbols are internationally understood/idea that symbols are eye-catching/idea of warning of danger	[2]	
	(b)	Idea that helium is not flammable	[1]	
	(c)		[1]	4

2



[3] 3

3	**(a)**	Bottles – glass or plastic drinks cans – metal	[1] [1]	
	(b)	Any man-made fibre, e.g. **not** cotton or wool	[1]	
	(c)	Glass	[1]	4
4	**(a)**	Fe	[1]	
	(b)	OH^-	[1]	
	(c)	Carbon	[1]	
	(d)	Boron has an atomic number of 5	[1]	4
5	**(a)**	stirring using warm water crushing the tablet using more water any **three**	[3]	
	(b)	solute	[1]	4

			AVAILABLE MARKS
6	**(a)**	Hydrogen is an element because it contains only one type of atom/ cannot be broken down into anything simpler by chemical means [1]	
	(b)	Water is a compound because it contains two different types of atoms [1] chemically combined [1] [2]	
	(c)	Any answer which indicates a mixture mixture (implied) [1]	4
7	**(a)**		

Name of particle	Number present in an atom of aluminium
proton	13
electron	13
neutron	14

[3]

	(b)	3 [1]	4
8	**(a)**	4 [1]	
	(b)	8 [1]	
	(c)	15 [1]	3
9	**(a)**	^{18}O has 10 neutrons [1] ^{16}O has 8 neutrons [1] allow [1] for idea of different number of neutrons [1] for fact that one has 2 extra neutrons unless wrongly qualified [2]	
	(b)	just as reactive as [1]	3
10	**(a)**	**(i)** $CuSO_4$ [1] H_2O [1] [2]	
		(ii) green [1] ⟶ blue [1] [2]	
	(b)	CO_2/carbon dioxide [1]	5

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11 (a)

Water sample	Observation with soap	Observation with detergent
A temporary hard		Lather
B soft	Lather	
C permanent hard	No lather	Lather

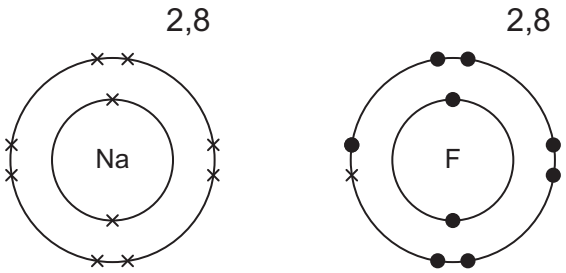
4 correct = [2] 2 or 3 correct = [1] 1 correct = [0] [2]

(b) water which has hardness which can be removed by boiling [1]

(c) good for teeth or bones/reduces risk of heart disease/tanning leather/brewing beer/idea of better taste [1]

scale in pipes or boilers/scum with soap/wastes soap/cost/ allow idea of blocked pipes [1] 5

12 (a) correct ion structure [2]



Charge +1 Charge −1 [1]

(b) electrostatic [1] 4

13 (a) electrode connected to the negative terminal/negative electrode [1]

(b) carbon/graphite [1]

(c) oxygen [1] 3

Total **50**

AVAILABLE MARKS

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Using Materials and Understanding Reactions
End of Module Test

Foundation Tier

B

[GDB01]

GDB01

WEDNESDAY 10 NOVEMBER 2010, AFTERNOON

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 twelve** questions.

INFORMATION FOR CANDIDATES

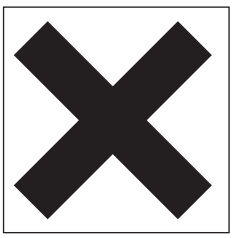
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
A Data Leaflet, which includes a Periodic Table of the elements, is provided for your use.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total Marks	

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Examiner Only	
Marks	Remark

1 The labels below could be found on bottles of bleach.



Label A



Label B

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(a) Give **two** reasons why the hazard symbol in Label A is better than the wording in Label B.

1. _____

_____

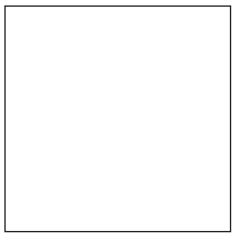
2. _____

_____ [2]

Each of the worded labels below could be improved by turning it into a hazard symbol.

(b) Draw a diagram in each empty box to show the correct hazard symbol.

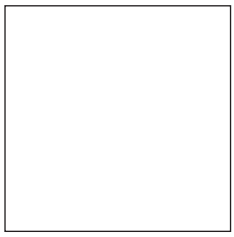
(i)





[1]

(ii)





[1]

2 The recipe for a hot milky drink is given below. Read it carefully and answer the questions which follow.

Examiner Only	
Marks	Remark

1. Place two teaspoons of cocoa powder into a large mug.
2. Pour in hot milk.
3. Stir to dissolve the cocoa powder.
4. Add sugar to taste.
5. Stir to dissolve the sugar.

(a) Name the **solvent** used in this recipe.

_____ [1]

(b) Give **two** reasons why the cocoa should dissolve quickly if this recipe is followed carefully.

_____

_____

_____ [2]

When more sugar is added a **saturated solution** is formed.

(c) What is meant by the term **saturated solution**?

_____

_____ [1]

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Examiner Only	
Marks	Remark

3 Copper and aluminium are both metals. They have different uses.

(a) Give **two** reasons why cooking foil is made from aluminium.

Image of aluminium foil is not available due to copyright

1. _____

_____

2. _____

_____ [2]

(b) Give **two** reasons why hot water tanks are made from copper.

Image of copper hot water tank is not available due to copyright

1. _____

_____

2. _____

_____ [2]

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Both aluminium and copper are used to make saucepans.

Examiner Only	
Marks	Remark

(c) Give **two** reasons why saucepans are not made from plastic such as polyethene.



© iStockphoto / Thinkstock

1. _____

_____

2. _____

_____ [2]

Examiner Only	
Marks	Remark

4 Read the following passage carefully and then answer the questions which follow.

Common names for substances can be misleading. Pencil lead is actually graphite, which is a form of carbon, not lead. Tin foil is made from aluminium, not tin. Dry ice is not solid water but solid carbon dioxide. When we think of salt we usually mean sodium chloride but sea salt contains many different compounds.

From the passage give the name of:

(a) a non-metallic element

_____ [1]

(b) a metallic element

_____ [1]

(c) an ionic compound

_____ [1]

One of the compounds in sea salt contains the elements potassium and iodine only.

(d) Give the name for this compound.

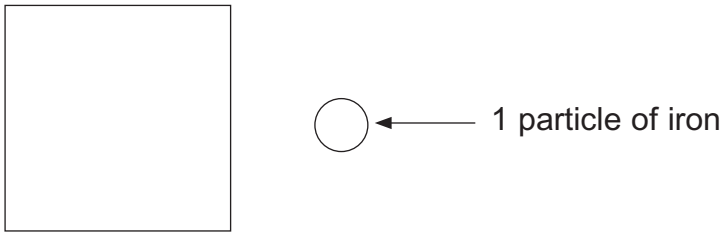
_____ [1]

Examiner Only	
Marks	Remark

5 The photograph below shows a blacksmith shaping a piece of solid iron into a horseshoe.

Image of blacksmith at work not available due to copyright.

(a) Fill in the box below to show how the particles are arranged in solid iron.



[1]

(b) What happens to the particles in solid iron as the blacksmith heats the horseshoe in the fire?

_____

_____

_____ [2]

(c) The blacksmith uses coal as a fuel for the fire.

Complete the word equation below showing the products formed when coal burns in air.

coal + air ⟶ + + energy

[2]

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Examiner Only	
Marks	Remark

6 In parts of Northern Ireland the water is described as **hard**.

(a) What effect has hard water on

(i) soap? _____

_____

(ii) detergent? _____

_____ [2]

(b) Give **one** method of removing hardness from water.

_____ [1]

7 This question is about chemical formulae.

You may find your Data Leaflet helpful.

(a) What is the chemical symbol for potassium?

_____ [1]

(b) Glucose has the formulae $C_6H_{12}O_6$.

How many atoms are present in a glucose molecule?

_____ [1]

(c) Ethanoic acid has the formula CH_3COOH.

How many **different** elements are present in an ethanoic acid molecule?

_____ [1]

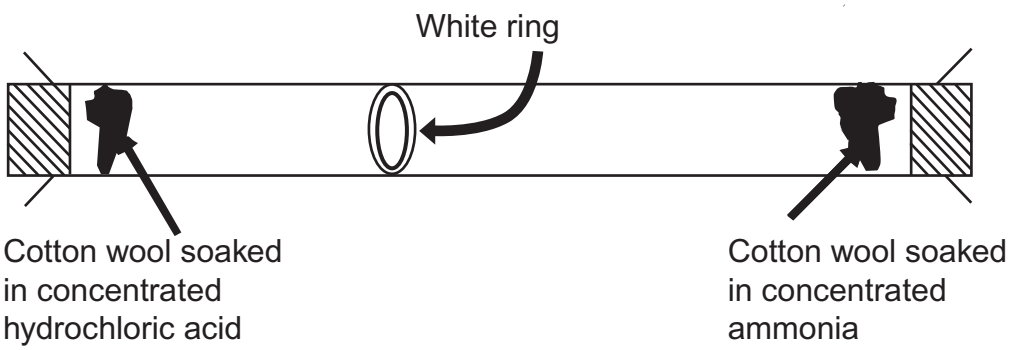
(d) Name the substance whose formula is $Ca(HCO_3)_2$.

_____ [1]

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Examiner Only	
Marks	Remark

8 The apparatus below is used in a warm room to investigate the movement of particles.



After about **5 minutes**, a white ring of ammonium chloride forms.

(a) What **word** is used to describe the movement of particles shown by using this apparatus?

_____ [1]

(b) If this experiment was repeated in a **colder** room what effect would this have on the formation of the white ring?

_____

_____ [1]

(c) Why is the white ring formed closer to the cotton wool soaked in concentrated hydrochloric acid?

_____

_____ [1]

(d) What is the formula of ammonium chloride? (You may find your Data Leaflet useful.)

_____ [1]

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Examiner Only	
Marks	Remark

9 The table below shows the atomic number, mass number and electronic arrangement (configuration) of four particles.

(a) Complete the table by filling in the blank spaces.
(You will need your Data Leaflet to find the missing mass numbers.)

Particle	Atomic Number	Mass Number	Electronic arrangement
A	6		2,4
B	1	2	1
C			2,3
D	1	3	

[4]

(b) **(i)** Which of the particles, A, B, C or D are isotopes?

_____ and _____ are isotopes [1]

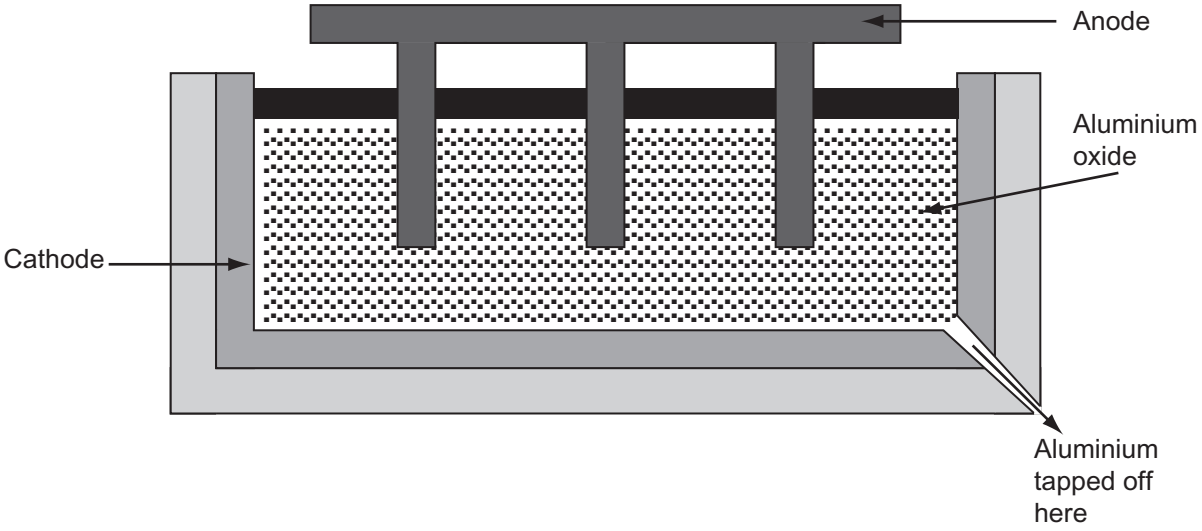
(ii) Explain your answer to **(b)(i)**.

_____

_____ [1]

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



(a) At which electrode is aluminium formed.

_____ [1]

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

_____ [1]

(c) Give a **disadvantage** of using this method to produce aluminium.

_____ [1]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

11 **(a)** Copper sulphate is a blue salt which can be prepared by the reaction of an acid with a base.

Complete the word equation below by naming the acid, the base and any other substance formed.

\+ ⟶ copper sulphate +

[3]

(b) Copper sulphate can also be prepared by the reaction of an acid with a carbonate.

What gas is formed when an acid reacts with a carbonate?

_____ [1]

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12 Magnesium fluoride is an ionic compound with the formula MgF_2.

Explain carefully, in terms of electron transfer, why two fluorine atoms are needed to bond with one atom of magnesium.

[3]

Examiner Only	
Marks	Remark

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Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Using Materials and Understanding Reactions End of Module Test

Foundation Tier

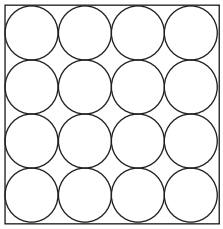
[GDB01]

WEDNESDAY 10 NOVEMBER 2010, AFTERNOON

MARK SCHEME

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				AVAILABLE MARKS
1	(a)	Idea that symbols are internationally understood Idea that symbols are eye-catching idea of not easy to read **not** idea of warning	[2]	
	(b)	(i) 	[1]	
		(ii) 	[1]	4
2	(a)	(Hot) milk	[1]	
	(b)	Any **two** from: Used cocoa **powder** **stirred** the mixture hot **not** melting	[2]	
	(c)	Idea of a **solution** which cannot hold any more (solute)	[1]	4
3	(a)	Any **two** from: Idea that aluminium is malleable is a (good) conductor of **heat** is light or other suitable e.g. unreactive or high melting point	[2]	
	(b)	Any **two** from: Copper is malleable will not react (with water) idea of long lasting or durable or rigid or other suitable **not** high mp, **not** strong, **not** good conductor	[2]	
	(c)	Any **two** from: Plastic will melt when heated will not hold its shape will burn will not conduct heat or other suitable **not** idea of not being strong	[2]	6

				AVAILABLE MARKS
4	**(a)**	carbon (graphite)	[1]	
	(b)	aluminium/tin/lead	[1]	
	(c)	sodium chloride	[1]	
	(d)	potassium iodide (must be **name**)	[1]	4
5	**(a)**			
		(i.e. a regular close packed)	[1]	
	(b)	The particles of iron gain energy/move faster and move further apart	[1] [1]	
	(c)	carbon dioxide water (any order)	[1] [1]	5
6	**(a)**	**(i)** idea of forming scum/difficult to form a lather	[1]	
		(ii) No effect/will always form a permanent lather	[1]	
	(b)	Boiling/adding washing soda/using an ion exchange resin accept distillation	[1]	3
7	**(a)**	K	[1]	
	(b)	24	[1]	
	(c)	3	[1]	
	(d)	Calcium hydrogen carbonate	[1]	4
8	**(a)**	Diffusion	[1]	
	(b)	Takes longer to form the white ring	[1]	
	(c)	Idea that ammonia (particles) diffuses/moves faster/hydrochloric acid particles diffuse/move more slowly accept idea that ammonia is less dense/hydrochloric acid is more dense	[1]	
	(d)	NH_4Cl	[1]	4

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				AVAILABLE MARKS
9 **(a)**				

Particle	Atomic Number	Mass Number	Electronic arrangement
A	6	(12)	2,4
B	1	2	1
C	(5)	(11)	2,3
D	1	3	(1)

[4]

(b) **(i)** B and D [1]

(ii) the particles have the same atomic number but different mass numbers [1] — 6

10 **(a)** cathode [1]

(b) carbon/graphite [1]

(c) high cost/idea of needing a lot of energy/anodes need to be replaced [1] — 3

11 **(a)** Acid – sulphuric acid [1]
base – copper oxide/copper hydroxide [1]
product – water [1]

If copper carbonate is used as the base it gains the mark for base but must state water and carbon dioxide for one mark for the product.

(b) carbon dioxide [1] — 4

12 idea of Mg atom losing 2 electrons [1]
idea of F atom gaining 1 electron [1]
idea of 2 F atoms needed to allow Mg to lose 2 electrons [1]
(third mark dependent on first two) — 3

Total — **50**

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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2009–2010

Science: Double Award (Modular)

Using Materials and Understanding Reactions
End of Module Test
Foundation Tier

B

[GDB01]

GDB01

THURSDAY 20 MAY 2010, 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	

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Examiner Only	
Marks	Remark

1 Sulphuric acid is a **corrosive** liquid.

This bottle of sulphuric acid should have a hazard symbol on it.



(a) Circle the hazard symbol below which should be placed on the bottle of sulphuric acid.



© Crown copyright [1]

Hazard symbols are used to warn people about the dangers of a substance.

(b) Give two **other** reasons why a hazard symbol should be placed on the container of sulphuric acid.

Reason 1 _____

_____

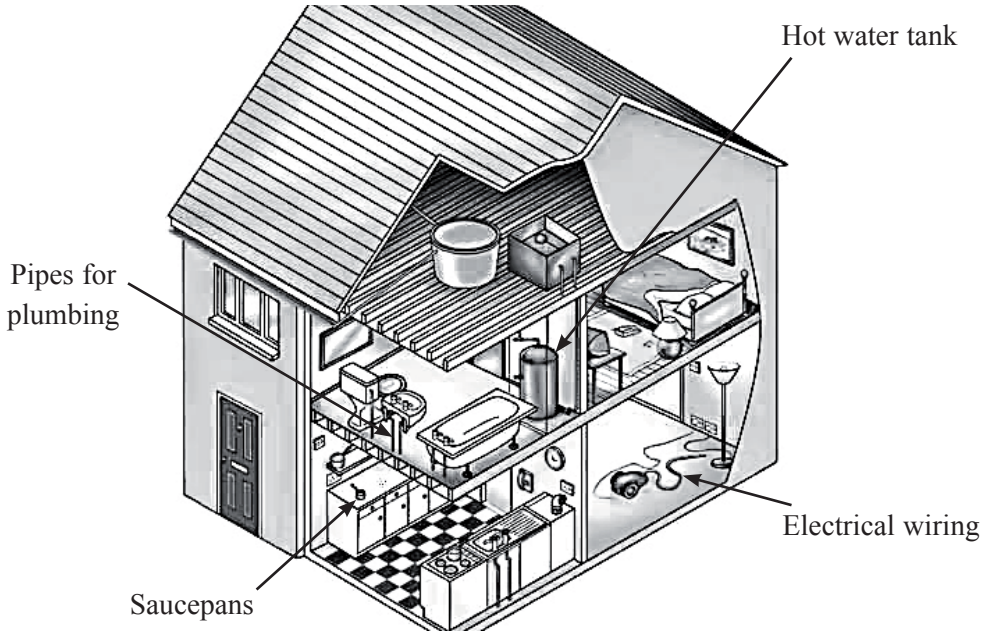
Reason 2 _____

_____ [2]

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Examiner Only	
Marks	Remark

2 Copper metal is used in many different ways in our homes. The picture below shows some of the uses of copper in the home.



© *Copper Development Association*

Using the diagram as a guide, give four reasons why copper has so many different uses.

Reason 1 _____

_____

Reason 2 _____

_____

Reason 3 _____

_____

Reason 4 _____

_____ [4]

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Examiner Only	
Marks	Remark

3 Cobalt chloride crystals contain water of crystallisation and are pink in colour. When heated, the crystals turn to a blue powder. When dissolved in water the solution is pink.

(a) What colour is **hydrated** cobalt chloride?

_____ [1]

(b) Name the **solvent** in the solution of cobalt chloride.

_____ [1]

(c) What word describes a solid which **will not** dissolve in water?
Circle the correct answer.

soluble **insoluble** **saturated** [1]

4 Use your Data Leaflet to help you answer this question.
Circle the correct answer in each part.

(a) The chemical symbol for potassium is:

K **Po** **P** [1]

(b) The formula for the sulphate ion is:

SO_3^- SO_4^{2-} S^{2-} [1]

(c) Cu is the chemical symbol for:

calcium **copper** **carbon** [1]

(d) The Periodic Table is a list of all the known:

elements **compounds** **solids** [1]

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Examiner Only	
Marks	Remark

5 Oxygen gas is obtained from air by a number of steps.

Step 1: Carbon dioxide is removed from the air.

Step 2: The remaining air is cooled to form a liquid.

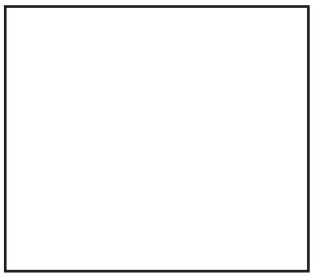
Step 3: The liquid is carefully heated.

Step 4: The different gases in air boil at different temperatures and are collected separately. Oxygen is separated from the other gases.

(a) In which step, 1, 2, 3, or 4, does **condensation** take place?

_____ [1]

(b) In the box below draw the arrangement of the particles of oxygen in oxygen gas.



○ = one oxygen particle

[1]

(c) If carbon dioxide is cooled it forms a solid, known as "dry ice".
When "dry ice" is heated it turns into a gas.
What word describes the change of state from solid to gas?

_____ [1]

(d) Explain why carbon dioxide is a **compound**.

_____

_____

_____ [2]

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Examiner Only	
Marks	Remark

6 This question is all about hard water. Place a tick (✓) in the box beside each correct answer.

(a) Hard water is water which will not easily form a lather with:

detergent ☐

soap ☐

bleach ☐

[1]

(b) Hard water causes hot water pipes:

to burst ☐

to fur up ☐

to rust ☐

[1]

(c) Hard water may be softened by using:

an acid ☐

an alkali ☐

washing soda ☐

[1]

(d) Which one of the following is **not** an advantage of hard water?

Good for bones and teeth ☐

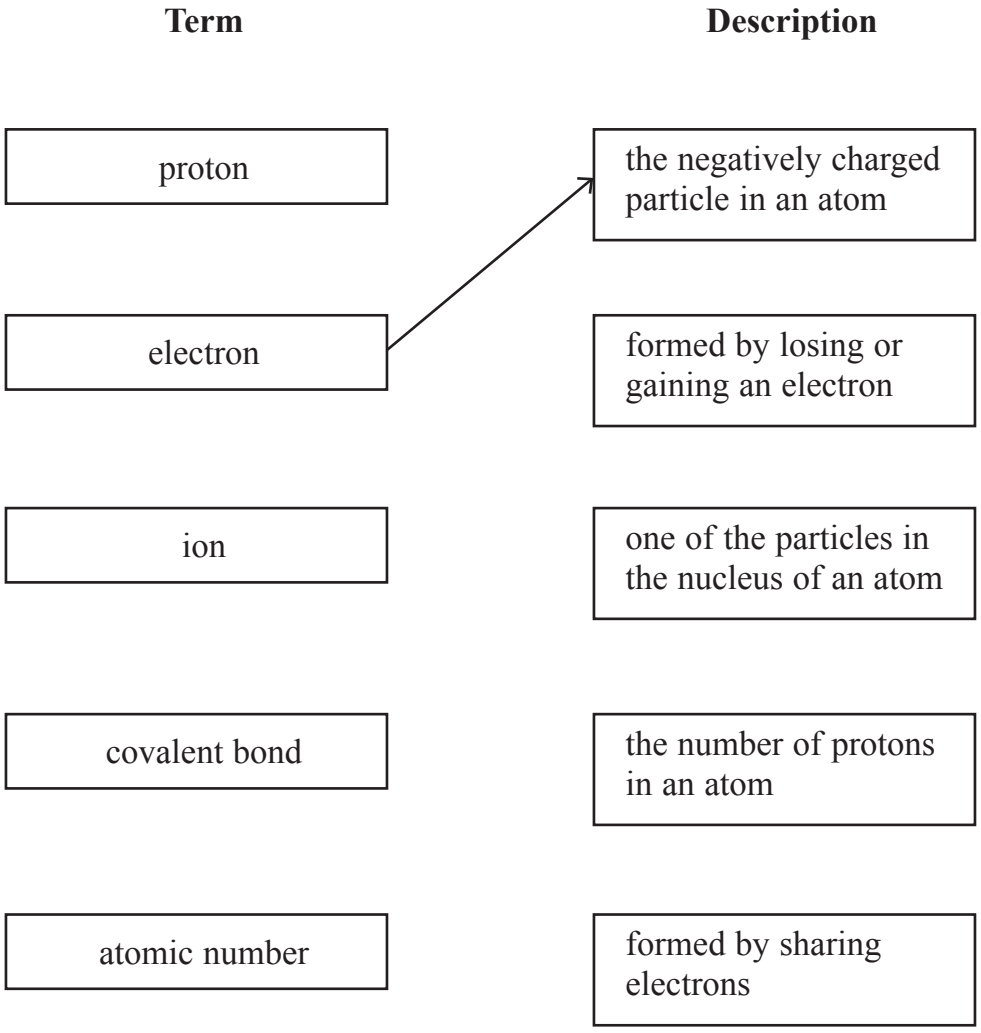
May prevent heart disease ☐

May prevent kidney failure ☐

[1]

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7 Each of the terms in the first list below can be matched with one of the descriptions in the second list.
Draw lines to match each term to the correct description. One has been done for you.



[4]

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Marks	Remark

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8 This question is about aluminium.

(a) Complete the table below which gives the number of protons, neutrons and electrons present in an aluminium atom, $^{27}_{13}Al$.

	$^{27}_{13}Al$
Number of protons	
Number of neutrons	
Number of electrons	

[3]

(b) What is the electronic structure of the aluminium atom?

_____ [1]

Examiner Only

Marks	Remark

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9 Oxygen reacts with both metals and non-metals to form oxides. These oxides can be classified as acidic, basic or neutral because of the way they react.

(a) Use the words **acidic**, **basic** or **neutral** to complete the table below. One has been done for you.

Compound	acidic, basic or neutral
Sodium oxide	basic
Hydrogen oxide (water)	
Carbon dioxide	
Magnesium oxide	

[3]

(b) What name is given to basic oxides which can dissolve in water?

_____ [1]

Examiner Only

Marks	Remark

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10 Ammonium sulphate has the chemical formula

$$(NH_4)_2SO_4$$

Use this information to answer the following questions.
You may find your Data Leaflet helpful.

(a) How many different elements are present in a molecule of ammonium sulphate?

_____ [1]

(b) How many hydrogen atoms are present in a molecule of ammonium sulphate?

_____ [1]

(c) What is the charge on the ammonium ion?

_____ [1]

(d) Write the formula for ammonium carbonate.

_____ [1]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

11 Calcium is a metallic element which combines with oxygen to form the compound calcium oxide. You may find your Data Leaflet helpful in this question.

(a) Draw a diagram to show **all** the electrons in a calcium atom.

[1]

(b) Draw a diagram to show **all** the electrons in an oxygen atom.

[1]

(c) Explain how calcium and oxygen atoms join together to form calcium oxide.

_____

_____

_____

_____

_____ [2]

(d) What kind of force holds the particles together in calcium oxide?

_____ [1]

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12 The table below shows the solubility of different gases in water at different temperatures.

Gas	Solubility/100 g water at		
	0 °C	20 °C	40 °C
Oxygen	0.07	0.04	0.03
Nitrogen	0.03	0.02	0.01
Carbon dioxide	0.34	0.17	0.10

(a) Which of the three gases is the **least** soluble in water at 20 °C?

_____ [1]

(b) Complete the sentence below.

The solubility of gases _____

as the temperature increases. [1]

(c) Fizzy drinks contain dissolved carbon dioxide.
If you want the drink to stay fizzy you should keep it?
Tick (✓) the correct box.

in the fridge ☐

at room temperature ☐

in a warmer room ☐

it doesn't matter where it is kept ☐ [1]

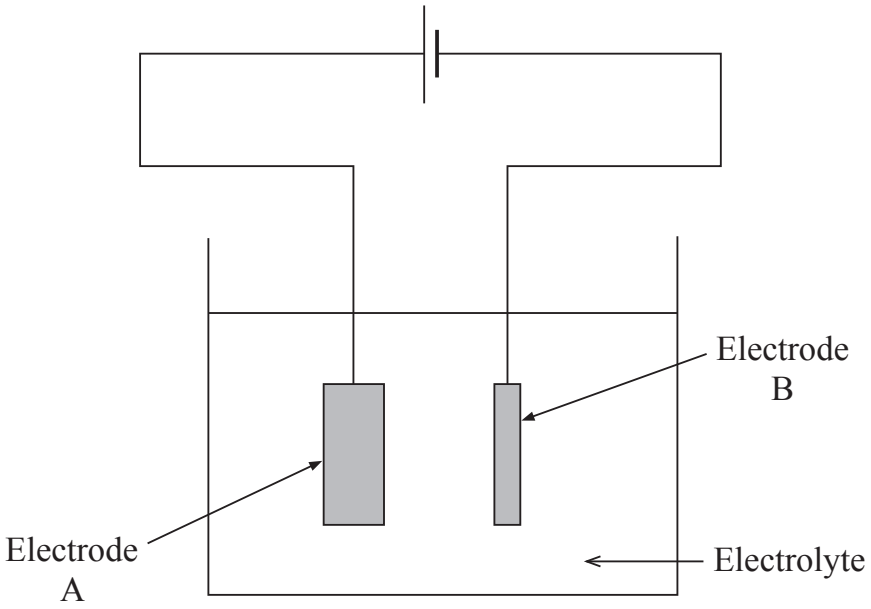
Examiner Only

Marks	Remark

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13 Copper can be purified by the process of electrolysis.

Examiner Only	
Marks	Remark



Circle the correct answer in each part below.

(a) Electrode B is made from:

pure copper **impure copper** **platinum** [1]

(b) A suitable substance for the electrolyte would be:

sulphuric acid **copper sulphate** **water** [1]

(c) Pure copper is formed:

at the anode **at the cathode** **in solution** [1]

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GCSE

Science: Double Award (Modular)

End of Module Tests

May 2010

Mark Schemes

Issued: October 2010

Rewarding Learning

General Certificate of Secondary Education
2009–2010

Science: Double Award (Modular)

Using Materials and Understanding Reactions
End of Module Test
Foundation Tier

[GDB01]

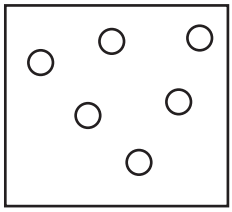
THURSDAY 20 MAY 2010, MORNING

MARK SCHEME

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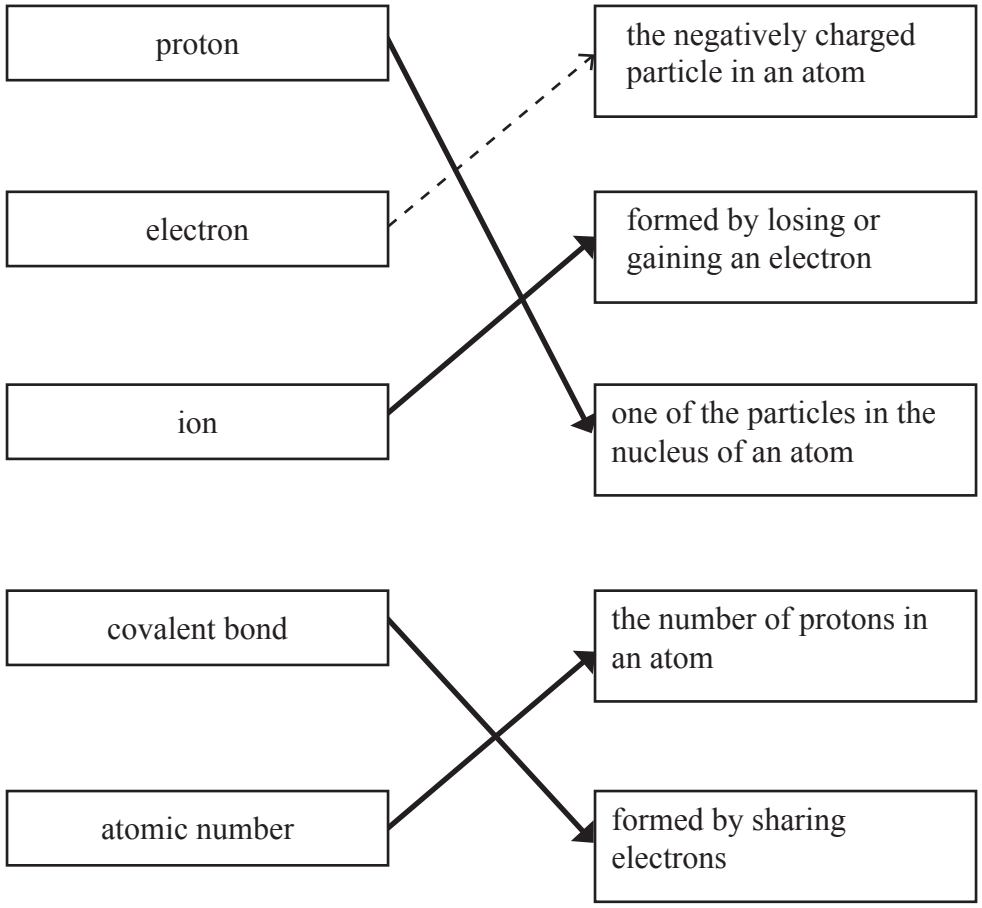
			AVAILABLE MARKS
1	**(a)** Candidates should indicate this hazard symbol, corrosive.		
			
	© *Crown copyright*	[1]	
	(b) Idea that symbols are internationally understood/idea that symbols are eye-catching/idea of helping those who can't read Do **not** accept idea of warning as it is used in the stem	[2]	3
2	Any **4** of: Conductor of heat [1] ductile [1] Conductor of electricity [1] high melting point [1] idea of malleable i.e. can be shaped [1] rigid [1] durable/unreactive/long-lasting [1] flexible [1] or other correct Any order **Accept** light **not** cheap **not** strong	[4]	4
3	**(a)** pink	[1]	
	(b) water	[1]	
	(c) insoluble	[1]	3
4	**(a)** (K) Po P	[1]	
	(b) SO_3^- (SO_4^{2-}) S^{2-}	[1]	
	(c) calcium (copper) carbon	[1]	
	(d) (elements) compounds solids	[1]	4

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				AVAILABLE MARKS
5	**(a)**	Step 2	[1]	
	(b)	 Diagram should clearly show a gas. i.e. far apart and random	[1]	
	(c)	Sublimation	[1]	
	(d)	A compound is a substance which contains two or more elements/ types of atoms [1] which are (chemically) combined/joined [1]	[2]	5
6		Candidates should place ticks against the following answers. More than one tick in each section is awarded zero for that section.		
	(a)	soap	[1]	
	(b)	to fur up	[1]	
	(c)	washing soda	[1]	
	(d)	May prevent kidney failure	[1]	4

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7



[4] 4

8 **(a)** protons 13 [1]
neutrons 14 [1]
electrons 13 [1] [3]

(b) 2, 8, 3 apply cm [1] 4

9 **(a)**

hydrogen oxide (water)	neutral	[1]
carbon dioxide	acidic	[1]
magnesium oxide	basic	[1]

[3]

(b) alkalis
Accept alkaline [1] 4

10 **(a)** 4 [1]

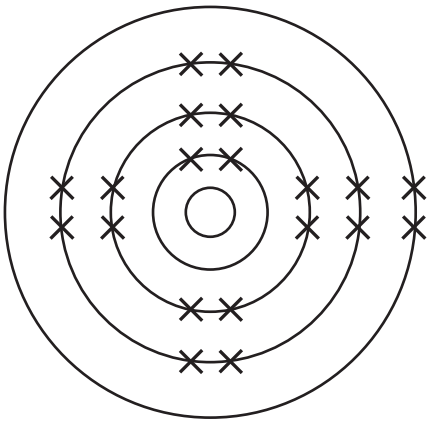
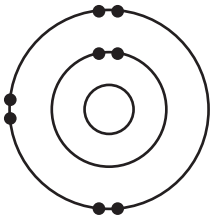
(b) 8 [1]

(c) +1/1+ allow + **not** positive [1]

(d) $(NH_4)_2 CO_3$ [1] 4

AVAILABLE MARKS

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				AVAILABLE MARKS
11	**(a)**		[1]	
	(b)		[1]	
	(c)	Idea of electron transfer from calcium to oxygen [1] two [1] electrons transferred Second mark follows from first Idea of sharing gains **no** credit	[2]	
	(d)	Ionic (bond)/electrostatic force/electrostatic attraction	[1]	5
12	**(a)**	nitrogen	[1]	
	(b)	decreases	[1]	
	(c)	in the fridge	[1]	3
13	**(a)**	pure copper	[1]	
	(b)	copper sulphate	[1]	
	(c)	at the cathode	[1]	3
			Total	**50**

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GCSE

Science: Double Award (Modular)

End of Module Tests

March 2010

Mark Schemes

Issued: May 2010

Rewarding Learning

General Certificate of Secondary Education
2009 – 2010

Science: Double Award (Modular)

Using Materials and Understanding Reactions
End of Module Test
Foundation Tier

[GDB01]

WEDNESDAY 24 FEBRUARY 2010, MORNING

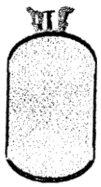
MARK SCHEME

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			AVAILABLE MARKS
1	**(a)** Idea that symbols are internationally understood / Idea that symbols are eye-catching / Idea of helpful to people who can't read (2 × [1]) Do **not** accept idea of warning as it is used in the stem	[2]	
	(b) **(i)** C	[1]	
	(ii) D	[1]	
	(c) 	[1]	5
2	**(a)** Transparent	[1]	
	(b) Idea that it retains its shape when heated	[1]	
	(c) Copper / aluminium or other suitable	[1]	
	(d)	[2]	5
3	**(a)** **(i)** B	[1]	
	(ii) D	[1]	
	(iii) A	[1]	3

Physical property of metal	**Meaning**
lustrous	shiny
malleable	Can be beaten into shape
ductile	**Idea that it can be drawn into wires**

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					AVAILABLE MARKS
4	**(a)**	**(i)**	Any **two** from: Stirring / shaking Use more water Crush the copper sulphate (2 × [1]) Do not accept idea of heat as it is suggested in the stem	[2]	
		(ii)	Idea that solution has dissolved maximum amount of solute	[1]	
	(b)		Solubility decreases	[1]	4
5	**(a)**	**(i)**	state symbol	[1]	
		(ii)	steam	[1]	
	(b)		Idea that zinc has gained oxygen	[1]	3
6	**(a)**		The number of protons is equal to the atomic number	[1]	
	(b)		A compound	[1]	
	(c)		Number of protons and electrons are equal	[1]	4
7	**(a)**		Idea that gases are compressible	[1]	
	(b)			[1]	
	(c)		21.4g	[1]	3
8	**(a)**	**(i)**	4	[1]	
		(ii)	3	[1]	
	(b)		Na_2CO_3	[1]	3
9	B.		Neutralisation	[1]	
	C.		Electrolysis	[1]	
	D.		Reduction	[1]	
	E.		Oxidation	[1]	4

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		AVAILABLE MARKS
10	**(a)** Hard water is water which will not (easily) form a lather **with soap** [1]	
	(b) B [1]	
	(c) Leaves scale (on kettles)/wastes soap/forms scum **with soap**/ clogs up (hot) water pipes/qualified economic reason or any suitable disadvantage [1]	3
11	**(a)** potassium sulphate [1] hydrochloric acid [1] sodium hydroxide **or** sodium oxide **or** sodium carbonate **or** sodium hydrogencarbonate [1] [3]	
	(b) Water [1]	4

12

Name of particle	**Charge**	**Relative mass**	**Position of particle in the atom**
Proton	**+1**	1	**nucleus**
Electron	–1	**Almost zero ***	outside the nucleus
Neutron	**0**	1	in the nucleus

[1] each

* Accept 0

or answers in $\frac{1}{1800} - \frac{1}{2000}$ range [4] 4

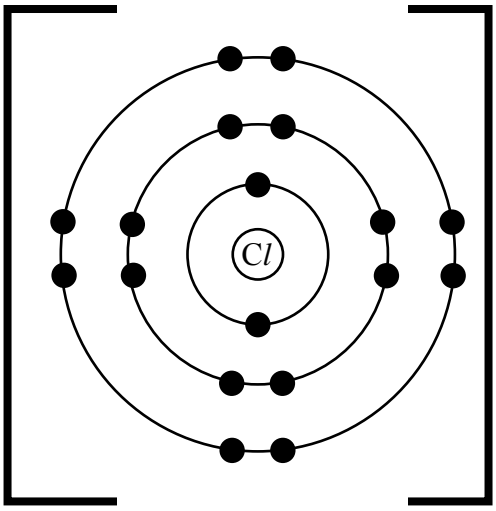
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	AVAILABLE MARKS

13 **(a)** Isotopes are atoms of the same element/have same atomic number [1]
Which have a different number of neutrons/have a different mass number [1] [2]

(b) Covalent [1]

(c) **(i)** −1 or − [1]



[1]

(ii) chlor**ide** [1] 6

Total **51**

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