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

Higher Tier

B

[GDB02]

GDB02

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 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	

Examiner Only	
Marks	Remark

1 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]

2 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

Examiner Only	
Marks	Remark

3 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]

4 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]

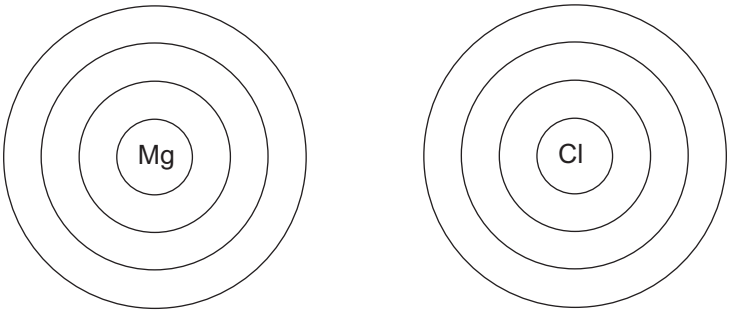
Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

5 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.

_____

_____

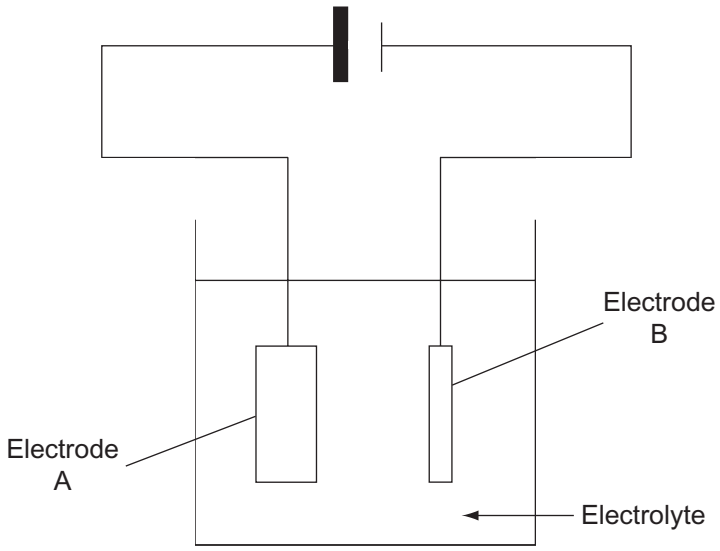
_____

_____

_____ [3]

6 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]

Examiner Only	
Marks	Remark

7 **(a)** In the space below draw a diagram to show how the atoms of hydrogen and oxygen bond together to form water. You should show **all** the electrons.

[2]

(b) From the list below choose **two** substances which have the same type of bonding as water.

Tick **two** correct boxes.

Carbon dioxide ☐

Sodium hydroxide ☐

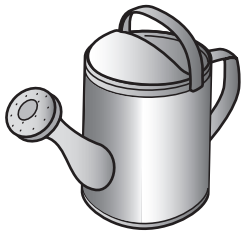
Aluminium oxide ☐

Chlorine ☐

Sodium chloride ☐

[2]

8 The picture shows an iron watering can that has been coated with zinc to prevent rusting.



(a) What name is given to the process of coating iron with zinc?

_____ [1]

(b) Explain fully why this type of watering can will last longer than one made only of iron.

_____

_____

_____ [2]

(c) What is the full chemical name for rust?

_____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

9 The table below gives some examples of plastics, their properties and their uses.

plastic	properties	uses
nylon	flexible, light, tough	rope, gears, hinges
epoxy resins	brittle, chemically inert	adhesives
melamine	hard, heat resistant	adhesives, work surfaces
polycarbonate	rigid, strong, transparent	spectacle lenses
polythene	tough, flexible, soft	packaging, bags

(a) Choose a plastic from the table which is **thermosoftening** and explain, **with reference to its structure**, how its properties make it suitable for one of its uses.

Example: _____ [1]

Explanation: _____

_____

_____ [2]

(b) Spectacle lenses are made of polycarbonate. Suggest what **type** of plastic this is and say why polycarbonate is a suitable choice for this use.

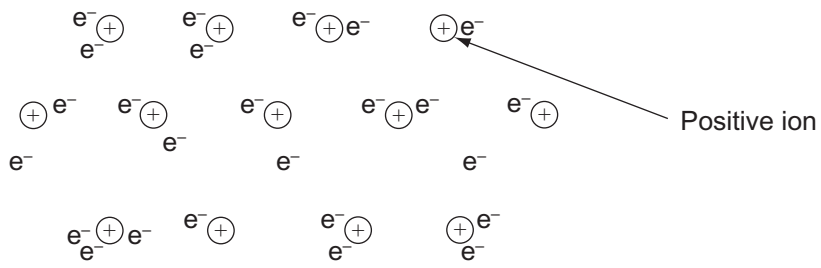
Type: _____ [1]

Reason: _____

_____ [1]

10 Aluminium is a metal that has many important uses. It can be hammered into very thin sheets, it is a good conductor of electricity, it has a low density and it has a reasonably high melting point.

The structure of aluminium can be represented by the diagram below.



Use your understanding of metallic bonding to answer the following questions.

(a) Why can metals such as aluminium be hammered into thin sheets?

_____

_____ [1]

(b) Explain why aluminium is a good conductor of electricity.

_____

_____

_____ [2]

(c) The melting point of aluminium is high enough for it to be used in cooking utensils.

What does this tell us about the bonds between the atoms in aluminium?

_____

_____ [1]

(d) Suggest why aluminium has a lower density than lead.

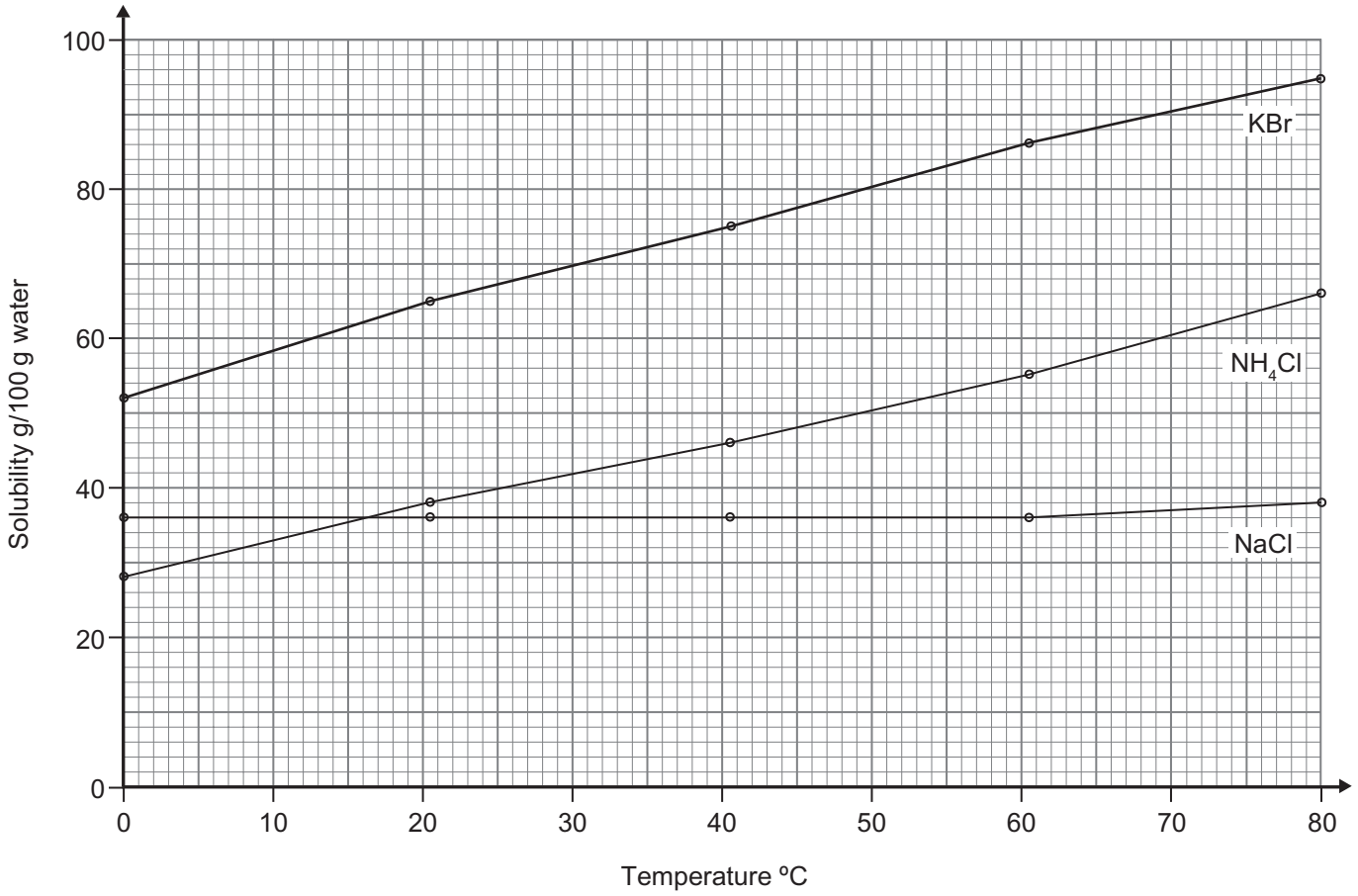
_____

_____ [1]

Examiner Only

Marks	Remark

11 The graph shows solubility curves for three substances, KBr, NH_4Cl and NaCl.



(a) At what temperature is the solubility of NH_4Cl equal to 50 g/100 g water?

_____ [1]

(b) If a saturated solution of KBr in 100 g of water is cooled from 65 ºC to 25 ºC how many grams of solid will be precipitated?

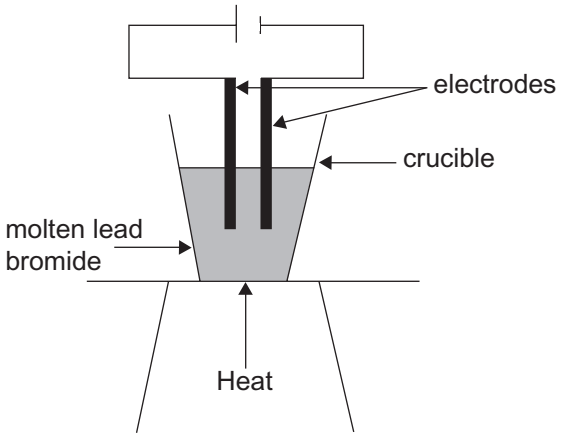
[2]

(c) Which of the saturated solutions shown would not easily form crystals if it was cooled from 60 ºC to 40 ºC?

_____ [1]

Examiner Only	
Marks	Remark

12 The diagram shows the apparatus used in the electrolysis of lead bromide.



(a) The lead bromide has to be heated until it is molten. Explain why this is necessary.

_____

_____ [1]

(b) Write an **ionic** equation to show the chemical reaction which takes place at the **anode**.

_____ [2]

(c) Why should this experiment not be carried out in the open laboratory?

_____

_____ [1]

Examiner Only

Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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