Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Chemical Patterns and our Environment Module 3

Higher Tier

[GSC32]

GSC32

WEDNESDAY 23 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 six** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 45.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
A Data Leaflet is provided for use with this paper.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
Total Marks	

Examiner Only	
Marks	Remark

1 Paul set up an experiment to investigate the reactions of metals with solutions of their salts.

In beaker A he put zinc into a solution of copper sulphate.

In beaker B he put iron into a solution of zinc sulphate.

He left the beakers to stand for 30 minutes.

Beaker	Colour at start	Colour after 30 minutes.
A	Solution – blue Metal – grey	Solution – _____ Metal – _____
B	Solution – colourless Metal – grey	Solution – _____ Metal – _____

(a) Complete the table above to show the colours Paul observed after 30 minutes. [4]

(b) Explain fully the results for beaker B.

_____

_____ [2]

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

_____ [1]

(d) Name the solution formed in beaker A after 30 minutes.

_____ [1]

Examiner Only	
Marks	Remark

2 Mary carried out an experiment to find out how much magnesium oxide could be produced by heating 8.4 g of magnesium carbonate.

She heated the magnesium carbonate in a test tube with a Bunsen burner.

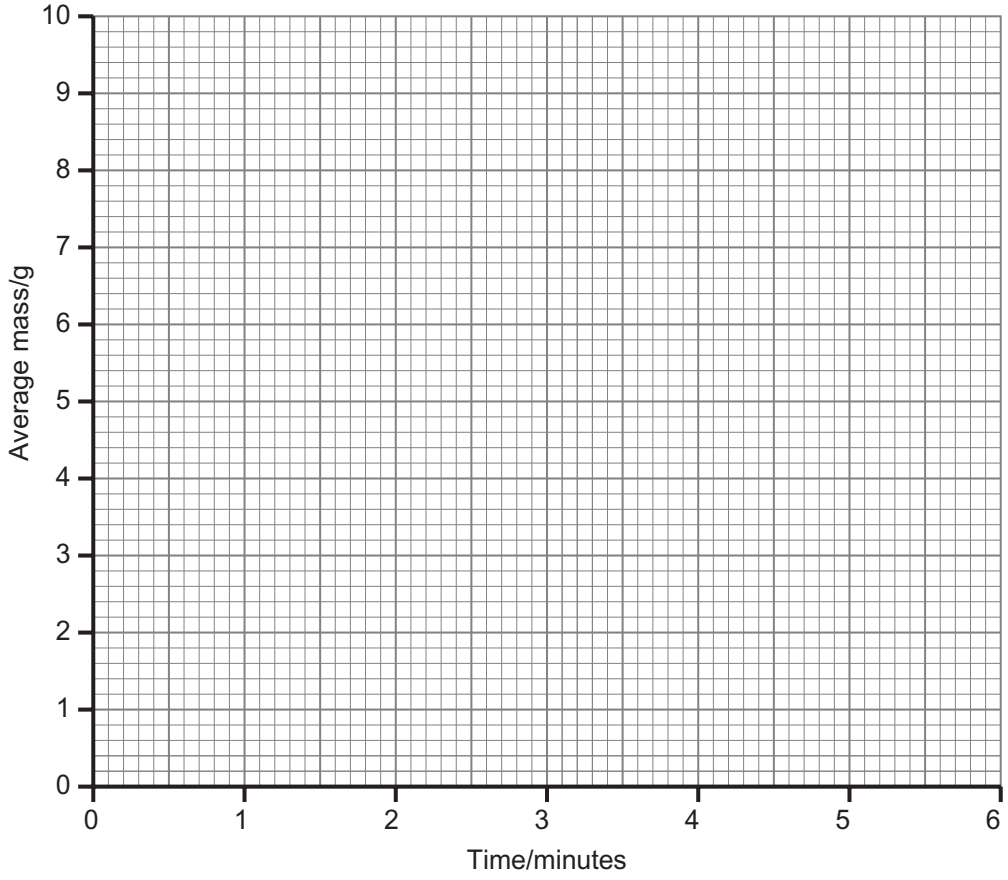
Mary then recorded the mass of the solid remaining in the test tube every minute.

She repeated the experiment with another 8.4 g of magnesium carbonate.

Her results are shown in the table below.

Time/ minutes	**0**	**1**	**2**	**3**	**4**	**5**	**6**
Mass/g (test 1)	8.4	7.1	6.3	5.3	4.3	3.9	3.9
Mass/g (test 2)	8.4	6.9	5.9	4.7	4.1	4.1	4.1
Average mass/g	8.4	7.0	6.1	5.0	4.2	4.0	4.0

(a) On the grid below plot and draw a line graph of average mass against time.



[3]

(b) Why did Mary do the experiment twice and calculate an average?

_____ [1]

(c) Give **one** safety precaution Mary would have taken.

_____ [1]

(d) Complete the symbol equation for heating magnesium carbonate.

$MgCO_3 \longrightarrow$ + [2]

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

_____ [2]

(ii) When 8.4 g of magnesium carbonate is heated, 4.0 g of magnesium oxide is left.

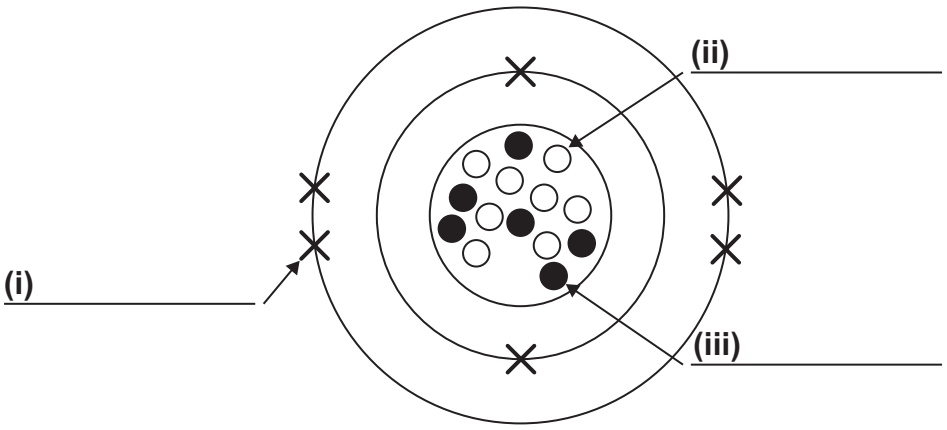
Calculate how much carbon dioxide has been given off.

Answer _____ g [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

3 **(a)** Complete the labels on the diagram below.



[3]

(b) Name the element shown above.
You may find your Data Leaflet helpful.

_____ [1]

(c) Complete the table below.

Particle	Relative charge	Relative mass
Proton	+1	
Neutron		1
Electron		$\frac{1}{1840}$

[3]

Examiner Only	
Marks	Remark

4 Emulsifiers are added to foods, e.g. salad cream, to stop the different substances in the food from separating.

(a) For the additives below give **one** reason why they are added to food.

(i) Anti-oxidants.

_____

_____ [1]

(ii) Acid base regulators.

_____

_____ [1]

(iii) Colourings.

_____

_____ [1]

(b) Give **two** reasons why some people are concerned about the use of food additives.

_____

_____ [2]

(c) Discuss the advantages and disadvantages of testing food additives on animals.

_____

_____

_____

_____ [3]

Examiner Only	
Marks	Remark

5 **(a)** Radiometric dating is a scientific method of estimating the age of the Earth using rocks.

Describe how this method is used.

_____

_____

_____

_____ [3]

(b) Another theory on the age of the Earth is based on the book of Genesis in the Bible.

(i) What is the name of the person who based his theory on the book of Genesis?

_____ [1]

(ii) What is the age of the Earth calculated from this method?

_____ [1]

Examiner Only	
Marks	Remark

6 **(a)** Aluminium sulphate has the chemical formula $Al_2(SO_4)_3$.

(i) Complete the table below, to show the number of atoms of each element in the formula for aluminium sulphate.

Element	Numbers of atoms in the formula $Al_2(SO_4)_3$
Aluminium, Al	_____
Sulphur, S	_____
Oxygen, O	_____

[3]

(ii) How many different elements are contained in the formula $Ca(HCO_3)_2$?

_____ [1]

(b) Magnesium hydroxide $Mg(OH)_2$ is used to relieve excess acidity in the stomach.

Complete and balance the symbol equation below.

$Mg(OH)_2 + 2HCl \longrightarrow$ +

[3]

THIS IS THE END OF THE QUESTION PAPER

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