Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2012

Science: Single Award (Modular)

Chemical Patterns and our Environment
Module 3
Foundation Tier

[GSC31]

GSC31

TUESDAY 13 NOVEMBER 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 eight** 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	
7	
8	
Total Marks	

Examiner Only	
Marks	Remark

1 **(a)** Common household substances contain chemicals. Using lines, link each household substance to one chemical it contains.

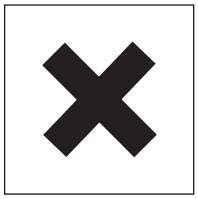
Household substance	Chemical
vinegar	sodium chloride
oven cleaner	citric acid
baking soda	ethanoic acid
lemon juice	sodium hydroxide
	sodium hydrogencarbonate

[4]

(b) Shown below are five hazard symbols and examples of chemicals that use them.

ammonium dichromate

ethanol



sodium hydroxide

hydrochloric acid

barium chloride

(i) Name the chemical shown which uses a toxic (poisonous) symbol.

_____ [1]

(ii) Name the chemical shown which is explosive.

_____ [1]

(iii) What is the name of the hazard symbol which is put on containers of hydrochloric acid?

_____ [1]

(iv) Why should ethanol not be stored near a gas cooker?

_____ [1]

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Marks	Remark

2 The picture below shows a farmer spraying lime on the soil.

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(a) Complete the following sentence.

Choose from:

alkaline **neutral** **acidic**

Farmers add lime to soil because the soil is _____. [1]

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Marks	Remark

(b) Universal Indicator solution was shaken with four soil samples **A**, **B**, **C** and **D**.

The colour of Universal Indicator at different pH values is given below.

Colour	**red**	**orange**	**yellow**	**light green**	**dark green**	**dark blue**	**purple**
pH	1	3	5	7	9	11	13

Use this information to complete the table below.

soil sample	**colour**	**pH**	**acidic, alkaline or neutral**
A		3	
B	dark blue		alkaline
C		7	
D	yellow		acidic

[3]

(c) Which soil sample (**A**, **B**, **C** or **D**) would be best for growing garlic which needs soil with a pH of 5?

_____ [1]

Examiner Only

Marks	Remark

3 Many sweets contain sherbet.

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Marks	Remark

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Complete the following sentences.

Choose from:

citric acid : oxygen : fizzing : hot

icing sugar : carbon dioxide : salt

Sherbet can be made by mixing together baking soda,

_____ and _____ .

A gas called _____ is produced when sherbet

mixes with water in the mouth.

This gas produces a pleasant _____ sensation.

[4]

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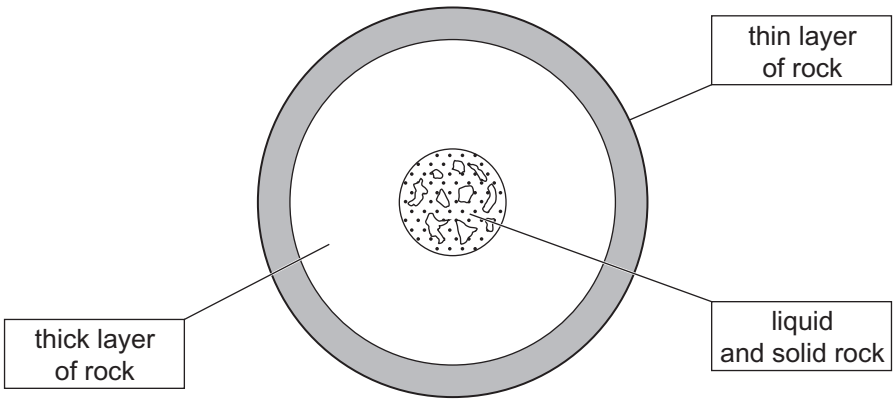
(Questions continue overleaf)

4 The diagram below shows the structure of the Earth.



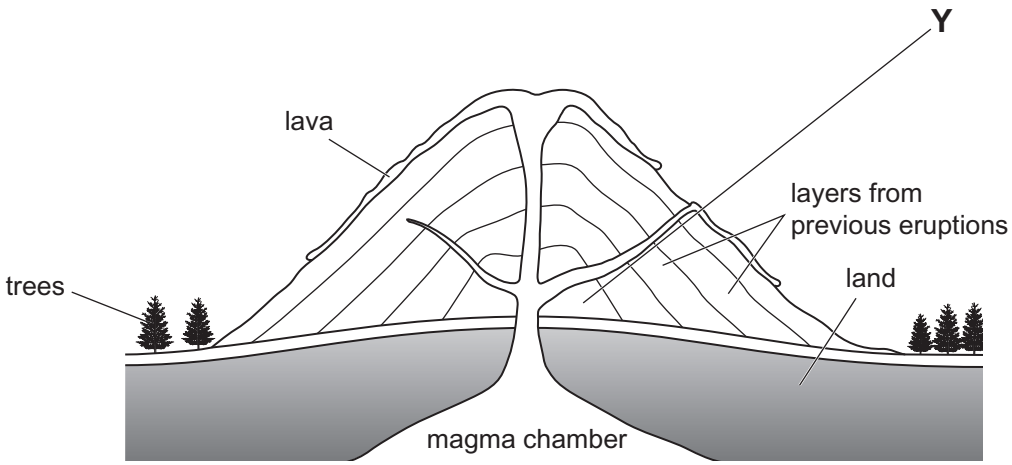
(a) Use the diagram to describe what the mantle is made from.

_____ [1]

(b) What name is given to the outer layer?

_____ [1]

(c) The following diagram shows a section through a volcano.



The line from **Y** shows the first eruption. How many eruptions has this volcano had?

_____ [1]

Examiner Only

Marks	Remark

(d) Describe fully what happens during an eruption and give **one** effect this will have on the surrounding area.

_____

_____

_____

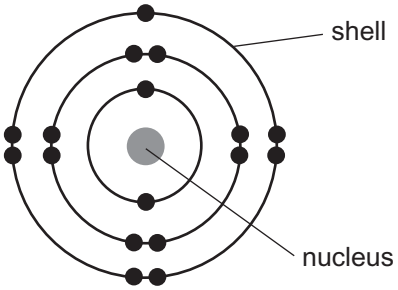
_____

_____ [3]

Examiner Only	
Marks	Remark

5 The diagram below shows the structure of an atom with three shells.

(You may find your Data Leaflet useful in this question.)



(a) Name the particles found in the shells.

_____ [1]

(b) Name the element to which this atom belongs.

_____ [1]

(c) How many protons will be in the nucleus of this atom?

_____ [1]

(d) The mass number of this atom is 35. Calculate how many neutrons the nucleus will contain.

_____ [1]

(e) Name the particles in an atom which have no charge.

_____ [1]

(f) To which Group of the Periodic Table does this element belong?

_____ [1]

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Marks	Remark

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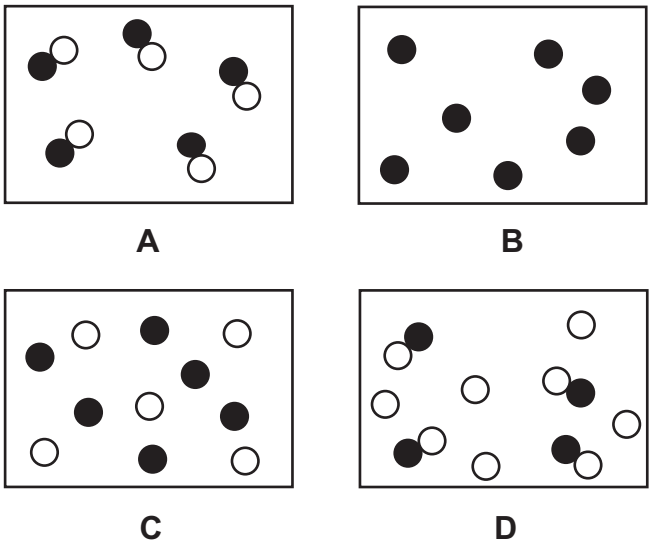
Marks	Remark

6 The following diagrams represent the arrangement of particles in some substances.



(a) Which diagram **A**, **B**, **C** or **D** represents a compound on its own?

_____ [1]

(b) Which diagram **A**, **B**, **C** or **D** represents a mixture of elements?

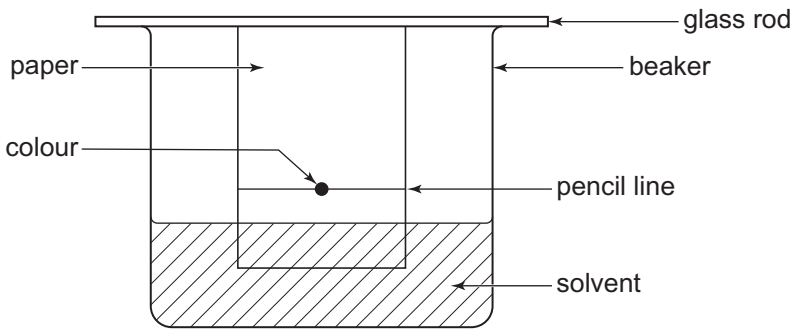
_____ [1]

(c) Which diagram **A**, **B**, **C** or **D** represents one element on its own?

_____ [1]

Examiner Only	
Marks	Remark

7 The method shown below can separate the dyes used to colour sweets.



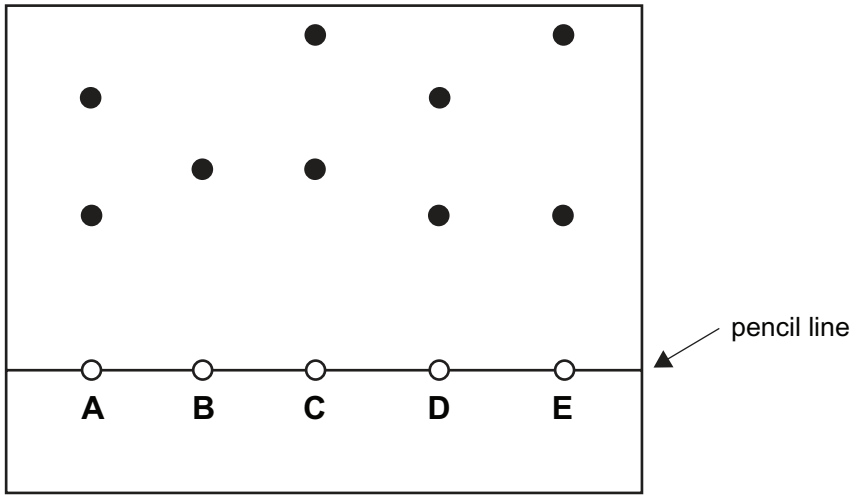
(a) Name this method of separating dyes.

_____ [1]

(b) Why is it important to draw the line in pencil and not in ink?

_____ [1]

The diagram below shows the result of an experiment in which five colours were tested.



(c) Which two colours **A**, **B**, **C**, **D** or **E** contain only the same two dyes?

_____ and _____ [1]

(d) Three of the colours tested contain the same dye.
Using the letters **A**, **B**, **C**, **D** or **E**, give these three colours.

_____ _____ _____ [1]

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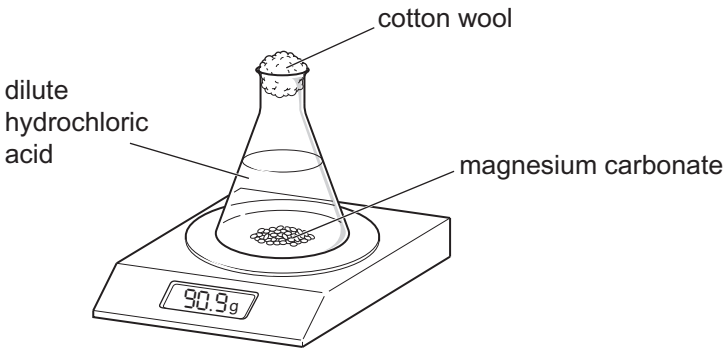
(Questions continue overleaf)

Examiner Only	
Marks	Remark

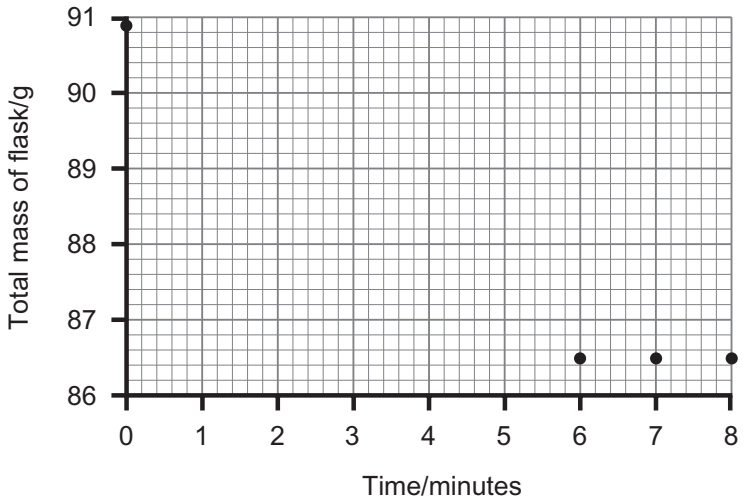
8 John investigated the reaction between hydrochloric acid and **excess** magnesium carbonate.



He measured the mass of the flask and its contents (total mass) every minute. His results are shown below.

Time/minutes	0	1	2	3	4	5	6	7	8
Total mass of flask/g	90.9	89.2	87.8	87.1	86.8	86.6	86.5	86.5	86.5

(a) Complete the graph by plotting the remaining points and draw a line of best fit.



[3]

(b) Describe fully the trend shown by these results.

_____

_____ [2]

(c) How do you know that all the acid was used up in this reaction?

_____

_____ [1]

Given below is the word equation for this reaction.

$$\text{magnesium carbonate} + \text{hydrochloric acid} \rightarrow \text{magnesium chloride} + \text{water} + \text{carbon dioxide}$$

(d) Use this information and your knowledge to explain fully why the total mass decreased during this experiment.

_____

_____ [2]

(e) Cotton wool was used instead of a rubber bung to plug the flask. Suggest a reason why.

_____

_____ [1]

THIS IS THE END OF THE QUESTION PAPER

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Marks	Remark

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