



Centre Number

71

Candidate Number

General Certificate of Secondary Education
2009–2010

Science: Single Award (Modular)

Chemical Patterns and our Environment
Module 3

Foundation Tier

[GSC31]



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 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



- 1 (a) Dangerous chemicals have symbols on their containers.
What name is given to these symbols?

Circle the correct answer.

safety hazard security

[1]

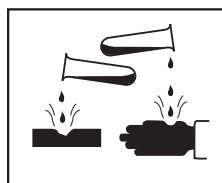
- (b) Why are these symbols used instead of words?

_____ [1]

- (c) Shown below are four of these symbols.



A



B



C



D

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- (i) Which symbol A, B, C or D should be put on a can of petrol?

_____ [1]

- (ii) Nitric acid is corrosive. Which symbol A, B, C or D should be put on a bottle of nitric acid?

_____ [1]

- (iii) Complete the following sentence.

A bottle with symbol C contains a _____ substance. [1]

Examiner Only	
Marks	Remark

2 (a) Match each food additive to its function by drawing straight lines.

The first has been done for you.

Food additive	Function
Anti-oxidants	Controls pH
Flavourings	Alternative to sugar
Emulsifiers	Improves taste
Sweeteners	Stabilises oil and water mixtures
Colourings	Stops fats from going off
	Makes food look attractive

[4]

(b) All additives have a number which starts with a letter of the alphabet. What is this letter?

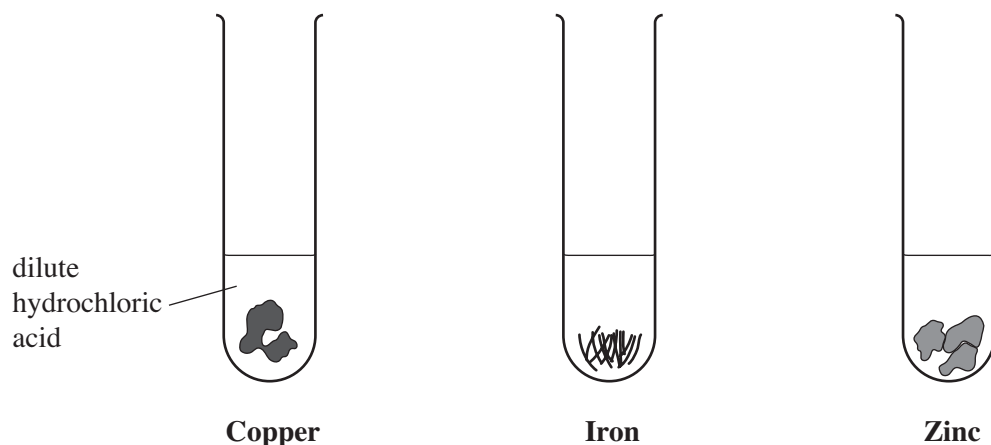
_____ [1]

(c) Give **one** problem with putting additives in food.

_____ [1]

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Marks	Remark
○	○

- 3 Jack wanted to investigate the reactivity of some metals. He added samples of iron, zinc and copper to dilute hydrochloric acid and heated them using a Bunsen burner.



- (a) (i) Which two of the metals gave off a gas when heated in the acid?

_____ and _____ [1]

- (ii) Give the name of the gas produced.

_____ [1]

- (iii) Which of the three metals is the most reactive?

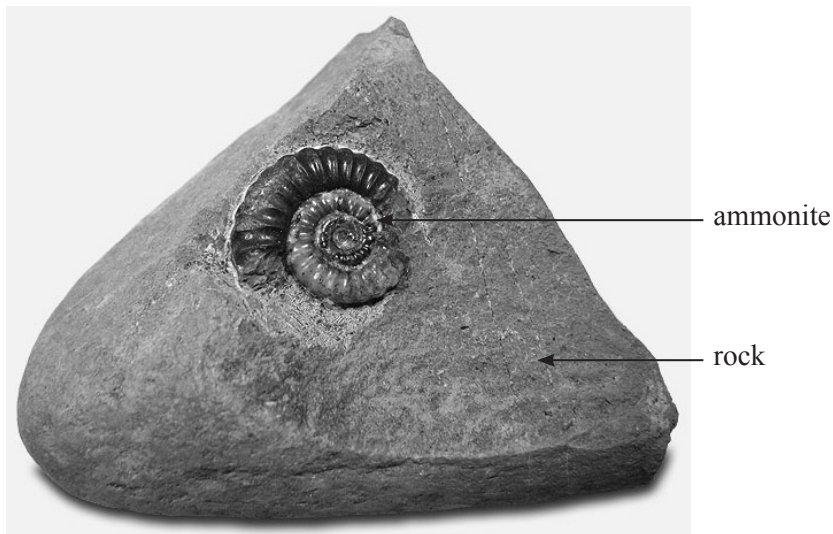
_____ [1]

- (b) Give **one** safety precaution needed for this investigation.

_____ [1]

Examiner Only	
Marks	Remark

- 4 The picture shows an ammonite, an animal which lived in the sea millions of years ago.



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- (a) (i) What name is given to animal remains found in rocks?

_____ [1]

- (ii) Name the **type** of rock in which animal remains are found?

_____ [1]

- (iii) When this type of rock is affected by pressure over long periods of time it can be changed into another type of rock. Name this new **type** of rock.

_____ [1]

- (b) Complete the table.

Type of rock	Example 1	Example 2
igneous		basalt
	sandstone	mudstone
metamorphic		slate

[3]

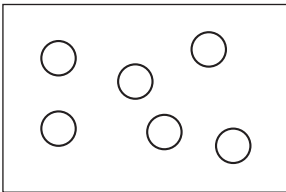
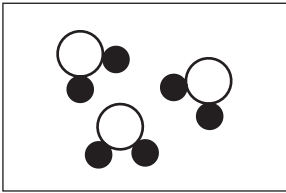
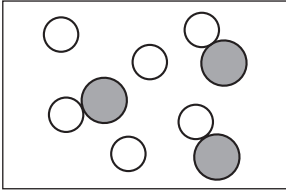
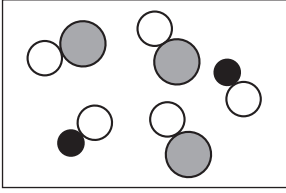

Examiner Only	
Marks	Remark
○	○

5 In the diagrams below different atoms are represented by symbols.



Draw **one** line from each diagram to the description which best describes it.

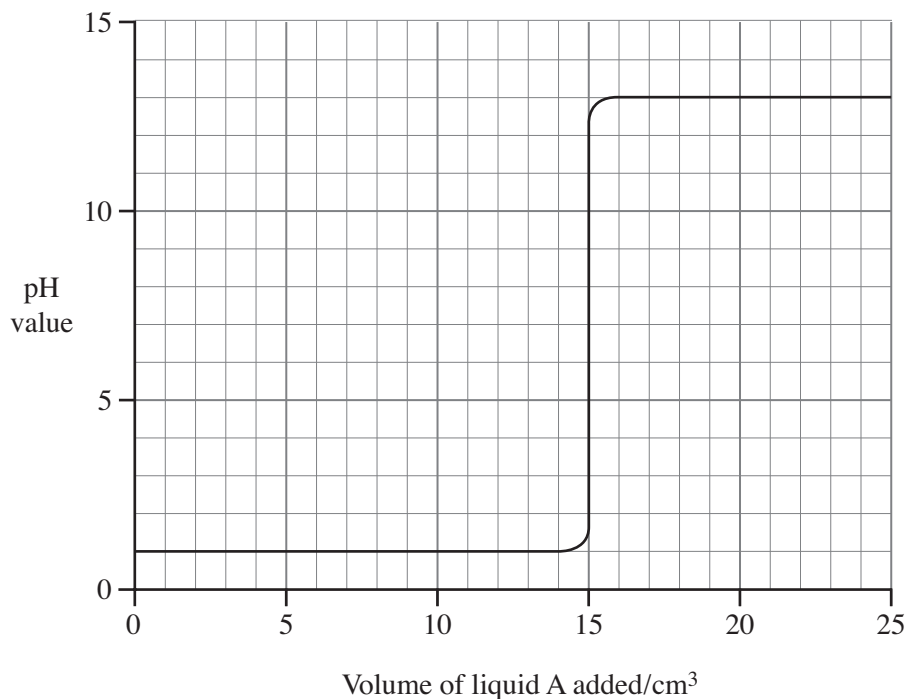
The first has been done for you.

Diagram	Description
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">A mixture of two elements</div>
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">An element</div>
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">A mixture of two compounds</div>
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">A compound</div>
	<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">A mixture of an element and a compound</div>

Examiner Only	
Marks	Remark
<div style="border: 1px solid black; border-radius: 50%; width: 80%; height: 80%; margin: 0 auto;"></div>	<div style="border: 1px solid black; border-radius: 50%; width: 80%; height: 80%; margin: 0 auto;"></div>

[3]

- 6 The pH changes during a reaction were measured in the laboratory using a pH probe. The following graph was produced.



In the experiment 15 cm³ of liquid X was measured into a conical flask. Liquid A was then added slowly.

- (a) What was the pH value of liquid X at the start of the experiment?

_____ [1]

- (b) Give the name of a suitable piece of apparatus for adding liquid A.

_____ [1]

- (c) What volume of liquid A was needed to cause a sharp change in the pH value?

_____ cm³ [1]

- (d) What name is given to a reaction in which acids react with alkalis?

_____ [1]

- (e) Using the pH values suggest names for liquid X and liquid A.

liquid X _____

liquid A _____ [2]

Examiner Only	
Marks	Remark
○	○

- 7 The table below gives information about the numbers of electrons in an atom of each of the elements A, B, C, D and E.

Element	No. of electrons in 1st shell	No. of electrons in 2nd shell	No. of electrons in 3rd shell
A	2	1	
B	2	4	
C	2	8	
D	2	8	1
E	2	6	

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

- (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 is a Noble gas?

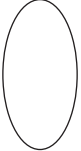

_____ [1]

- (c) Which two elements A, B, C, D or E are in the same Group of the Periodic Table?

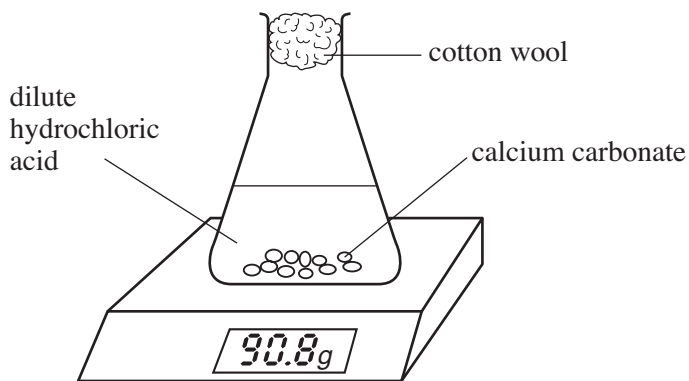
_____ and _____ [1]

- (d) Give the name of element D.

_____ [1]

Examiner Only	
Marks	Remark
	

- 8 Mary investigated the reaction between hydrochloric acid and excess calcium carbonate.

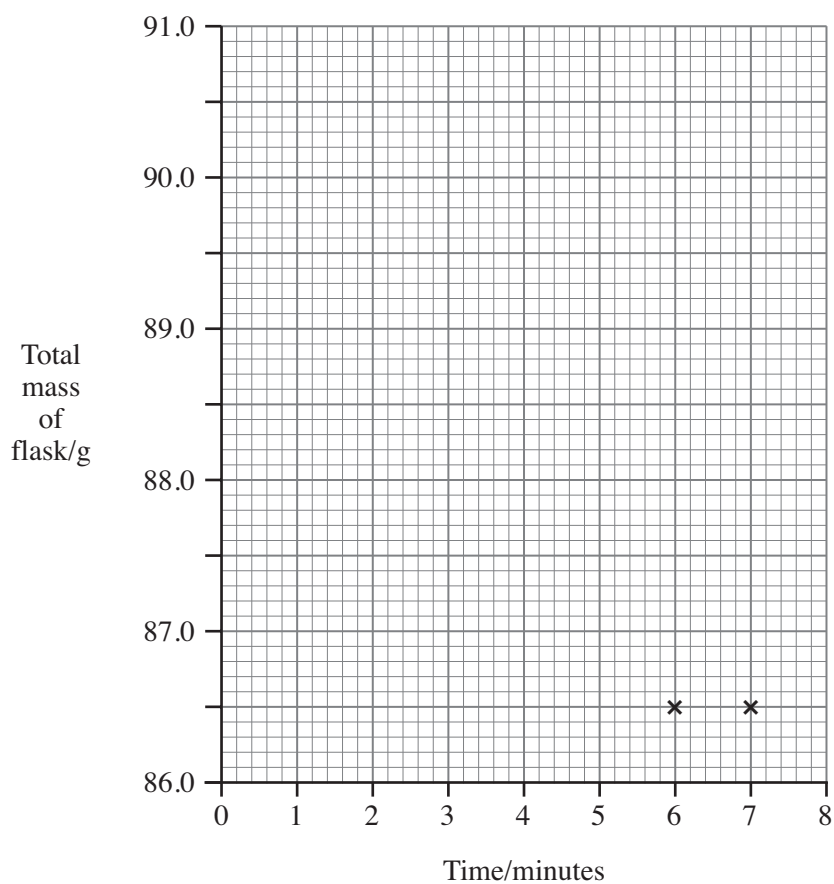


She measured the mass of the flask and its contents every minute.

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

Time/ minutes	0	1	2	3	4	5	6	7
Total mass of flask/g	90.8	88.9	87.5	87.0	86.7	86.6	86.5	86.5

[3]



Examiner Only	
Marks	Remark
○	○

THIS IS THE END OF THE QUESTION PAPER

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