

| Centre Number | | | | |
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| 71 | | | | |
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Candidate Number

General Certificate of Secondary Education 2011–2012

Science: Single Award (Modular)

Chemical Patterns and our Environment

Module 3

Higher Tier

[GSC32]



WEDNESDAY 9 NOVEMBER 2011 9.15 am-10.00 am

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 ${\bf all\ six}$ 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 | | | |

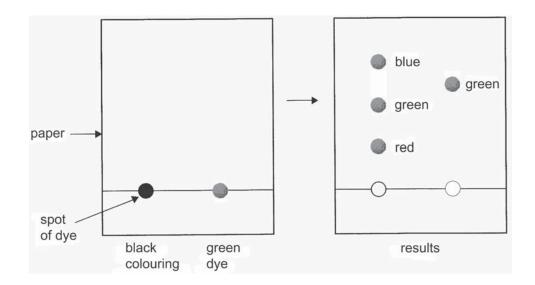


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1 Emma investigated if a green dye was used in making a certain black colouring which is used in baking.

Examiner Only Marks Remark

She carried out an experiment and obtained the following results.



(a) What name is given to this type of experiment?

_____[1]

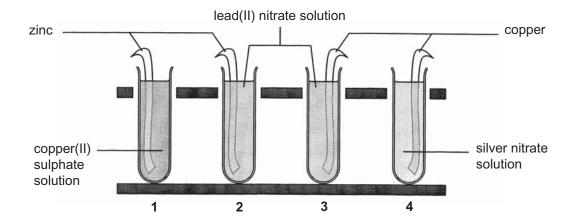
(b) Which dye from the black colouring was the most soluble in this experiment?

_____[1]

(c) Explain fully what Emma has found out from her results.

[2]

2 The diagram below shows four solutions into which strips of metal were placed.



After several hours the following results were obtained.

- **Test tube 1:** solution lost its blue colour and a reddish brown deposit was seen on the metal strip.
- **Test tube 2:** solution remained colourless and a greyish white deposit was seen on the metal strip.
- **Test tube 3:** solution remained colourless and the metal strip remained shiny with no deposit.
- **Test tube 4:** solution turned blue and a deposit was seen on the metal strip.

Use this information to answer the following questions.

- (a) Why are reactions like these described as displacement reactions?

 [1]
- (b) Name the reddish brown deposit formed on the zinc in test tube 1.

 [1]
- (c) Why did the solution lose its blue colour in test tube 1?

 [1]

| (d) | Explain fully the result for test tube 3. | Examiner Only Marks Remark |
|-----|---|-------------------------------|
| | | [2] |
| (e) | Two products were formed in test tube 4. Name these two products. | |
| | and | [2] |
| (f) | Which of the metals involved is the least reactive? | |
| | Circle the correct answer. | |
| | copper zinc lead silver | [1] |
| | Explain fully why sodium would not be a suitable metal for this experiment. | |
| | | [2] |

3 (a) Aluminium is an element which has 13 electrons.

Examiner Only Marks Remark

In the space below draw a diagram to show how all these electrons are arranged in an atom of aluminium.

[2]

(b) Complete the table below about the particles in an atom.

| Particle | Mass | Charge |
|----------|--------|--------|
| electron | 1/1840 | |
| neutron | | 0 |
| | 1 | +1 |

[3]

 $\mbox{(c)}\;\;\mbox{Use your Data Leaflet to name the formulae given below .}$

| (i) | CaCO | |
|-----|------|--|
| | | |

6



| | © Tangerine Confectionery Ltd | |
|-----|--|---------|
| (a) | Give the chemical name and formula for baking soda. | |
| | Name | |
| | Formula | [2] |
| (b) | Sherbet is made from a mixture of baking soda and citric acid which react together in the mouth to produce a cooling sensation. | 1 |
| | Write a complete word equation for this reaction. | |
| | | [4] |
| (c) | Baking soda is also used to make honeycomb. In this reaction the baking soda is added to a mixture of golden syrup and sugar which has been allowed to come to the boil in a saucepan. | |
| | Describe fully the chemical reaction which takes place in the saucepan. | |
| | | |
| | | [3] |
| (d) | Why would adding vinegar to the honeycomb mixture improve the height of the honeycomb? | |
| | | [2] |

| 5 | (a) | The | ere are different ideas about the age of the Earth. | | Examiner Marks Ren | |
|---|-----|--|--|-----|-----------------------|-------|
| | | One is based on the Book of Genesis in the Bible and involves counting the generations of ancestors. | | | | nan (|
| | | (i) | Name the person who is known to have based his ideas on the Book of Genesis. | 9 | | |
| | | | | [1] | | |
| | | (ii) | What is the age of the Earth calculated from this method? | | | |
| | | | | [1] | | |
| | And | other | theory is based on radiometric dating. | | | |
| | (b) | Des | scribe how radiometric dating is used to find the age of the Eartl | n. | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | [3] | | |
| | | | | | | |
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| 6 | Indigestion | is caused | when there | is too | much | acid in | the stomach. |
|---|-------------|-----------|------------|--------|------|---------|--------------|
|---|-------------|-----------|------------|--------|------|---------|--------------|

Examiner Only Marks Remark

One of the substances used to treat indigestion is called Milk of Magnesia.

- (a) The chemical name for this product is magnesium hydroxide, Mg(OH) $_2$. How many different elements are present in this compound?
- **(b)** When used to treat indigestion, name the type of chemical reaction that takes place in the stomach.

_____[1]

(c) Complete and balance the symbol equation for this reaction.

 $Mg(OH)_2 + HCI \longrightarrow +$ [3]

(d) Tablets containing calcium carbonate can also be used to relieve indigestion. Complete the symbol equation below.

 $CaCO_3 + 2HCI \longrightarrow CaCl_2 + +$ [2]

THIS IS THE END OF THE QUESTION PAPER

9

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