

Rewarding Learning General Certificate of Secondary Education 2010-2011

## Science: Single Award (Modular)

Chemical Patterns and our Environment Module 3

Foundation Tier
[GSC31]

## TUESDAY 9 NOVEMBER 2010, AFTERNOON

## 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 seven 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 <br> use only |  |
| :---: | :---: |
| Question <br> Number | Marks |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |

Total
Marks

1 (a) The pictures below show substances found in the home. Draw one line from each substance to the chemical it contains.

Household substance


Sodium hydroxide
(b) What name is given to a substance which can change colour in acids and alkalis?

Choose from:
neutraliser base indicator medicine
neutraliser
base
indicator
medicine
$\qquad$
(c) Smoke alarms have the hazard symbol shown below.

(i) What type of hazardous material is found in smoke alarms?
$\qquad$
(ii) In the space below draw the hazard symbol which should be put on a can of petrol.

(iii) What name is given to this hazard symbol?

2 (a) The pH scale is shown below.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |

(i) What is the pH number of pure water?
(ii) Which of the following could have a pH of 1?

Circle the correct answer.
lemon juice : sodium hydroxide : hydrochloric acid
(iii) How would you describe a liquid with a pH of 10 ?

Circle the correct answer.
strong acid : weak alkali : strong alkali

The picture below shows a farmer putting lime on the soil.

© $N$ Herendeen
(b) Explain fully why farmers sometimes put lime on the soil.
$\qquad$
$\qquad$
$\qquad$
$\qquad$

3 The diagram shows an atom of nitrogen.

(a) Name the parts labelled A, B, and C on the diagram above.
(b) Complete the following sentence.

Choose from:

$$
7
$$

$$
14
$$

The atomic number of nitrogen is $\qquad$ .
(c) An oxygen atom has eight electrons.

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

© Ruth Wilson - Scotproof
The instructions for making Yellow Man are given below. They are not in the correct order.

A Heat the mixture until it boils.
B Pour the mixture onto a tray.
C Add the baking soda and stir.
D When it is cool enough, cut into chunks.
E Mix the sugar with the golden syrup and vinegar.
(a) Put these stages in the correct order using the letters $\mathbf{A}, \mathbf{B}, \mathbf{C}, \mathbf{D}$ and E .

The first one is done for you.
E $\qquad$
$\qquad$
$\qquad$
(b) What would you see after the baking soda was added at stage $\mathbf{C}$ ?
$\qquad$
(c) Name the gas that causes the bubbles to form in the toffee.
$\qquad$
(d) This recipe includes vinegar. When vinegar is added the baking soda undergoes two different types of chemical reaction during the cooking process.
Circle the two correct reaction types.
neutralisation : displacement $:$ thermal decomposition
combustion : oxidation

5 The table below gives some elements from four different groups of the Periodic Table.

| A | B | C | D |
| :--- | :--- | :--- | :--- |
| carbon | helium | chlorine | lithium |
| silicon | neon | bromine | sodium |
| lead | argon | iodine | potassium |

Use the information in the table and your Data Leaflet to answer the following questions.
(a) (i) Which group $A, B, C$ or $D$ belong to the halogens?
(ii) Which group $\mathbf{A}, \mathbf{B}, \mathbf{C}$ or $\mathbf{D}$ is described as being chemically inert?
(iii) Give the name for this group of inert elements.
(iv) What name is given to the type of elements in group $\mathbf{D}$ ?
(b) State three things that would happen if a small piece of lithium was dropped into a trough of cold water.

1 $\qquad$

2 $\qquad$
3

6 (a) In February 2008 there was a small earthquake in the south of England. It happened at one o'clock in the morning.

Suggest two reasons why it could injure more people so early in the morning.
$\qquad$
$\qquad$
$\qquad$
(b) The table below shows the effects of different strengths of earthquakes.

| Number on <br> Richter Scale | Effect of earthquake |
| :---: | :--- |
| 2 | Trees sway, ponds ripple, doors swing slowly. People <br> cannot tell that it is an earthquake. |
| 4 | Buildings shake, dishes rattle, windows rattle. |
| 6 | Furniture moves, plaster can fall, walls may crack. |
| 8 | Buildings fall down, bridges collapse, lives are lost. |

Earthquakes are quite common in the UK, but most are less than 2 on the Richter Scale.
Suggest one reason why most are not reported and explain your answer.
$\qquad$
$\qquad$
$\qquad$
(c) Given below are some comments from BBC reporters just after the 2008 earthquake.
"Everything started wobbling. The windows were rattling and the blinds were moving."
"I went outside in my dressing gown to see if the roof had collapsed."
"Cracks appeared in the ceiling and some plaster fell. All the cupboard doors flew open."

Using this information and the table opposite suggest what number on the Richter Scale best describes the 2008 earthquake.

Circle the correct answer.
1
3
5
7
9
(d) In January 2010 there was a major earthquake in Haiti which measured 7 on the Richter Scale. Describe what causes an earthquake, and explain why it is not possible to warn people.
$\qquad$
$\qquad$
$\qquad$
$\qquad$
(e) Give one reason why it would be important to be able to warn people that an earthquake is about to happen.
$\qquad$
$\qquad$

7 A student set up an experiment to investigate the dyes in a black food colouring.

He wanted to compare the dyes with the permitted colours E102, E122 and E142 and to find out if any other dyes were present.
His results are shown below.

(a) Name this method of separation.
$\qquad$
(b) Describe fully what the student discovered as a result of this experiment.
$\qquad$
$\qquad$
$\qquad$
$\qquad$
(c) Food colourings are tested on animals.

Give one advantage and one disadvantage of animal testing.
$\qquad$
$\qquad$
$\qquad$
$\qquad$

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