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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

B641/01

GATEWAY SCIENCE

CHEMISTRY B

Unit 1 Modules C1 C2 C3 (Foundation Tier)

WEDNESDAY 26 MAY 2010: Morning

DURATION: 1 hour

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

**Candidates answer on the Question Paper
A calculator may be used for this paper**

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Pencil

Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully and make sure that you know what you have to do before starting your answer.**
- **Answer ALL the questions.**
- **Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).**

INFORMATION FOR CANDIDATES

- **The number of marks is given in brackets [] at the end of each question or part question.**
- **The total number of marks for this paper is 60.**
- **The Periodic Table is printed on the back page.**

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Answer ALL the questions.

SECTION A – MODULE C1

1 This question is about foods and food additives.

Look at the table. It gives some information about E numbers.

| TYPE OF FOOD ADDITIVE | E NUMBER RANGE |
|-----------------------|----------------|
| food colour | E101 to E199 |
| preservative | E200 to E299 |
| antioxidant | E300 to E321 |
| emulsifier | E400 to E499 |
| sweetener | E950 to E967 |

Look at the food label found on a packet of cake mix.

INGREDIENTS:

Sugar, wheat flour, vegetable oil, baking powder, E341, dried whey, E477, E471, salt and E415.

(a) What type of food additive is E477?

_____ [1]

(b) Which ingredient is present in the SMALLEST amount?

_____ [1]

- (c) One of the ingredients in the cake mixture is baking powder.

Write down ONE reason why baking powder is used for baking cakes.

_____ [1]

- (d) Baking powder contains sodium hydrogencarbonate.

When sodium hydrogencarbonate is heated it breaks down.

Look at the word equation for the breakdown of sodium hydrogencarbonate.



Write down the name of one PRODUCT of this reaction.

_____ [1]

- (e) How can you test for CARBON DIOXIDE gas?

name of the chemical used

result you would expect to see

_____ [2]

[Total: 6]

- 2 An elephant in a zoo has an injured foot. A vet makes a shoe for the elephant.



The shoe is made out of Gore-Tex®.

The shoe is hard-wearing and waterproof. It is also breathable.

- (a) Suggest ONE reason why the elephant's shoe was NOT made out of nylon.

[1]

(b) Gore-Tex[®] and nylon are both polymers.

It can be difficult to dispose of some polymers.

Look at the list of sentences about the disposal of polymers.

Which sentences are correct?

Put ticks (✓) in the TWO boxes next to the correct sentences.

Most polymers break down quickly in landfill sites.

Some polymers release toxic fumes when burned.

Microbes decompose biodegradable polymers.

Recycling polymers wastes valuable resources.

Polymers are easy to sort for recycling.

[2]

(c) Polymers are very large molecules.

They are made from small molecules called monomers.

This is shown in the equation.



(i) What is the name of process A?

_____ [1]

(ii) Polystyrene is made from styrene.

Ethene is used to make a polymer.

Write down the NAME of this polymer.

_____ [1]

(d) Polystyrene is a polymer.

Write down ONE use of polystyrene.

_____ [1]

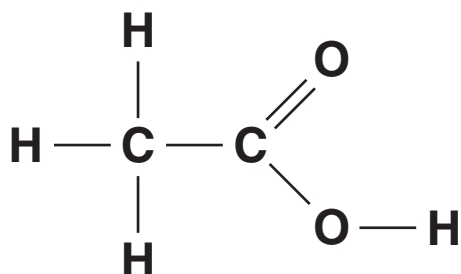
[Total: 6]

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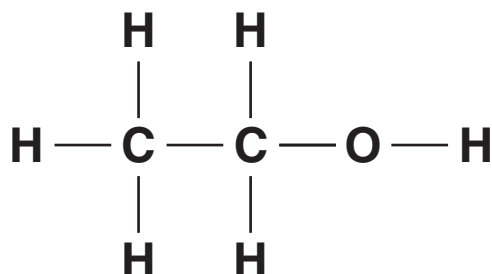
3 This question is about compounds that contain carbon.

Look at the displayed formulas of some compounds.

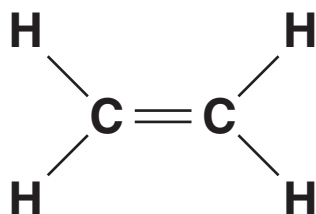
ethanoic acid



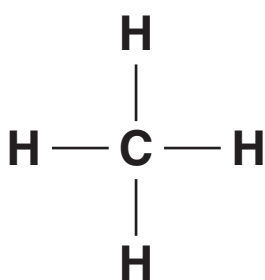
ethanol



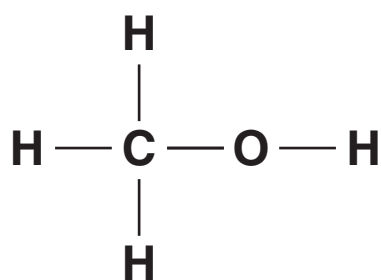
ethene



methane



methanol



(a) Write down the NAME of a compound that is a hydrocarbon.

Choose from the compounds shown.

_____ [1]

(b) Write down the NAME of a compound that is an alkane.

Choose from the compounds shown.

_____ [1]

(c) Look at the displayed formula for ethanol.

How many ATOMS are shown in the displayed formula?

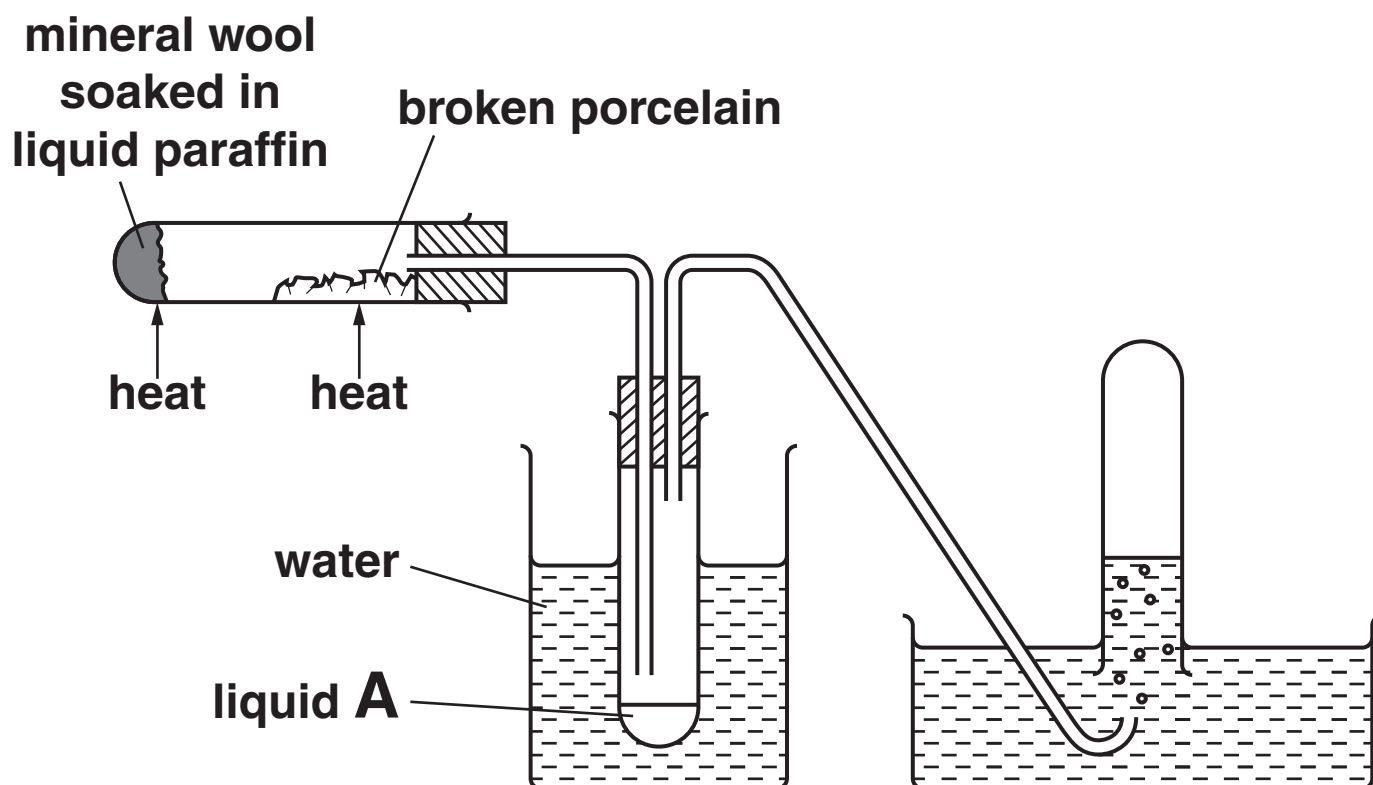
_____ [1]

[Total: 3]

4 This question is about cracking.

Cracking is an important reaction used in the oil industry.

Look at the diagram. It shows the apparatus that can be used in a laboratory to crack liquid paraffin.



(a) What is the name of liquid **A?**

Choose from the list.

bitumen

petrol

water

answer _____ [1]

(b) Cracking is used to make ethene.

ON THE DIAGRAM put the letter **X to show where ethene is collected. [1]**

(c) Write about cracking.

Your answer should include

- the conditions needed for cracking**
- what happens to hydrocarbon molecules during cracking**
- why cracking is a useful reaction.**

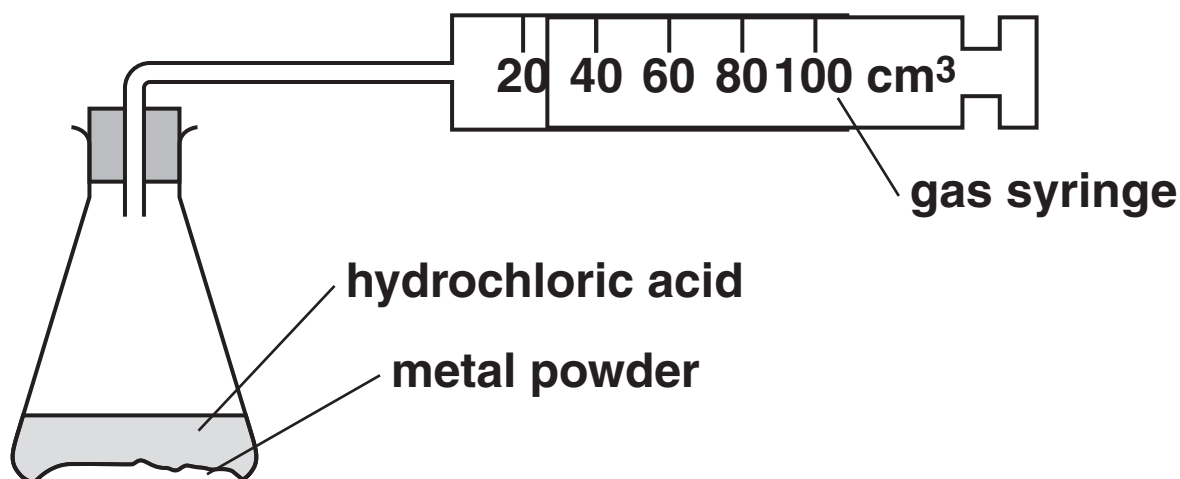
[3]

[Total: 5]

SECTION B – MODULE C2

- 5 Cameron investigates the reaction of metal powders with dilute hydrochloric acid.

Look at the apparatus he uses.



Cameron measures the time it takes to collect 100 cm³ of hydrogen in the gas syringe.

He makes sure that all of his experiments are fair.

Look at the bar chart of Cameron's results.

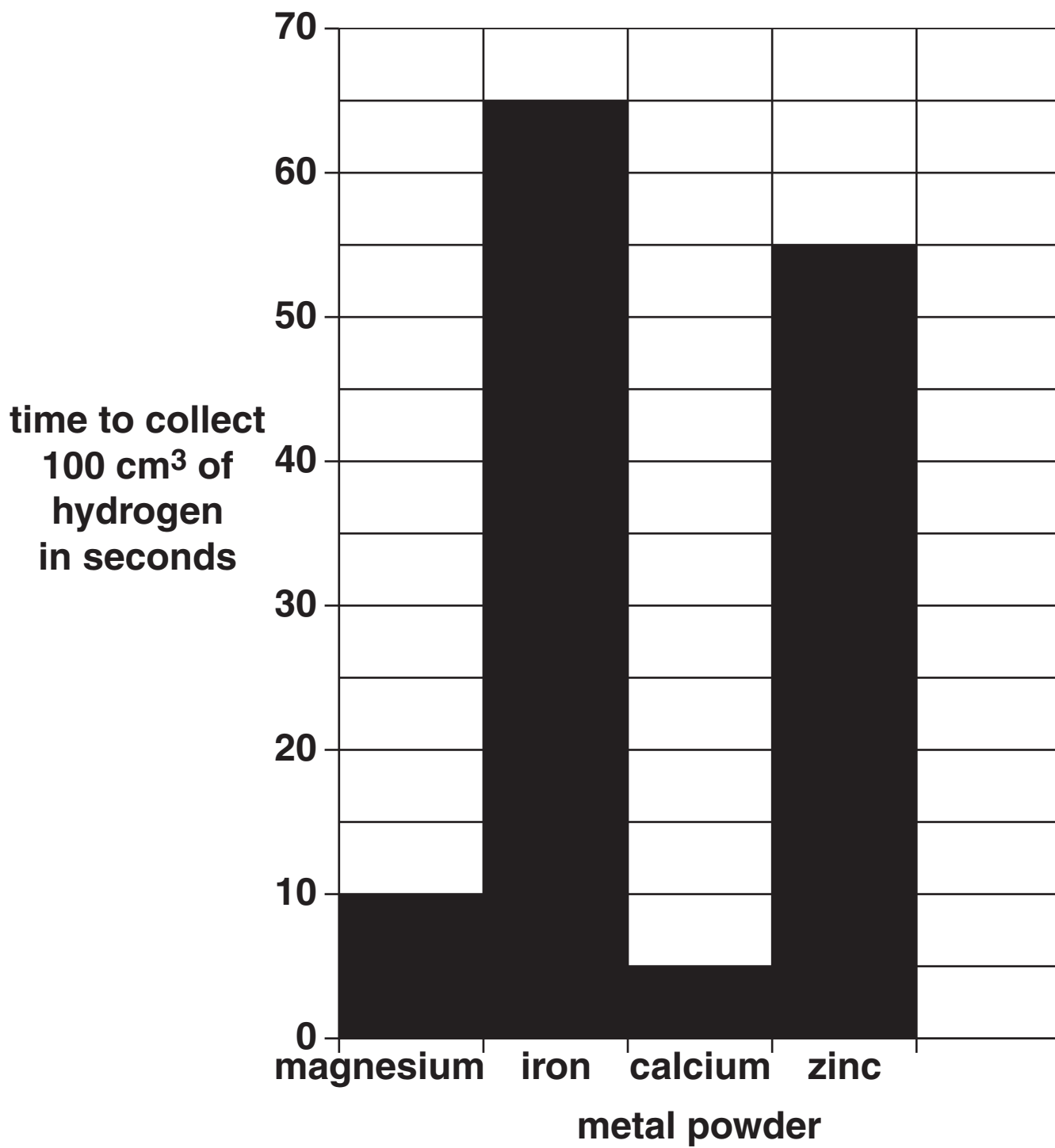
- (a) Look at the bar for MAGNESIUM.

How long does it take to collect 100 cm³ of hydrogen?

_____ seconds [1]

- (b) Which metal takes the LONGEST time to collect 100 cm³ of hydrogen?

_____ [1]



(c) Cameron repeats the experiment with zinc.

This time he uses a MORE concentrated solution of hydrochloric acid.

What happens to the time it takes for the zinc to make 100 cm³ of hydrogen?

Explain your answer.

[2]

(d) Cameron does the experiment with zinc again.

This time he uses acid at a HIGHER temperature.

The reaction is much FASTER.

Explain why.

Use ideas about particles.

[2]

(e) Cameron does the experiment with zinc again.

This time he uses a LUMP of zinc rather than zinc POWDER.

What happens to the rate of reaction?

Explain your answer.

[2]

[Total: 8]

6 This question is about air.

Air contains oxygen, carbon dioxide and water vapour.

Air also contains pollutants such as carbon monoxide, oxides of nitrogen and sulfur dioxide.

(a) Write down the name of ONE OTHER gas found in air.

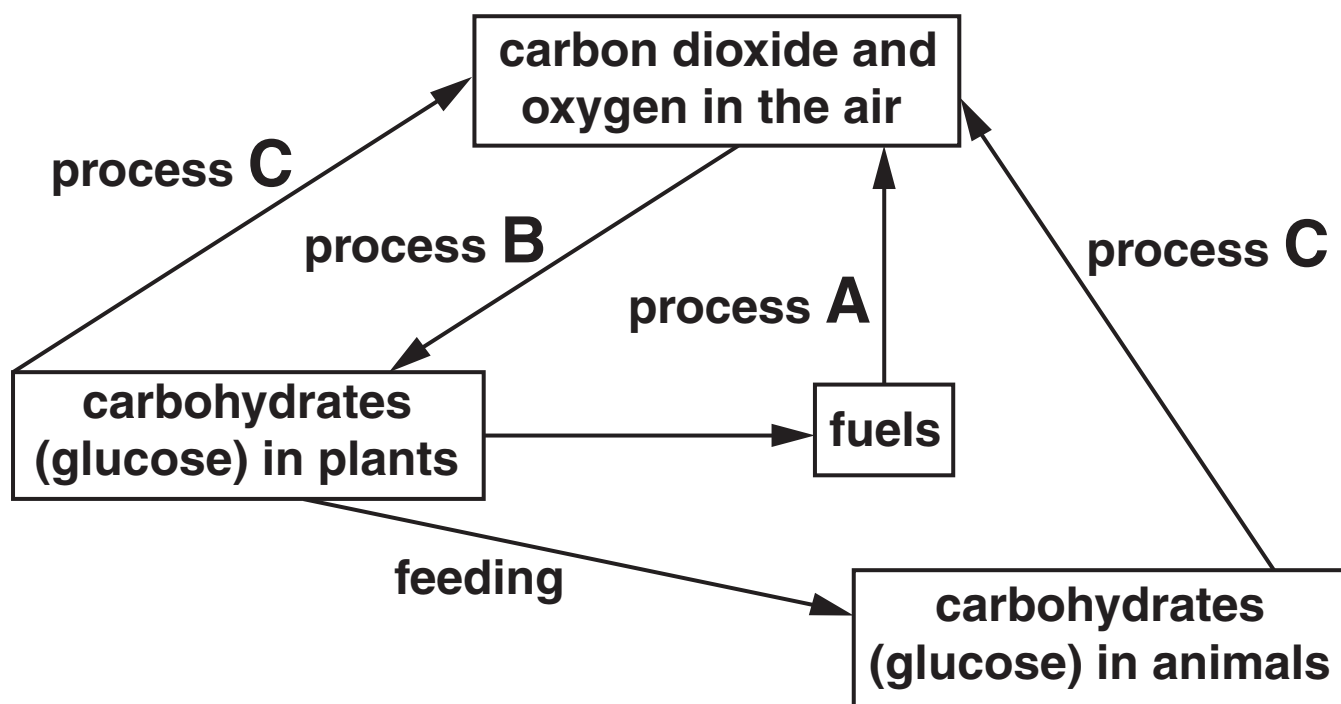
_____ [1]

(b) The levels of oxygen and carbon dioxide in the air are almost constant.

The carbon cycle helps to keep these levels constant.

Look at the diagram.

It shows a simple carbon cycle.



(i) Find process **A** on the diagram.

It increases the level of carbon dioxide and decreases the level of oxygen in the air.

What is the name of process **A**?

_____ [1]

(ii) Find process **B** on the diagram.

It decreases levels of carbon dioxide and increases levels of oxygen in the air.

What is the name of process **B**?

_____ [1]

(iii) Find process **C** on the diagram.

It increases the level of carbon dioxide and decreases the level of oxygen in the air.

What is the name of process **C**?

_____ [1]

(c) Oxides of nitrogen are pollutants in the air.

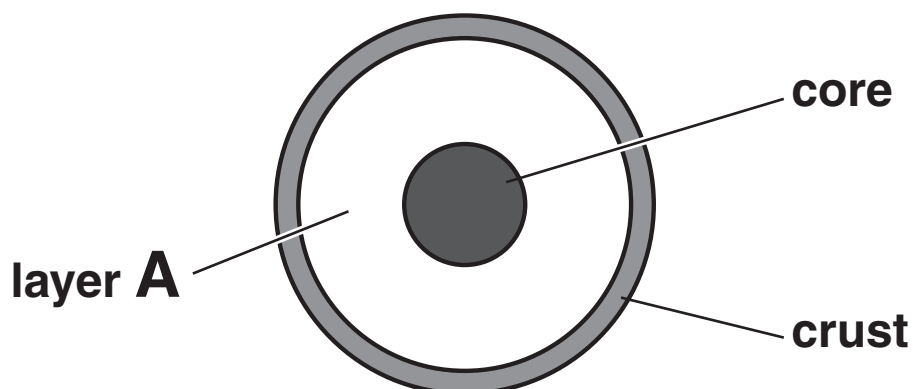
Write down one problem caused by oxides of nitrogen in the air.

_____ [1]

[Total: 5]

7 The Earth is made of several layers.

Look at the diagram. It shows the structure of the Earth.



(a) What is the name of layer **A?**

_____ [1]

(b) What is the name of the main element that makes up the core?

Choose from

calcium

carbon

hydrogen

iron

silicon

answer _____ [1]

(c) The crust consists of tectonic plates.

The tectonic plates move very slowly.

Finish the sentence.

The movement of tectonic plates can cause

volcanoes and _____ . [1]

(d) Lava is liquid (molten) rock that erupts from a volcano.

(i) What TYPE of rock is made when lava cools down?

Choose from

igneous

magma

metamorphic

sedimentary

answer _____ [1]

(ii) Lava often cools down very rapidly.

Describe how the rate of cooling affects the size of crystals in the rock.

_____ [1]

(e) Construction materials are used to make buildings.

Brick and glass are construction materials.

Brick and glass are made from rocks from the Earth's crust.

(i) Look at the table about brick and glass.

Finish the table.

| CONSTRUCTION MATERIAL | ROCK FROM WHICH THE CONSTRUCTION MATERIAL IS MADE |
|------------------------------|--|
| brick | clay |
| glass | _____ |

[1]

(ii) Write down the name of ONE OTHER construction material.

_____ [1]

[Total: 7]

SECTION C – MODULE C3

8 This question is about the elements in the Periodic Table.

Look at the list of elements.

| | |
|-----------|------------|
| aluminium | oxygen |
| argon | phosphorus |
| chlorine | potassium |
| helium | sodium |
| iodine | sulfur |

Answer the questions.

Choose ALL your answers from the list.

Each element can be used ONCE, MORE THAN ONCE or NOT AT ALL.

The Periodic Table may help you.

(a) Write down the NAME of an element in Group 1 (an alkali metal).

_____ [1]

(b) Write down the NAME of the element used for sterilising cuts and wounds.

_____ [1]

(c) Write down the NAME of the element with atomic number 16.

_____ [1]

(d) Write down the NAME of the element with 8 electrons in its outer shell.

_____ [1]

(e) Write down the NAME of an element that forms a positive ion.

_____ [1]

[Total: 5]

9 The Group 7 elements are called the halogens.

Look at the table.

It shows some information about the halogens.

| element | molecular formula | colour | state at room temperature |
|----------|-------------------|-------------|---------------------------|
| fluorine | F_2 | pale yellow | gas |
| chlorine | Cl_2 | pale green | gas |
| bromine | Br_2 | _____ | liquid |
| iodine | I_2 | dark grey | _____ |
| astatine | At_2 | black | solid |

(a) Complete the table to show

- the COLOUR of bromine
- the STATE of iodine at room temperature. [2]

(b) Which is the most reactive halogen?

_____ [1]

(c) Sodium reacts with chlorine.

Sodium chloride is made.

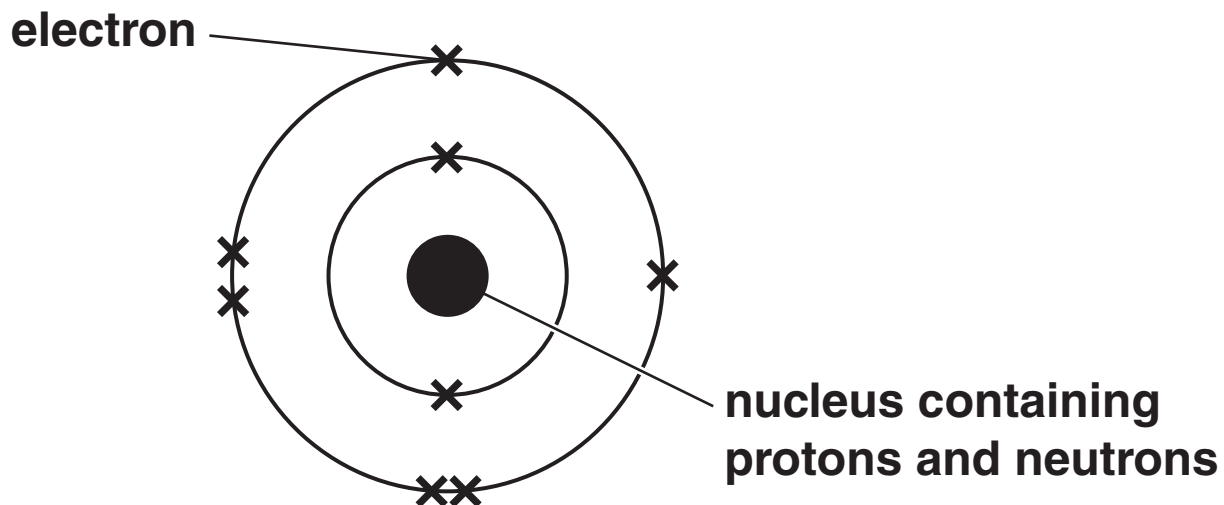
Write down a USE for sodium chloride.

_____ [1]

[Total: 4]

10 This question is about atoms.

Look at the diagram. It shows an oxygen atom.



- (a) (i) How many electrons are there in an oxygen atom?**

_____ [1]

- (ii) What is the electrical charge on an electron?**

Choose from the list.

negative

neutral

positive

answer _____ [1]

(b) What is the electrical charge on the nucleus?

Choose from the list.

negative

neutral

positive

answer _____ **[1]**

(c) Oxygen is in period 2 of the Periodic Table.

Use the diagram of the oxygen atom to explain why oxygen is in period 2.

_____ **[1]**

[Total: 4]

11 A company has created a new toy car that uses hydrogen and oxygen.



(a) Hydrogen and oxygen react to make water.

Write a WORD EQUATION for this reaction.

_____ [1]

(b) What is the test for HYDROGEN gas?

Your answer should include

- what you would do
- the result of the test.

_____ [2]

(c) The hydrogen and oxygen can both be made by ELECTROLYSIS.

Draw a straight line between each WORD and its correct DESCRIPTION.

You should draw only three lines.

WORD

DESCRIPTION

anode

a negative electrode

cathode

a liquid that conducts
electricity during electrolysis

electrolyte

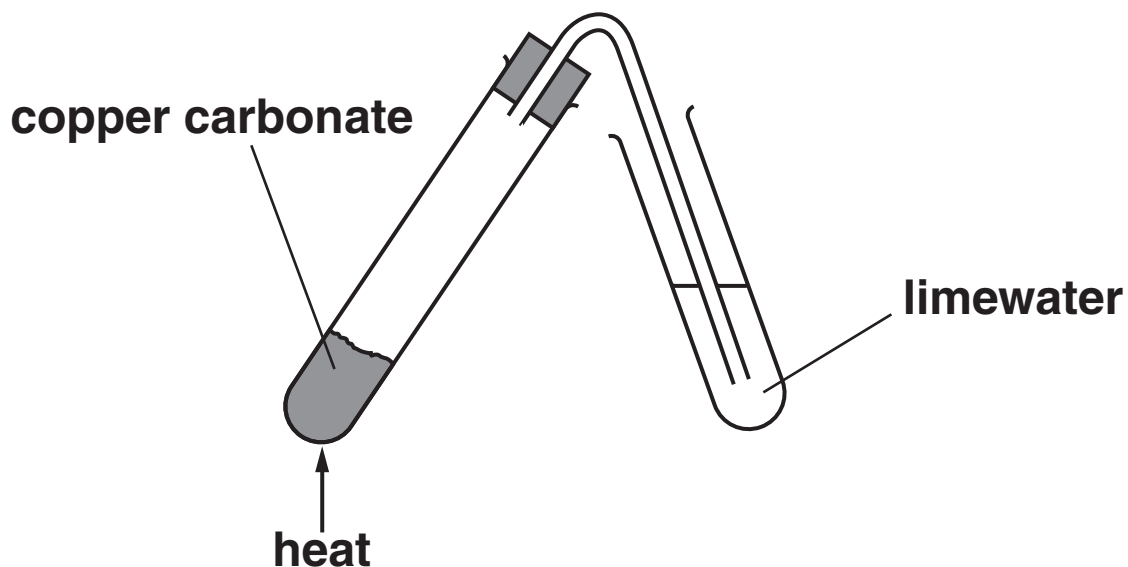
a positive electrode

[2]

[Total: 5]

12 Helen and Brian heat copper carbonate.

Look at the diagram. It shows the apparatus they use.



(a) The word equation for the reaction is

copper carbonate \rightarrow copper oxide + carbon dioxide

This is an example of THERMAL DECOMPOSITION.

What is meant by thermal decomposition?

_____ [1]

(b) The formula of copper carbonate is **CuCO_3** .

How many different ELEMENTS are combined together in copper carbonate?

_____ [1]

[Total: 2]

END OF QUESTION PAPER



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