

## 9G Environmental chemistry

### Assessment for learning...year 9 (level 3-6)

Answer all questions:

Total marks	31
Time allowed	25 mins.

#### Question 1:

This table shows where different pollutants in the air come from.

pollutants	source of pollutants		
	percentage from power stations	percentage from road traffic	percentage from other sources
sulphur dioxide	72	2	26
nitrogen oxides	28	51	21
smoke	6	46	48
carbon monoxide	1	90	9

(a) Which **two** pollutants in the table above cause acid rain?

1. ....

2. ....

2 marks

(b) Lichens are organisms which grow on buildings and trees. They are affected by some pollutants.

Use the information in the table to suggest why few lichens survive close to power stations but many survive alongside roads.

.....  
.....  
.....

1 mark

(c) The **two** products of complete combustion of petrol are not shown in the table. Give the names of the **two** products of complete combustion of a fuel such as petrol.

1. ....
2. ....

2 marks

(d) Smoke contains particles of carbon. These can burn when there is enough oxygen present. Write a word equation for the reaction of carbon with **excess** oxygen.

.....

1 mark

(e) Which term best describes the combustion process?

Tick **one** box.

decomposition

oxidation

pollution

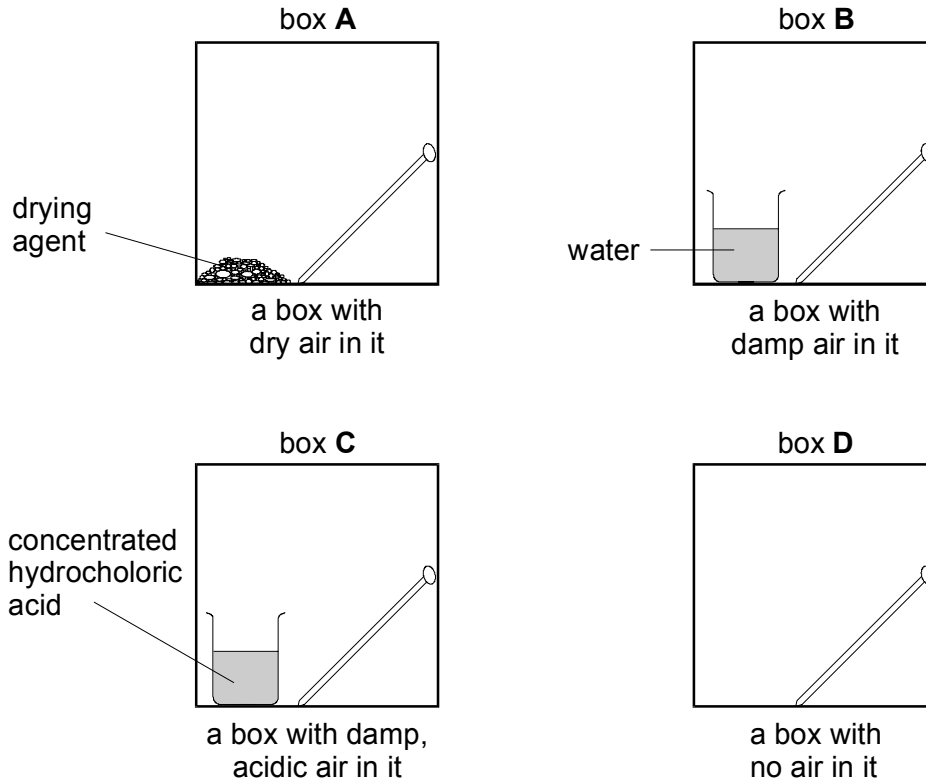
respiration

1 mark

Maximum 7 marks

**Question 2:**

Four shiny iron nails are put in small sealed plastic boxes. The labels show what else is in the boxes.



(a) (i) In which **two** boxes will the iron **not** rust or corrode?

..... and .....

2 marks

(ii) In which box will the iron corrode the most?

.....

1 mark

(b) Many parts of bicycles are made from iron or steel. These parts can rust easily, even indoors. Give **two** ways to stop these parts rusting.

1. ....

2. ....

2 marks

Maximum 5 marks

**Question 3:**

Fossil fuels are used to generate electricity, but over half of the world's population uses biomass as a fuel.

(a) What is 'biomass', which is used as a fuel?

.....  
.....

1 mark

(b) Biomass and fossil fuels are both energy resources. What is the original source of this energy?

.....  
.....

1 mark

(c) Give the names of **three** fossil fuels which are often burned to generate electricity.

1. ....
2. ....
3. ....

1 mark

(d) Fossil fuels are often described as non-renewable energy resources. Explain why they are called 'non-renewable'.

.....  
.....

1 mark

(e) There are advantages and disadvantages of burning different fuels.

(i) Give **one** advantage of using biomass rather than fossil fuel as an energy resource.

.....  
.....

1 mark

(ii) Give **one** advantage of using fossil fuel rather than biomass as an energy resource.

.....  
.....

1 mark

(iii) Give **one disadvantage** of using both fossil fuel and biomass.

.....  
.....

1 mark

Maximum 7 marks

**Question 4:**

Copper can be extracted from an ore called copper pyrites. The formula of copper pyrites is  $\text{CuFeS}_2$ .

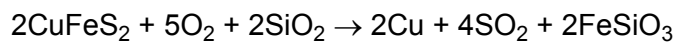
(a) Give the names of the elements present in copper pyrites. One has been done for you.

1. copper
2. ....
3. ....

1 mark

(b) Copper is obtained by heating the ore in a controlled supply of air with sand ( $\text{SiO}_2$ ).

Overall the reaction is:



(i) The amount of oxygen in the reaction must be carefully controlled. If there is too much, the copper could react with the oxygen. What substance would be formed?

.....

1 mark

(ii) In the industrial process, the waste gas sulphur dioxide (SO<sub>2</sub>) is removed. It is bubbled through a solution that reacts with the sulphur dioxide and prevents it escaping.

Explain why the sulphur dioxide should be removed from the waste gases.

.....

.....

.....

2 marks

(iii) What **type** of solution is used to remove the sulphur dioxide?

.....

1 mark

Maximum 5 marks

**Question 5:**

(a) The table gives the names of three different rocks and how they are classified.

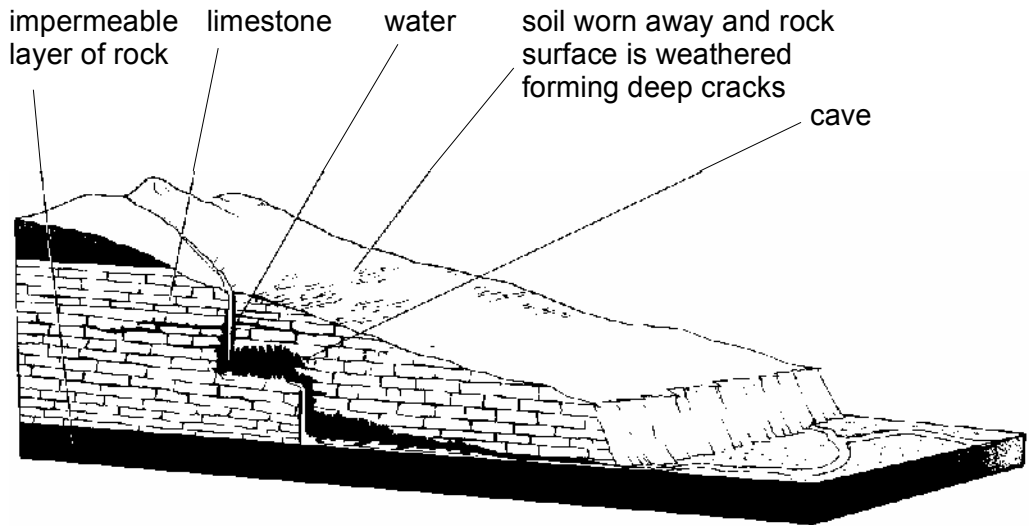
<b>name of rock</b>	<b>class of rock</b>
granite	igneous
marble	metamorphic
shale	sedimentary

In the table below, draw lines to connect the name of each rock to the description of how the rock was formed and then to the correct description of features of the rock.

<b>how the rock was formed</b>	<b>name of rock</b>	<b>features of the rock</b>
layers of mud and tiny dead animals compressed and turned into rock	granite	large interlocking crystals
magma cooling slowly underground in the Earth's crust	marble	crumbly, layered, containing fossils
limestone changed by heat and pressure	shale	hard, shiny, white with veins of colour, fizzes with acid

3 marks

(b) The diagram shows a section through a limestone cliff.



(i) There are caves in the limestone.

Explain how **chemical** weathering causes caves to form in limestone.

.....

.....

.....

.....

2 marks

(ii) Limestone is a porous rock. Water can enter the spaces in limestone. Describe how this causes **physical** weathering of the limestone.

.....

.....

.....

2 marks

Maximum 7 marks