

Name:

Date:

C9 - Test 2
ATMOSPHERE
Beginner

GCSE

CHEMISTRY

AQA - Triple Science

Mark

Grade

Materials

For this paper you must have:

- Ruler
- Pencil and Rubber
- Scientific calculator, which you are expected to use when appropriate

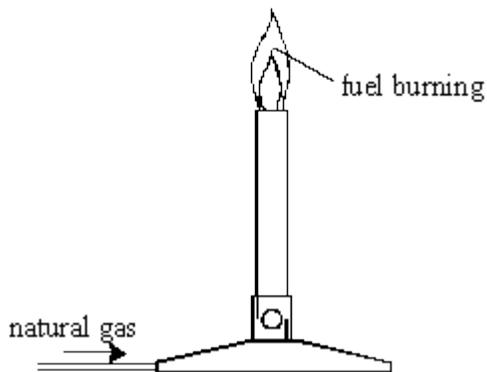
Instructions

- Answer all questions
- Answer questions in the space provided
- All working must be shown

Information

- The marks for the questions are shown in brackets

1. Natural gas is a fuel.



(a) Complete these sentences.

When the fuel burns completely, we cannot see the new substances produced because they are mainly colourless _____ .

The energy of the fuel is released as _____ .

(3)

(b) Choose words from this list to complete the sentence below.

- | | | | |
|--------|-----------------|--------------|----------|
| carbon | carbon dioxide | hydrogen | nitrogen |
| oxygen | sulphur dioxide | water vapour | |

Three gases which can be produced when fuels burn are:

1. _____

2. _____

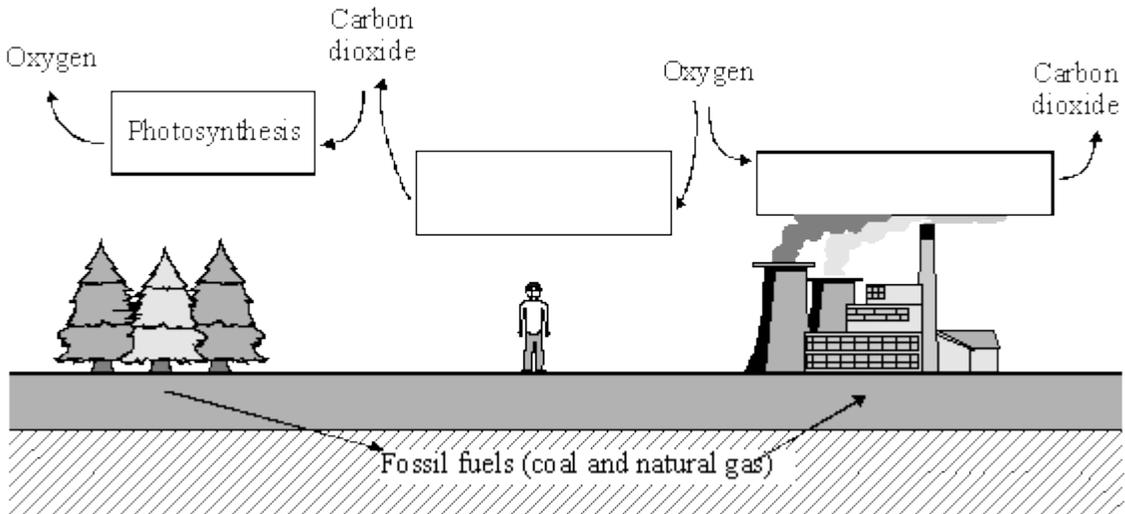
3. _____

(3)

(Total 6 marks)

2.

In the carbon cycle the amounts of carbon dioxide and oxygen in the air are changed by several processes.



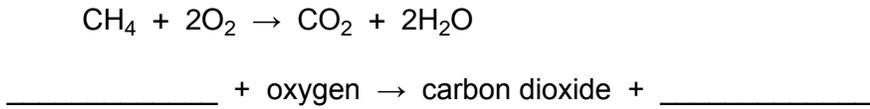
(a) The names of some processes are given in the box below.

- | | | |
|----------------|---------------|----------------|
| combustion | decomposition | neutralisation |
| photosynthesis | | respiration |

Choose the correct process for each box in the diagram. The first one has been done for you.

(2)

(b) Fossil fuels, such as natural gas, react with oxygen.



Complete the word equation for this reaction

(2)

(c) What problem is caused by the formation of large amounts of carbon dioxide?

(1)

(Total 5 marks)

3. Greenhouse gases affect the temperature of the Earth.

(a) Which gas is a greenhouse gas?

Tick **one** box.

Argon

Methane

Nitrogen

Oxygen

(1)

(b) An increase in global temperature will cause climate change.

What is **one** possible effect of climate change?

Tick **one** box.

Deforestation

Global dimming

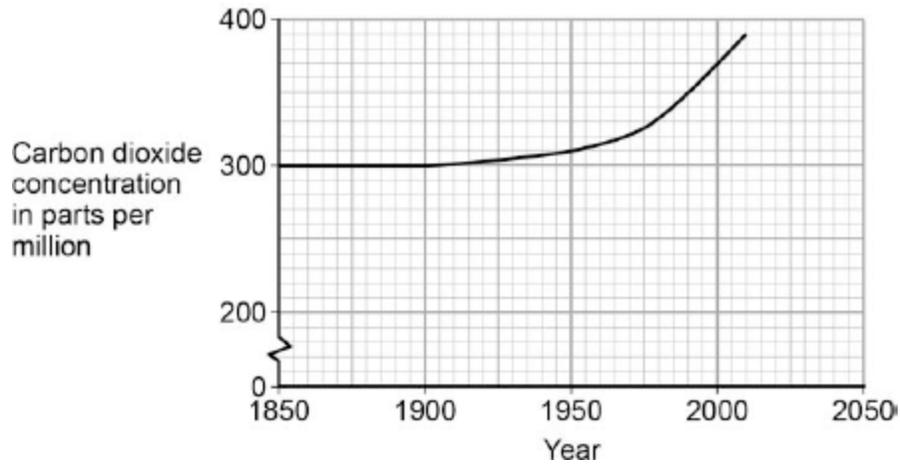
Sea levels rising

Volcanic activity

(1)

(c) Carbon dioxide is also a greenhouse gas.

The figure below shows how the concentration of carbon dioxide in the atmosphere has changed since 1850.



Which process is the reason for the change in carbon dioxide concentration shown on the figure above?

Tick **one** box.

Burning of fossil fuels

Carbon capture

Formation of sedimentary rocks

Photosynthesis

(1)

(d) Give **three** conclusions that can be made from the figure above.

1. _____

2. _____

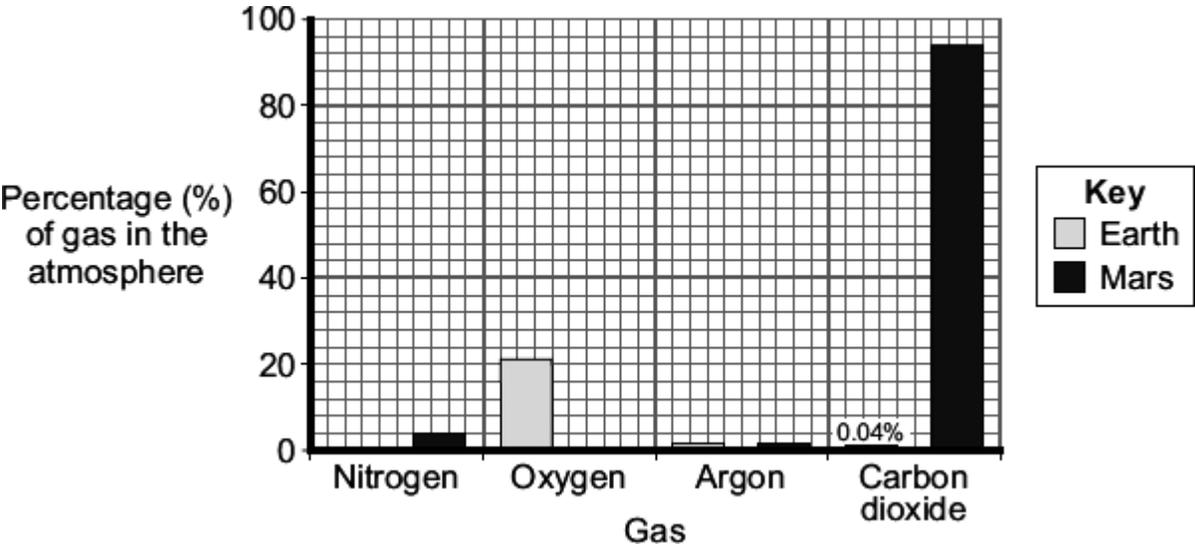
3. _____

(3)

(Total 6 marks)

4.

The bar chart shows some of the gases in the atmospheres of Earth today and Mars today.



(a) Complete the bar chart to show the percentage of nitrogen in the Earth's atmosphere today.

(1)

(b) Some scientists suggest that the Earth's early atmosphere was like the atmosphere of Mars today.

(i) There is **not** much oxygen in the atmosphere of Mars.

Suggest why.

(1)

(ii) The percentage of argon in the Earth's atmosphere today is the same as it was in the Earth's early atmosphere.

Suggest why.

(1)

(c) Compared with the percentage of carbon dioxide in the Earth's early atmosphere there is **not** much carbon dioxide in the Earth's atmosphere today.

Give **one** reason for this change.

(1)

(d) Draw a ring around the correct answer to complete the sentence.

Some theories suggest that the Earth's early atmosphere was

made by

- burning fossil fuels.
- the formation of oceans.
- the eruption of volcanoes.

(1)

(Total 5 marks)

5.

Coal is used as a fuel in power stations.

The table shows the percentage of carbon and sulfur in four different coal samples.

Sample	Percentage (%) by mass in coal	
	Carbon	Sulfur
A	22.1	0.4
B	46.8	0.6
C	66.3	0.9
D	92.0	0.7

(a) Sulfur produces a gas that causes acid rain.

Name the gas.

(1)

(b) Give **one** environmental effect caused by acid rain.

(1)

(c) Which coal sample produces the most acid rain from 1 kg of coal?

Use the table above.

Give a reason for your answer.

Sample _____

Reason _____

(2)

- (d) Calculate the mass of coal sample **A** that would produce the same amount of carbon dioxide as 1 kg of coal sample **C**.

Mass of coal sample **A** = _____ kg

(2)

- (e) Incomplete combustion of coal can produce carbon monoxide.

Carbon monoxide is a toxic gas.

Give **two** reasons why people may be unaware of the presence of carbon monoxide.

1. _____

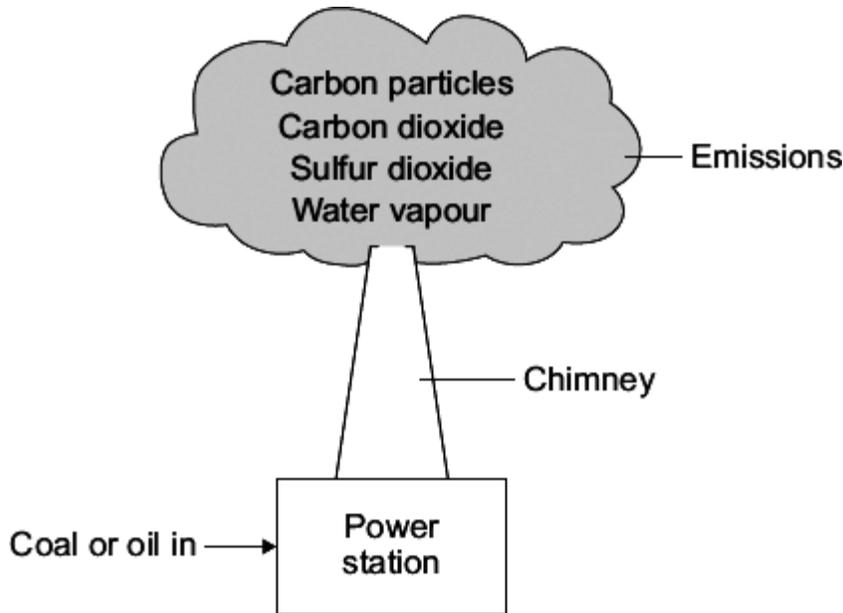
2. _____

(2)

(Total 8 marks)

6.

In the future more coal-fired and fewer oil-fired power stations will be used to generate electricity. When coal and oil are burned they produce the same types of emissions which can cause environmental problems.



(a) Emissions from the chimney can cause acid rain, global dimming and global warming. Draw **one** straight line from each possible environmental problem to the emission that causes it.

Possible environmental problem

Emission that causes it

acid rain

carbon particles

global warming

carbon dioxide

global dimming

sulfur dioxide

water vapour

(3)

(b) Draw a ring around the correct word in the box to complete each sentence.

(i) Incomplete combustion of coal or oil is caused by too little

carbon dioxide.
nitrogen.
oxygen.

(1)

(ii) A gas formed by the incomplete combustion of coal or oil is

carbon monoxide.
hydrogen.
oxygen.

(1)

(c) The table shows the world production for both coal and oil in 2000.

The world production figures after 2000 are predicted.

Year	World production of coal (billions of tonnes per year)	World production of oil (billions of barrels per year)
2000	3.5	12.5
2050	4.5	5.6
2100	5.0	1.7
2150	5.5	0.5
2200	6.0	0.0

(i) How is the world production of oil predicted to change from 2000 to 2200?

(1)

(ii) Suggest **two** reasons why the world production of coal is predicted to increase.

1. _____

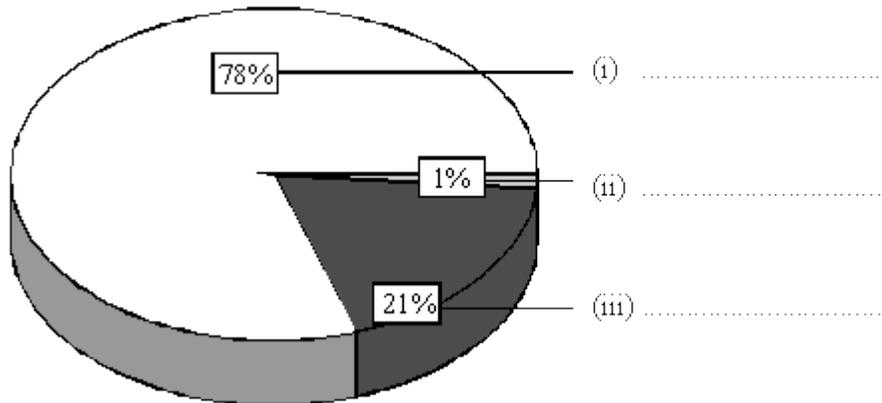
2. _____

(2)

(Total 8 marks)

7.

(a) Air is a mixture of gases. The pie chart shows the percentages, by volume, of the main gases in dry air. Complete the chart by adding the names of these **three** gases.



(3)

(b) Complete each of the **four** spaces in the sentences by choosing the best word from the box.

condenses condensing evaporates evaporating
melts sea trees vapour

The air in the atmosphere above this country always contains _____ .

Most of this is the result of water _____ from the surface of the

_____. Some of it _____ to form millions of tiny

drops of water in clouds.

(4)

- (c) Thousands of millions of years ago the Earth's early atmosphere was formed. Complete the following sentence.

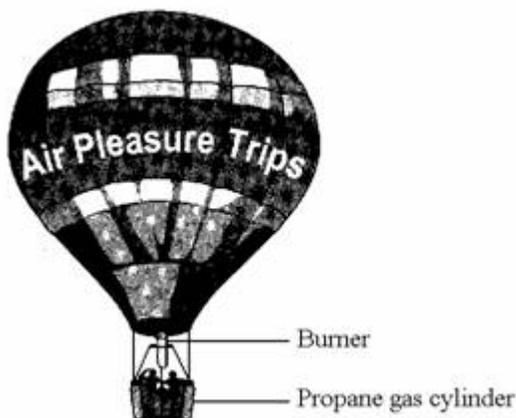
The carbon dioxide in this early atmosphere probably came from _____

(1)

(Total 8 marks)

8.

Hot air balloons are used mainly for pleasure trips.



- (a) Air is a mixture of gases. Complete the table. (Carbon dioxide has been done for you.)

Gas	Chemical formula	% in air
nitrogen		78
oxygen	O ₂	
argon		0.9
carbon dioxide	CO ₂	0.03

(3)

- (b) The air in the balloon is heated using a propane burner. Propane, C₃H₈, is a *hydrocarbon* that burns in air forming carbon dioxide, CO₂, and water, H₂O.

- (i) What does *hydrocarbon* mean?

(1)

- (ii) Which gas, in the air, reacts with propane when it burns?

(1)

(iii) What type of chemical reaction happens when a hydrocarbon burns?

(1)

(iv) The formation of more carbon dioxide causes global problems. Explain why.

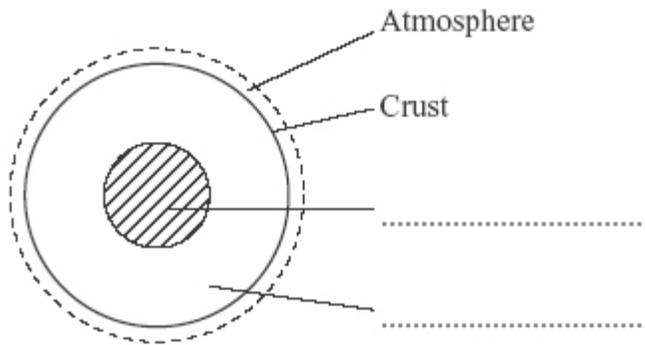
(2)

(Total 8 marks)

9.

The Earth is shaped like a ball and is surrounded by an atmosphere.

(a) The diagram shows the layered structure of the Earth.



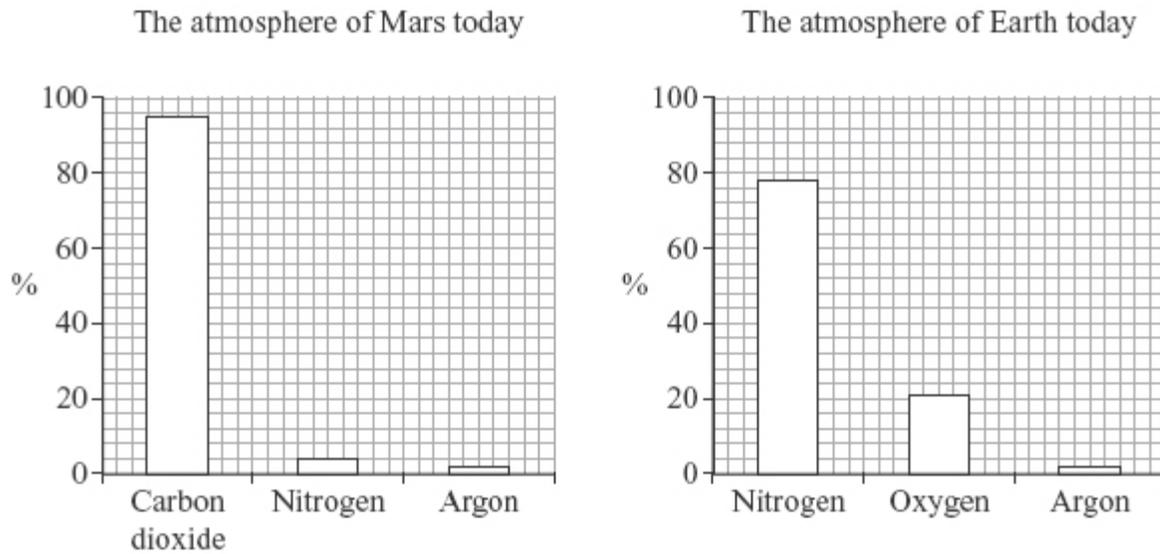
Choose words from the box to complete the labels on the diagram.

core	mantle	plate
------	--------	-------

(2)

- (b) Some theories suggest that the Earth's early atmosphere was like the atmosphere of Mars today.

The bar charts show the three most common gases in each atmosphere today.



- (i) Use the bar charts to complete the sentence by writing in the correct gases.

In the atmosphere of Mars today there is mainly _____
and no _____ .

(2)

- (ii) Use the bar charts to complete the sentence by writing in the correct number.

These theories suggest that there was about _____ % nitrogen in the Earth's early atmosphere.

(1)

- (iii) The atmosphere of the Earth today has much more nitrogen than in the early atmosphere. Denitrifying bacteria released most of this nitrogen into the atmosphere.

There are other differences between the Earth's early atmosphere and the atmosphere of the Earth today.

Use the bar charts to describe and explain **two** of these other differences.

(3)
(Total 8 marks)