

Using the Earth's resources and obtaining potable water – GCSE Chemistry Paper 21. **No.1****0 1**

This question is about the Earth's atmosphere.

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How long ago was the Earth formed?

[1 mark]Tick (✓) **one** box.

4.6 billion years ago

☐

4.6 million years ago

☐

4.6 thousand years ago

☐**Table 1** shows the percentages of gases in the atmospheres of Mars and Earth today.**Table 1**

Gas	Percentage of gas in atmosphere (%)	
	Mars	Earth
Carbon dioxide	95.97	0.04
Nitrogen	1.89	78.09
Oxygen	0.15	20.95
Other gases	1.99	X

0 1 . 2Calculate the percentage **X** of other gases in the Earth's atmosphere.Use **Table 1**.**[1 mark]**

X = _____ %

The atmosphere of the early Earth is thought to have been similar to the atmosphere of Mars today.

The percentages of nitrogen and of oxygen in the Earth's atmosphere today have changed from the percentages in the Earth's early atmosphere.

0 1 . 3 Draw **one** line from each gas to the change in the percentage of that gas.

Use **Table 1**.

[2 marks]

Gas	Change in percentage of gas
Nitrogen	Increased by about 4 times
	Increased by about 21%
Oxygen	Increased by about 40 times
	Increased by about 96%

0 1 . 4 The percentage of carbon dioxide in the Earth's early atmosphere decreased.

Which **two** processes caused this decrease?

[2 marks]

Tick (✓) **two** boxes.

Carbon dioxide dissolving in sea water

☐

Combustion of fossil fuels

☐

Farming of animals

☐

Formation of sedimentary rocks

☐

Volcanoes releasing carbon dioxide

☐

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Photosynthesis also decreased the percentage of carbon dioxide in the Earth's early atmosphere.

Photosynthesis increased the percentage of another gas.

Complete the word equation for photosynthesis.

[2 marks]

_____ + water → glucose + _____

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Complete the sentence.

[1 mark]

Scientists are not certain about the percentages of gases in the Earth's early atmosphere because there is a lack of _____.

2. No.5

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This question is about fertilisers.

Some fertilisers are described as NPK fertilisers because they contain three elements needed for healthy plant growth.

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Which **two** compounds each contain **two** of these elements?**[2 marks]**Tick (✓) **two** boxes.

Ammonium nitrate

☐

Ammonium phosphate

☐

Calcium chloride

☐

Calcium phosphate

☐

Potassium chloride

☐

Potassium nitrate

☐

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Rocks containing calcium phosphate are treated with acid to produce soluble salts that can be used as fertilisers.

Name the soluble salts produced when calcium phosphate reacts with:

- nitric acid
- phosphoric acid.

[2 marks]

Nitric acid _____

Phosphoric acid _____

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Ammonium sulfate is a compound in fertilisers.

Ammonium sulfate can be made using an industrial process or in the laboratory.

In the industrial process, the following steps are used.

1. React streams of ammonia solution and sulfuric acid together.
2. Evaporate the water by passing the solution down a warm column.
3. Collect dry crystals continuously at the bottom of the column.

In the laboratory, the following steps are used.

1. React ammonia solution and sulfuric acid in a conical flask.
2. Evaporate water from the solution until crystals start to form.
3. Leave to cool and crystallise further.
4. Separate the crystals using filtration.
5. Dry the crystals between pieces of filter paper.

Evaluate the two methods for producing a large mass of ammonium sulfate.

[4 marks]
