AQA GCSE Chemistry | 8462

SPECIFICATION POINT 4.8.2.2

# Test for oxygen

## Past-paper questions

| | |
|---|---|
| Tier | **Foundation** |
| Question groups | **5** |
| Available paper years | **2010–2024** |

## Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

**Name:** _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

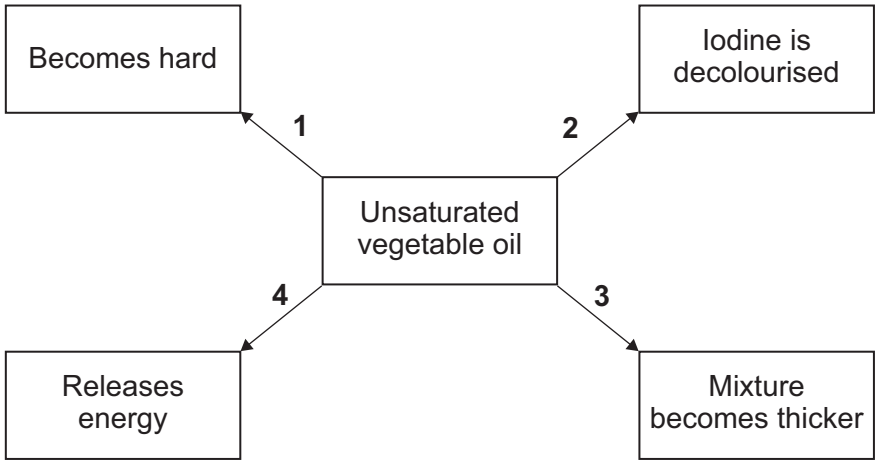
### 4.8.2.2 Test for oxygen

**Question 01**

June 2010 | CHY1BP | Original Q5 | Legacy

**QUESTION FIVE**

The diagram shows what happens to an unsaturated vegetable oil when it is treated in different ways.




Match processes, **A**, **B**, **C** and **D**, with the numbers **1–4** in the diagram.

**A** Burn in oxygen

**B** Test for unsaturation

**C** Add water and shake vigorously

**D** React with hydrogen

### 4.8.2.2 Test for oxygen

**Question 02**

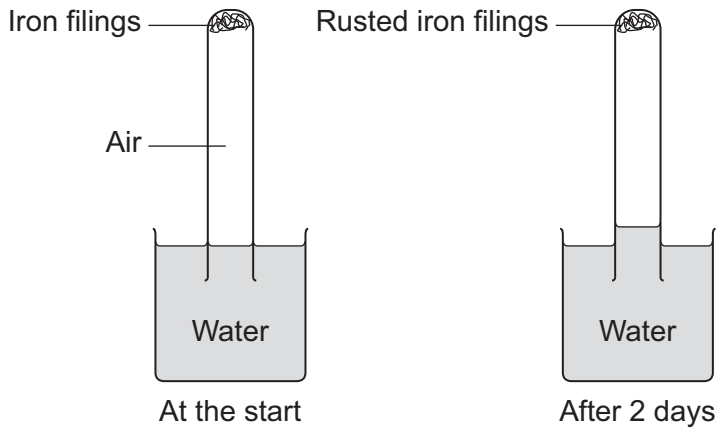
June 2010 | CHY1BP | Original Q7 | Legacy

**QUESTION SEVEN**

The experiment below can be used to estimate the percentage of oxygen in the air.

- Damp iron filings are placed into a 150 mm long test tube.
- The test tube is inverted and then placed in a beaker of water.
- The test tube is then left for one week.
- The height of the water in the test tube is measured every day.

Rusting is a reaction between iron, oxygen and water.
The water rises up the test tube to replace the oxygen that has reacted.




These are the results of the experiment.

| Day | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| Height of the water in the test tube in mm | 0 | 9 | 16 | 20 | 23 | 25 | 25 | 25 |

**7A** At what height will the water be after another seven days?

**1** 25 mm

**2** 50 mm

**3** just below the iron filings

**4** the top of the test tube

**4.8.2.2 Test for oxygen**

**Question 02 · continued** June 2010 | CHY1BP | Original Q7 | Legacy

**7B** In this experiment, the height of the water in the test tube is the dependent variable.

This is because . . .

**1** it is dependent on an accurate measurement being carried out.

**2** it changes due to the changes in another variable.

**3** it is the value that is measured first.

**4** it is not dependent on any other variable.

**7C** A student used the experiment described to find the percentage of oxygen in the air. He was unsure about his result.

The student could check the reliability of the results by . . .

**1** using fewer iron filings.

**2** using colder water.

**3** repeating the experiment.

**4** using already rusted iron filings.

**7D** Another student did the experiment with more iron filings in the test tube.

One reason for doing this is because . . .

**1** the reaction would be much slower.

**2** the volume of oxygen reacting would be much greater.

**3** there would be less air in the test tube.

**4** it would confirm that all the oxygen had reacted.

### 4.8.2.2 Test for oxygen

**Question 03**

June 2019 | 8462/2F | Original Q7

**0 7** Some students investigated the rate of decomposition of hydrogen peroxide.

The equation for the reaction is:

hydrogen peroxide → water + oxygen

**0 7 . 1** Complete the sentence.

Choose an answer from the box.

**[1 mark]**

| | |
|---|---|
| **a burning splint** | **a glowing splint** |
| **damp litmus paper** | **limewater** |

The students tested the gas produced to show that it was oxygen.

The students used _____ .

Student **A** investigated the effect of the particle size of a manganese dioxide catalyst on the rate of the reaction.

This is the method used.

1. Measure 25 $cm^3$ hydrogen peroxide solution into a conical flask.

2. Add some fine manganese dioxide powder to the conical flask.

3. Measure the volume of oxygen produced every 30 seconds for 10 minutes.

4. Repeat steps 1 to 3 two more times.

5. Repeat steps 1 to 4 with coarse manganese dioxide lumps.

4.8.2.2 Test for oxygen

Question 03 · continued



**0 7 . 2** The method student **A** used did **not** give repeatable results.

How could student **A** make the results repeatable?

**[1 mark]**

Tick (✓) **one** box.

- Student **A** should make measurements every 2 minutes. ☐
- Student **A** should measure the mass of manganese dioxide. ☐
- Student **A** should use 50 $cm^3$ hydrogen peroxide. ☐
- Student **A** should use a beaker instead of a conical flask. ☐

Student **B** used a method which gave repeatable results.

**0 7 . 3** How could student **B** improve the accuracy of these results?

**[1 mark]**

Tick (✓) **one** box.

- Calculate a mean but do not include any anomalous results. ☐
- Calculate a mean but do not include the first set of results. ☐
- Record the results in a table and plot the results on a bar chart. ☐
- Record the results in a table and plot the results on a line graph. ☐

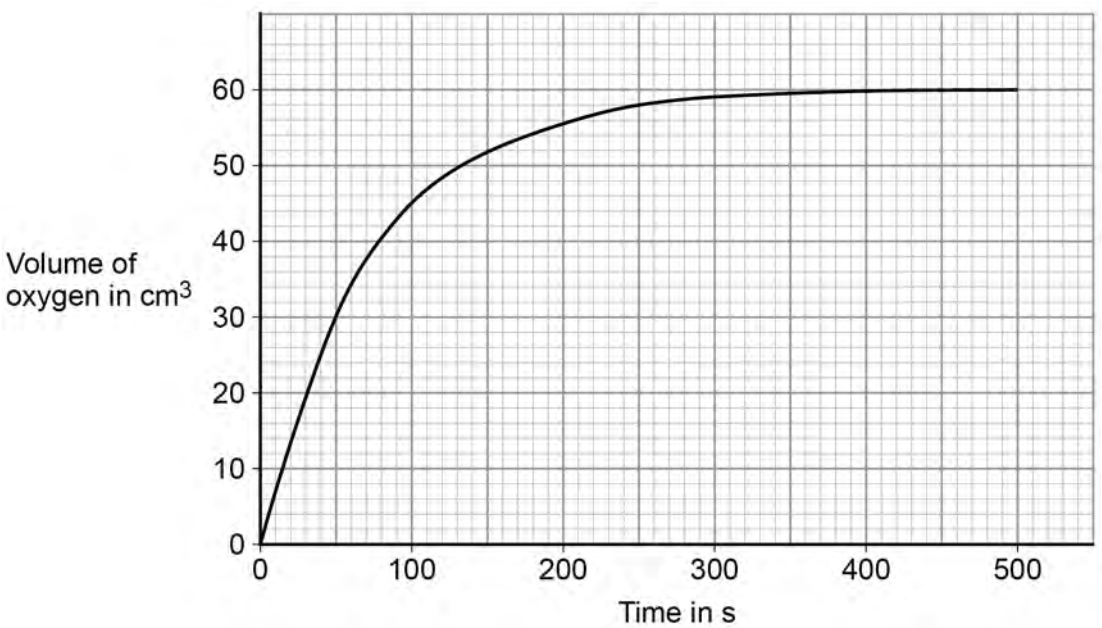
4.8.2.2 Test for oxygen

Question 03 · continued



**Figure 5** shows student **B**'s results for coarse manganese dioxide lumps.

**Figure 5**




**0 7 . 4** Calculate the mean rate of reaction between 30 and 250 seconds for coarse manganese dioxide lumps.

Use **Figure 5** and the equation:

$$\text{Mean rate of reaction} = \frac{\text{Volume of oxygen formed}}{\text{Time taken}}$$

Give your answer to 3 significant figures.

**[4 marks]**

Volume of oxygen formed _____

Time taken _____

_____

_____

_____

_____

Mean rate of reaction = _____ $cm^3/s$

4.8.2.2 Test for oxygen

Question 03 · continued



**0 7 . 5** Fine manganese dioxide powder produces a higher rate of reaction than coarse manganese dioxide lumps.

Sketch on **Figure 5** the results you would expect for student **B**'s experiment with fine manganese dioxide powder.

**[2 marks]**

**0 7 . 6** Hydrogen peroxide molecules collide with manganese dioxide particles during the reaction.

Why does fine manganese dioxide powder produce a higher rate of reaction than coarse manganese dioxide lumps?

**[1 mark]**

Tick (✓) **one** box.

- Fine manganese dioxide powder has a larger surface area. ☐
- Fine manganese dioxide powder has larger particles. ☐
- Fine manganese dioxide powder produces less frequent collisions. ☐

### 4.8.2.2 Test for oxygen

**Question 04**

June 2023 | 8462/2F | Original Q1

**0 1** This question is about oxygen.

Scientists think that there was little or no oxygen in the Earth's early atmosphere.

**0 1 . 1** Which planet today has an atmosphere that is similar to the Earth's early atmosphere?

**[1 mark]**

Tick (✓) **one** box.

- Jupiter ☐
- Mars ☐
- Neptune ☐
- Saturn ☐

**0 1 . 2** Which is the approximate percentage of oxygen in the Earth's atmosphere today?

**[1 mark]**

Tick (✓) **one** box.

- 20% ☐
- 50% ☐
- 80% ☐
- 100% ☐

**Question 1 continues on the next page**

4.8.2.2 Test for oxygen

Question 04 · continued



**0 1 . 3** Which **two** of the following increased the percentage of oxygen in the Earth's atmosphere?

**[2 marks]**

Tick (✓) **two** boxes.

- Active volcanoes emitted gases ☐
- Algae and plants evolved ☐
- Animals evolved ☐
- Carbonate sediments formed in oceans ☐
- Photosynthesis took place ☐

4.8.2.2 Test for oxygen

Question 04 · continued



**0 1 . 4** Some scientists think that 1100 million years ago the Earth's atmosphere contained:

- 16% oxygen
- 4% carbon dioxide.

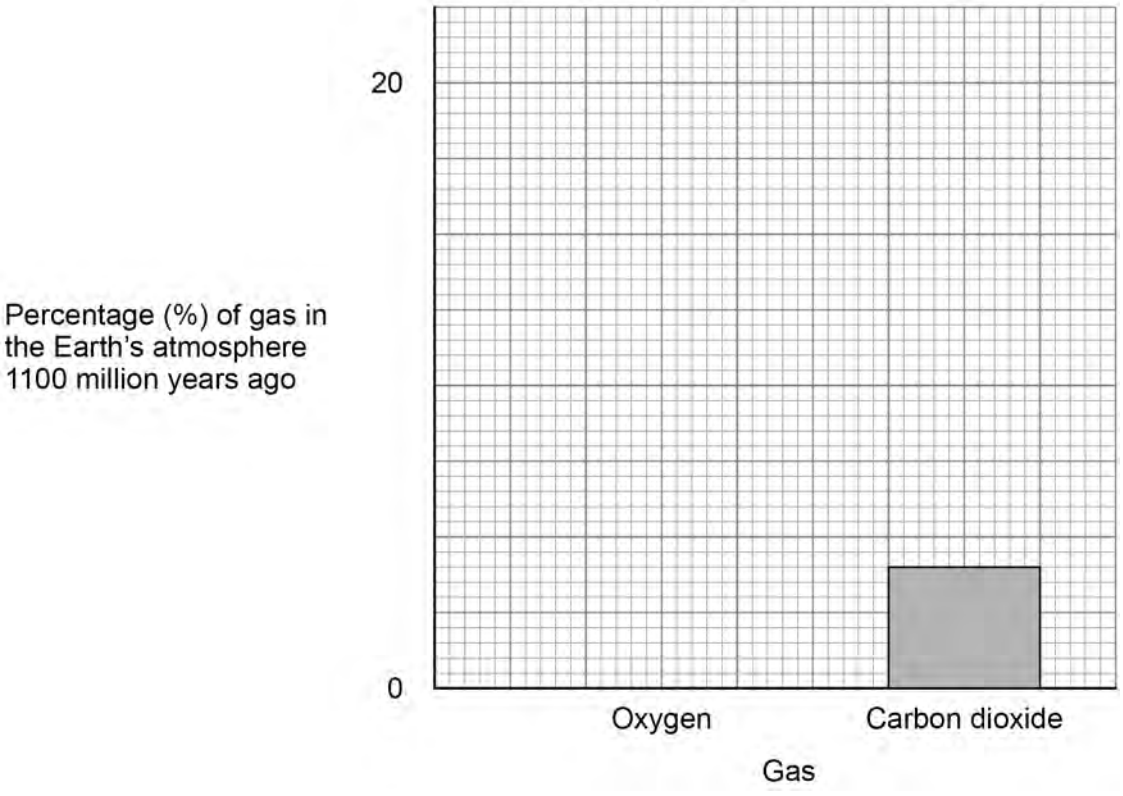
Complete **Figure 1**.

You should:

- complete the *y*-axis scale
- plot the percentage of oxygen in the Earth's atmosphere 1100 million years ago.

**[2 marks]**

**Figure 1**




**Question 1 continues on the next page**

**4.8.2.2 Test for oxygen**

**Question 04 · continued**



Oxygen is produced when manganese dioxide is added to hydrogen peroxide solution.

The equation for the reaction is:

hydrogen peroxide → water + oxygen

A student investigated the effect of changing the temperature on the decomposition of hydrogen peroxide.

This is the method used.

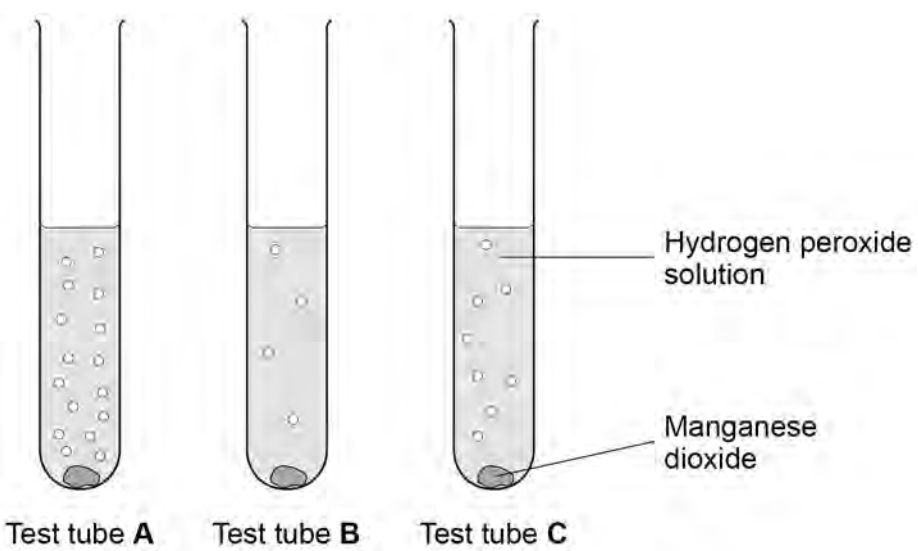
1. Add 5 $cm^3$ of hydrogen peroxide solution to three test tubes labelled **A**, **B** and **C**.

2. Place each test tube in a water bath at a different temperature.

3. Add 0.2 g of manganese dioxide to each test tube.

**Figure 2** shows the results.

**Figure 2**



4.8.2.2 Test for oxygen

Question 04 · continued



**0 1 . 5** Which test tube contained hydrogen peroxide solution at the highest temperature?

**[1 mark]**

Tick (✓) **one** box.

Test tube **A** ☐

Test tube **B** ☐

Test tube **C** ☐

**0 1 . 6** The student tested the gas produced.

What is used to prove that the gas is oxygen?

**[1 mark]**

Tick (✓) **one** box.

A glowing splint ☐

Bromine water ☐

Damp litmus paper ☐

**0 1 . 7** Manganese dioxide does not appear in the chemical equation for this reaction.

Which is a correct statement about manganese dioxide in this reaction?

**[1 mark]**

Tick (✓) **one** box.

Manganese dioxide increases the activation energy in this reaction. ☐

Manganese dioxide is a catalyst in this reaction. ☐

Manganese dioxide is used up during this reaction. ☐

Manganese dioxide reduces the rate of this reaction. ☐

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4.8.2.2 Test for oxygen

Question 05

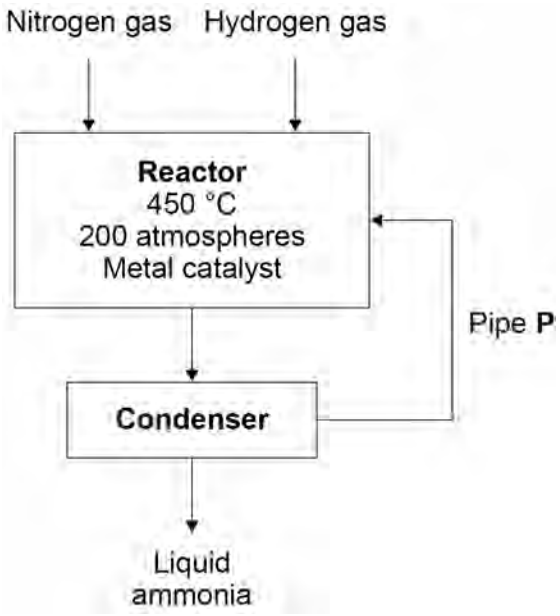
June 2024 | 8462/2F | Original Q9

**0 9** This question is about ammonia and nitric acid.

In the Haber process ammonia is produced from nitrogen and hydrogen.

**Figure 10** represents the Haber process.

**Figure 10**




**0 9 . 1** Pipe **P** links the condenser to the reactor.

Why is the condenser linked to the reactor?

Use **Figure 10**.

**[1 mark]**

**0 9 . 2** Which metal is used as a catalyst in this reaction?

**[1 mark]**

4.8.2.2 Test for oxygen

Question 05 · continued



Nitric acid is produced by reacting ammonia with oxygen.

The word equation for the production of nitric acid is:

ammonia + oxygen → water + nitric acid

Platinum is a catalyst in this reaction.

**0 9 . 3** Describe the test for oxygen gas.

Give the result if oxygen gas is present.

**[2 marks]**

Test _____

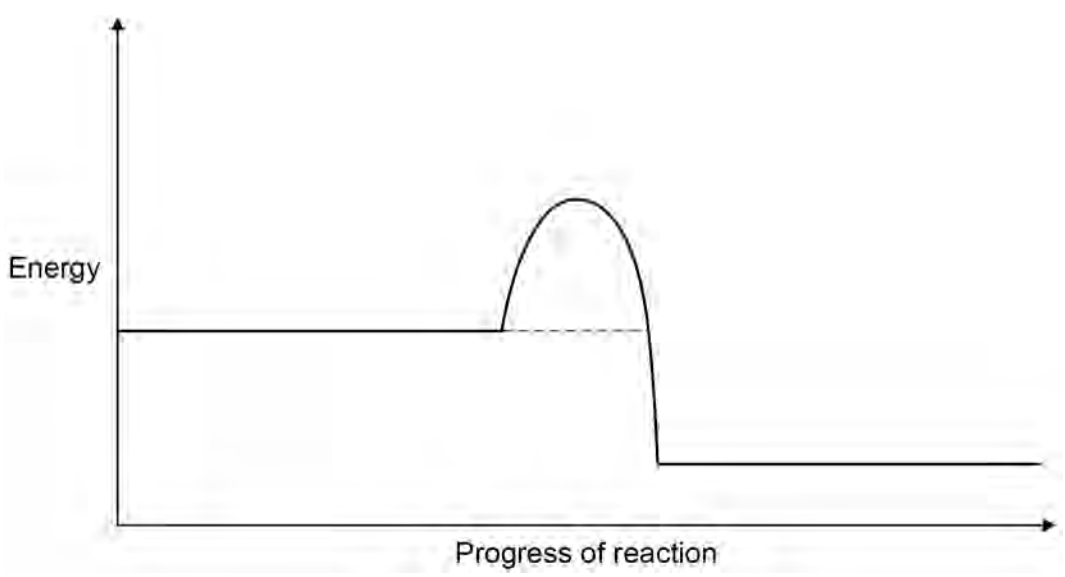
_____

Result _____

_____

**Figure 11** represents the reaction profile of the catalysed reaction between ammonia and oxygen.

**Figure 11**



4.8.2.2 Test for oxygen

Question 05 · continued



**0 9 . 4** Complete the reaction profile for the catalysed reaction in **Figure 11**.

You should:

- label the activation energy
- label the reactants and products, using the names of the reactants and products.

**[2 marks]**

**0 9 . 5** How would **Figure 11** be different if **no** catalyst was used?

**[1 mark]**

Tick (✓) **one** box.

The final energy level would be higher. ☐

The final energy level would be lower. ☐

The line would reach a higher peak. ☐

The line would reach a lower peak. ☐

**0 9 . 6** Ammonia and nitric acid react to produce the salt, ammonium nitrate.

Ammonium ions and nitrate ions both contain nitrogen.

Suggest **one** use of ammonium nitrate.

**[1 mark]**

_____

_____

**8**