AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 5.8.2.1

Test for hydrogen

Past-paper questions

Tier	**Higher**
Question groups	**2**
Available paper years	**2020–2023**

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.

5.8.2.1 Test for hydrogen

Question 01

November 2020 | 8464/C/2H | Original Q1

0 1 This question is about the Earth's resources.

When most fuels burn carbon dioxide is produced.

Propane (C_3H_8) is a fuel.

0 1 . 1 Balance the equation for the combustion of propane.

[1 mark]

$$C_3H_8 + ____ O_2 \rightarrow 3\,CO_2 + 4\,H_2O$$

0 1 . 2 Describe the test for carbon dioxide.

Give the result of the test.

[2 marks]

Test _____

Result _____

_____

0 1 . 3 Propane can be cracked to produce propene and hydrogen.

Complete the symbol equation for the reaction.

[1 mark]

$$\underset{\text{propane}}{C_3H_8} \rightarrow \underset{\text{propene}}{_____} + \underset{\text{hydrogen}}{H_2}$$

5.8.2.1 Test for hydrogen

Question 01 · continued

0 1 . 4 Describe the test for hydrogen.

Give the result of the test.

[2 marks]

Test _____

Result _____

_____

0 1 . 5 Propene is an alkene.

Describe the test for alkenes.

Give the colour change in the test.

[3 marks]

Test _____

Colour change _____ to _____

9

5.8.2.1 Test for hydrogen

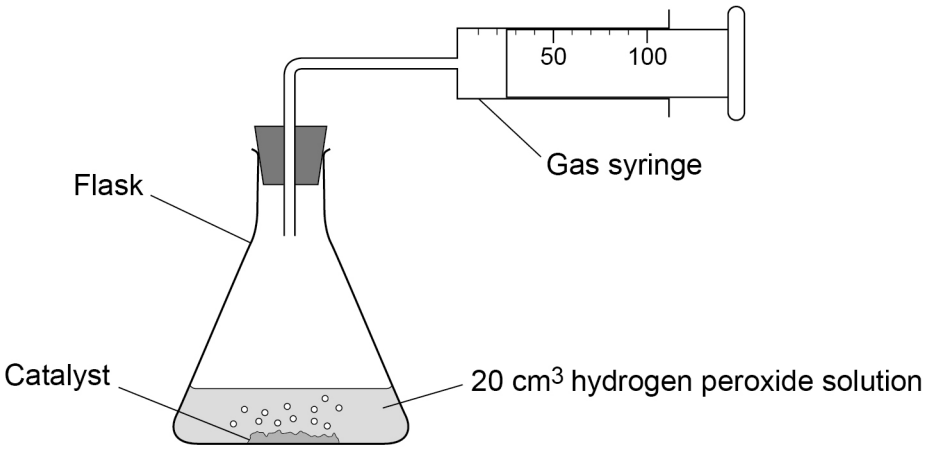
Question 02

0 6 A student investigated the rate of decomposition of hydrogen peroxide using three different catalysts:

- manganese dioxide
- copper oxide
- zinc oxide.

Figure 2 shows the apparatus.

Figure 2



This is the method used.

1. Measure 20 cm^3 of hydrogen peroxide solution into a flask.

2. Add 0.5 g of manganese dioxide catalyst to the flask.

3. Attach a gas syringe to the flask.

4. Measure the volume of oxygen produced every 30 seconds for 180 seconds.

5. Repeat steps 1 to 4 two more times.

6. Repeat steps 1 to 5 using copper oxide catalyst.

7. Repeat steps 1 to 5 using zinc oxide catalyst.

5.8.2.1 Test for hydrogen

Question 02 · continued

0 6 . 1 The equation for the decomposition of hydrogen peroxide is:

$$2\,H_2O_2 \rightarrow 2\,H_2O + O_2$$

Describe a test to identify the gas produced in the reaction.

[2 marks]

Test _____

_____

Result _____

_____

0 6 . 2 Using 10 cm^3 of hydrogen peroxide solution gives less accurate results than using 20 cm^3 of hydrogen peroxide solution of the same concentration.

Explain why.

[2 marks]

_____

_____

_____

_____

0 6 . 3 Suggest **one** possible source of systematic error in the investigation.

[1 mark]

_____

_____

Question 6 continues on the next page

5.8.2.1 Test for hydrogen

Question 02 · continued

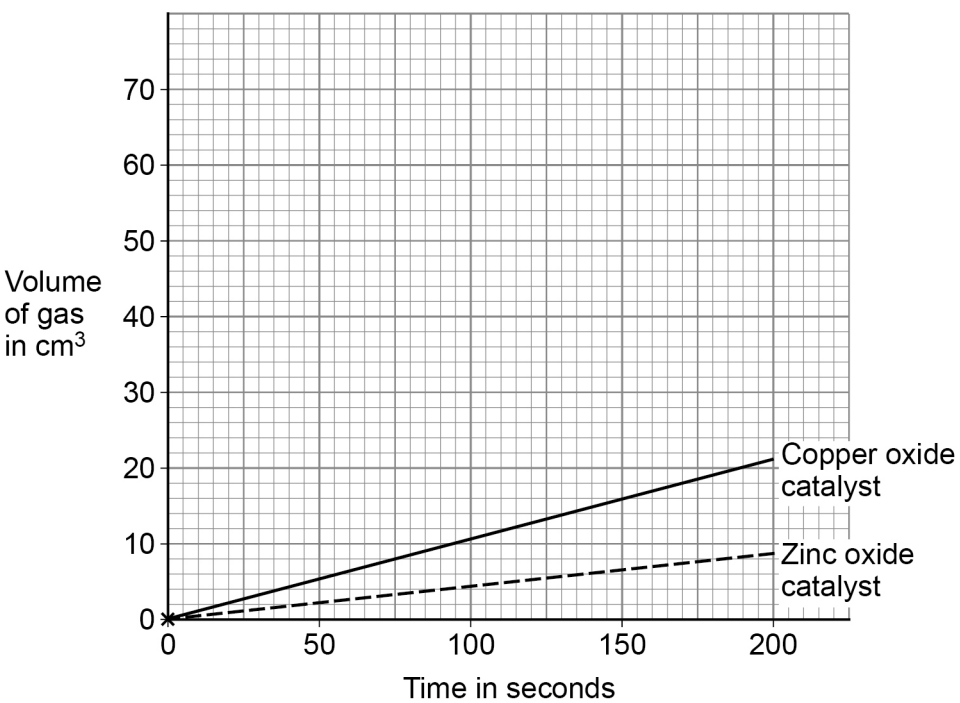
Table 3 shows the results for manganese dioxide catalyst.

Table 3

Time in seconds	0	30	60	90	120	150	180
Volume of gas in cm^3	0	22	38	41	54	58	60

Figure 3 shows a graph of the results with copper oxide catalyst and with zinc oxide catalyst.

Figure 3



0 6 . 4 Complete **Figure 3**.

You should:

- plot the data from **Table 3**
- draw a line of best fit.

The first point has been plotted for you.

[3 marks]

5.8.2.1 Test for hydrogen

Question 02 · continued

0 6 . 5 Which catalyst gives the fastest **rate** of reaction?

Give **one** reason for your answer.

Use the completed **Figure 3**.

[2 marks]

Catalyst _____

Reason _____

_____

0 6 . 6 The rate of reaction is **not** dependent on the volume of hydrogen peroxide solution.

Explain why.

[2 marks]

_____

_____

_____

_____

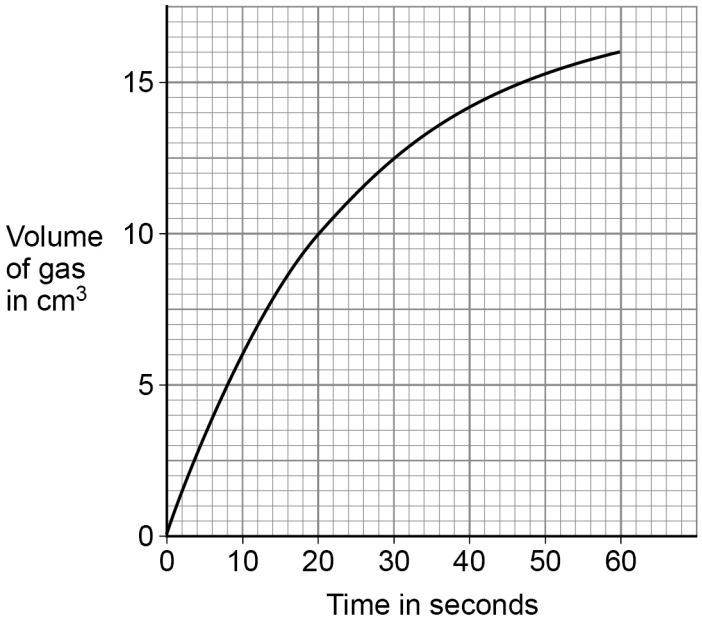
Question 6 continues on the next page

5.8.2.1 Test for hydrogen

Question 02 · continued

0 6 . 7 **Figure 4** shows the results from a different investigation.

Figure 4



Determine the rate of reaction at 20 seconds.

Show your working on **Figure 4**.

Give your answer to 3 significant figures.

[5 marks]

Rate (3 significant figures) = _____ cm^3/s

17