AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 5.8.2.1

Test for hydrogen

Past-paper questions

Tier	**Foundation**
Question groups	**3**
Available paper years	**2020–2025**

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/2F | Original Q6

0 6 This question is about the Earth's resources.

When most fuels burn carbon dioxide is produced.

Propane (C_3H_8) is a fuel.

0 6 . 1 Balance the equation for the combustion of propane.

[1 mark]

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

0 6 . 2 Describe the test for carbon dioxide.

Give the result of the test.

[2 marks]

Test _____

Result _____

_____

0 6 . 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 6 . 4 Describe the test for hydrogen.

Give the result of the test.

[2 marks]

Test _____

Result _____

_____

0 6 . 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

June 2023 | 8464/C/2F | Original Q1

0 1 Crude oil contains a large number of hydrocarbons.

0 1 . 1 Crude oil is a finite resource.

What is a finite resource?

[1 mark]

Tick (✓) **one** box.

- A limited resource ☐
- A renewable resource ☐
- A sustainable resource ☐

0 1 . 2 What is crude oil formed from?

[1 mark]

Tick (✓) **one** box.

- Plankton ☐
- Volcanoes ☐
- Water ☐

5.8.2.1 Test for hydrogen

Question 02 · continued

0 1 . 3 What type of substance is crude oil?

[1 mark]

Tick (✓) **one** box.

Compound ☐

Element ☐

Mixture ☐

0 1 . 4 The hydrocarbons in crude oil are separated into fractions using fractional distillation.

Complete the sentences.

Choose answers from the box.

[2 marks]

condense	**evaporate**	**freeze**	**melt**

In fractional distillation the crude oil is heated so

the hydrocarbons _____ .

The fractions collect as the hydrocarbons cool and _____ .

Question 1 continues on the next page

5.8.2.1 Test for hydrogen

Hydrocarbons can be cracked to produce more useful molecules.

0 1 . 5 Complete the sentence.

Choose the answer from the box.

[1 mark]

alloys	**fertilisers**	**fuels**

Some products of cracking are useful as _____ .

0 1 . 6 Hydrogen gas is a product of cracking.

What is used in the test for hydrogen gas?

[1 mark]

Tick (✓) **one** box.

Burning splint ☐

Glowing splint ☐

Limewater ☐

5.8.2.1 Test for hydrogen

Question 02 · continued

0 1 . 7 5.20 kg of crude oil contains 1.53 kg of LPG (Liquefied Petroleum Gas).

Calculate the percentage (%) of LPG in 5.20 kg of crude oil.

Give your answer to 3 significant figures.

[3 marks]

Percentage (3 significant figures) = _____ %

10

Turn over for the next question

5.8.2.1 Test for hydrogen

Question 03

June 2025 | 8464/C/2F | Original Q3

0 3 Screenwash is a mixture designed to keep car windscreens clean.

The components in screenwash include glycerol, methanol and water.

0 3 . 1 Screenwash is made by mixing the components in carefully measured quantities so that the product has the required properties.

What name is given to this type of mixture?

[1 mark]

Tick (✓) **one** box.

Catalyst ☐

Formulation ☐

Polymer ☐

0 3 . 2 Glycerol has the formula $C_3H_8O_3$

How many atoms are there in one molecule of glycerol?

[1 mark]

Tick (✓) **one** box.

3 ☐ 8 ☐ 11 ☐ 14 ☐

Question 3 continues on the next page

5.8.2.1 Test for hydrogen

Question 03 · continued

0 3 . 3 Incomplete combustion happens when glycerol burns in limited oxygen.

Incomplete combustion produces carbon monoxide gas.

Why can the production of carbon monoxide gas be a problem?

[1 mark]

Tick (✓) **one** box.

Carbon monoxide is a greenhouse gas. ☐

Carbon monoxide is a toxic gas. ☐

Carbon monoxide is an acidic gas. ☐

0 3 . 4 Complete combustion happens when methanol (CH_4O) burns in excess oxygen.

Balance the equation for the reaction.

[1 mark]

$$2\,CH_4O + 3\,O_2 \rightarrow ____ CO_2 + 4\,H_2O$$

5.8.2.1 Test for hydrogen

Question 03 · continued

Methanol can be produced by the reaction of carbon dioxide with hydrogen.

0 3 . 5 Describe the test for hydrogen gas.

Give the result of the test.

[2 marks]

Test _____

_____

Result _____

_____

0 3 . 6 Carbon dioxide is a greenhouse gas.

An increase in greenhouse gases in the atmosphere has led to an increase in average global temperature.

The increase in average global temperature has caused global climate change.

Give **two** effects of global climate change.

[2 marks]

1 _____

_____

2 _____

_____

Question 3 continues on the next page

5.8.2.1 Test for hydrogen

Question 03 · continued

Anhydrous cobalt chloride can be used to test for water.

The word equation for the reaction is:

anhydrous cobalt chloride (blue) + water ⇌ hydrated cobalt chloride (pink)

0 3 . 7 Suggest **one** observation that could be made when water is added to anhydrous cobalt chloride.

[1 mark]

0 3 . 8 The reaction between anhydrous cobalt chloride and water is exothermic.

What type of reaction is the reverse reaction?

[1 mark]

10