AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 5.10.2.2

Ways of reducing the use of resources

Past-paper questions

Tier	**Higher**
Question groups	**2**
Available paper years	**2021–2025**

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.

5.10.2.2 Ways of reducing the use of resources

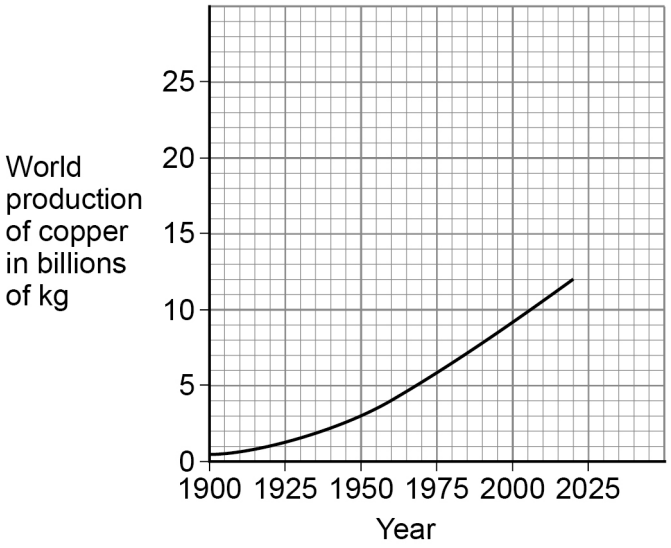
Question 01

November 2021 | 8464/C/2H | Original Q4

0 4 Industries use the Earth's natural copper resources to produce useful products.

Figure 4 shows the world production of copper from 1900 to 2020.

Figure 4



0 4 . 1 Describe the trend shown by the graph in **Figure 4**.

[2 marks]

0 4 . 2 Suggest **one** reason for the trend in **Figure 4**.

[1 mark]

5.10.2.2 Ways of reducing the use of resources

Question 01 · continued

0 4 . 3 Suggest **one** reason why the trend cannot be used to accurately predict the future world production of copper.

[1 mark]

Question 4 continues on the next page

5.10.2.2 Ways of reducing the use of resources

Question 01 · continued

0 4 . 4 High-grade copper resources are now difficult to find.

Phytomining is used to extract copper from low-grade ores.

There are five stages, **A**, **B**, **C**, **D** and **E**, in phytomining.

The stages are **not** in the correct order.

Stage **A** Copper compounds from ash are dissolved in acid.

Stage **B** Plants absorb metal compounds.

Stage **C** Plants are burned.

Stage **D** Plants are harvested.

Stage **E** Solution of copper compound is electrolysed.

What is the correct order of stages **A**, **B**, **C**, **D**, and **E**?

[1 mark]

Tick (✓) **one** box.

B, **C**, **D**, **E**, **A** ☐

B, **D**, **C**, **A**, **E** ☐

D, **B**, **C**, **E**, **A** ☐

D, **C**, **B**, **A**, **E** ☐

5.10.2.2 Ways of reducing the use of resources

Question 01 · continued

0 4 . 5 Give **two** disadvantages of phytomining compared with traditional mining methods.

Do **not** refer to cost in your answer.

[2 marks]

1 _____

_____

2 _____

_____

0 4 . 6 In one year, 8.89×10^9 kg of copper was produced.

41.0% of this copper was produced from recycled copper.

The energy needed to produce 1 kg of copper from copper ore is 70.4 MJ.

The energy needed to produce 1 kg of recycled copper is 27.2 MJ.

Calculate the difference in energy used if all the copper was produced from recycling.

Give your answer to 3 significant figures.

[5 marks]

_____

_____

_____

_____

_____

_____

_____

_____

Difference in energy used (3 significant figures) = _____ MJ

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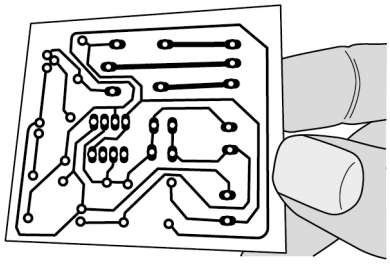
5.10.2.2 Ways of reducing the use of resources

Question 02

0 6 Gold is used in the printed circuit boards found in smartphones.

Figure 6 shows a printed circuit board.

Figure 6



A type of smartphone contains 1.73×10^{-4} moles of gold.

0 6 . 1 In one year, a manufacturer sold 2.48 million of this type of smartphone.

Calculate the total mass of gold contained in 2.48 million of these smartphones.

Give your answer in kilograms.

Relative atomic mass (A_r): Au = 197

[5 marks]

Total mass of gold = _____ kg

5.10.2.2 Ways of reducing the use of resources

Question 02 · continued

0 6 . 2 What is the total number of gold atoms in one of this type of smartphone?

The Avogadro constant = 6.02×10^{23} per mole

[1 mark]

Tick (✓) **one** box.

2.87×10^{-28} ☐

1.04×10^{20} ☐

3.48×10^{27} ☐

0 6 . 3 The materials in printed circuit boards can be recycled.

Bioleaching is one method used to extract gold from printed circuit boards.

Describe how bioleaching is used to extract gold.

[3 marks]

Question 6 continues on the next page

5.10.2.2 Ways of reducing the use of resources

Question 02 · continued

0 6 . 4 Copper is also extracted using bioleaching.

Copper can also be extracted from low-grade ores using phytomining.

Phytomining has **not** been widely used to extract copper.

Suggest **two** reasons why.

[2 marks]

1 _____

_____

2 _____

_____

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