

Corrosion

GCSE Chemistry · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

A student sets up iron nails in four tubes: (A) air and water, (B) dry air with calcium chloride, (C) boiled water with a layer of oil, (D) salt water and air. Predict and explain which nails rust. (4 marks)

Step 1 · A

Rusts: both oxygen (air) and water are present.

Step 2 · B

No rust: calcium chloride removes water vapour from the air.

Step 3 · C

No rust: boiling removes dissolved air, and the oil stops air dissolving back in.

Step 4 · D

Rusts fastest: salt speeds up rusting.

Answer: A and D rust (D fastest); B and C do not

Check: Rusting needs both air (oxygen) and water.

2. Now try one with the steps

Explain how painting a bicycle frame prevents rusting. (2 marks)

Step 1 · Barrier

Step 2 · Result

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Define the term corrosion. [1]

2. State the two substances needed for iron to rust. [2]

3. Write the word equation for the rusting of iron. [1]

4. In a rusting experiment, explain why calcium chloride is added to one tube. [1]

5. Explain why a nail in boiled water covered with a layer of oil does not rust. [2]

6. Describe the effect of salt water on the rate of rusting. [1]

7. Give two barrier methods of preventing rusting. [2]

8. Explain how sacrificial protection prevents rusting. [2]

9. Describe what galvanising is. [1]

10. Explain why aluminium objects do not corrode badly even though aluminium is a reactive metal. [1]

11. A nail increases in mass from 5.00 g to 5.24 g rusts. Calculate the increase in mass in g. [1]

12. Calculate the percentage increase in mass of the nail in question 11. [1]

13. $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$. Calculate the mass of iron oxide, in g, formed from 2.8 g of iron. (Fe = 56, O = 16) [3]

14. Explain why scratched galvanised steel is still protected from rusting but scratched painted steel is not. [2]

4. Before you hand it in

"All corrosion is rusting."

Corrosion is the general term; rusting is the corrosion of iron.

"Iron rusts in dry air."

Rusting needs both oxygen and water.

Using a less reactive metal for sacrificial protection

The sacrificial metal must be MORE reactive than iron (zinc, magnesium).