

Exercise walk-through

Corrosion of metals ■ 9.5

eXercise

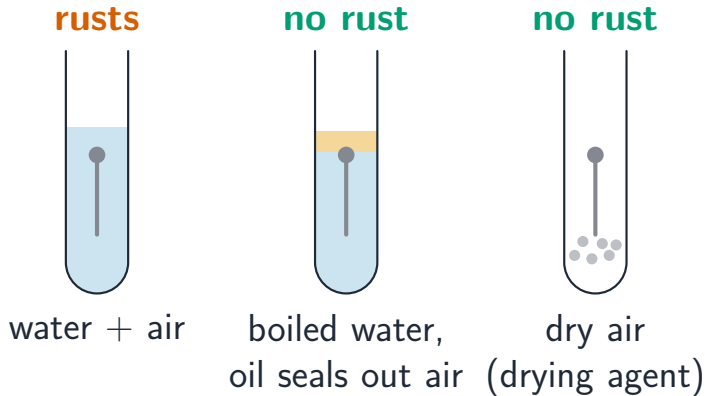
You must be able to

- state that rusting needs oxygen and water
- describe barrier methods and galvanising
- explain sacrificial protection

Method — Preventing rust

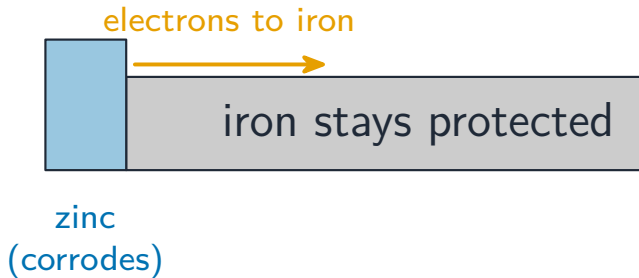
- **barrier methods:** painting, greasing, plastic coating.

Method — Preventing rust



Three test tubes: a nail rusts only where both water and oxygen are present

Method — Preventing rust



Zinc attached to iron, electrons flowing from zinc to iron

Practice 2.1 ■ 2 marks

State the two substances needed for iron to rust.

Solution 2.1

Method: Preventing rust

Worked steps

oxygen **B1**; water **B1**.

Practice 2.2 ■ 1 mark

Name the process of coating iron with zinc.

Solution 2.2

Method: Preventing rust

Worked steps

galvanising **B1**.

Exam-style 3.1 ■ 1 mark

Rust is:

- A** iron(II) sulfate
- B** hydrated iron(III) oxide
- C** iron carbonate
- D** zinc oxide

Solution 3.1

- A iron(II) sulfate
- B hydrated iron(III) oxide
- C iron carbonate
- D zinc oxide



Worked steps

- B. Rust is hydrated iron(III) oxide.

Exam-style 3.2 ■ 2 marks

In an experiment, an iron nail is kept in (i) water and air, (ii) boiled water under oil, and (iii) dry air with a drying agent.

- (a) State in which tube the nail rusts, and why.
- (b) State the purpose of the boiled water in tube (ii).

Solution 3.2

Method: Preventing rust

Worked steps

- (a) only tube (i) **M1**; because it is the only one with both water and oxygen present **A1**.
- (b) boiling removes the dissolved oxygen from the water **B1**.

Exam-style 3.3 ■ 3 marks

A block of zinc is attached to the steel hull of a ship. Explain how this protects the steel from rusting, even if the surface is scratched.

Solution 3.3

Method: Preventing rust

Worked steps

zinc is more reactive than iron, so it corrodes instead of the iron (M1); the zinc loses electrons / gives them to the iron (M1); so the iron is protected even where the surface is scratched (A1).