Exercise walk-through

Redox ▪ 6.4

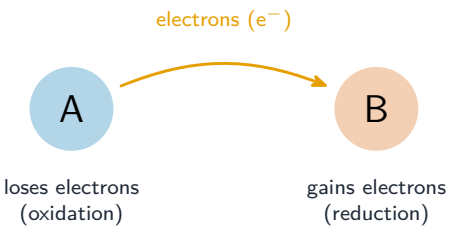
eXercise

You must be able to

- define oxidation and reduction (oxygen, electrons — OIL RIG)
- identify the oxidising agent and the reducing agent
- use the colour changes of manganate(VII) and iodide

Method — Electron transfer

- **oxidation:** loss of electrons (or gain of oxygen); **reduction:** gain of electrons (or loss of oxygen).
- **oxidising agent:** is itself reduced; **reducing agent:** is itself oxidised.
- acidified manganate(VII) (purple) $\rightarrow$ colourless when it acts as an oxidising agent.



Practice 2.1 ▪ 1 mark

Define oxidation in terms of electrons.

Solution 2.1

Method: Electron transfer

Worked steps

the loss of electrons B1.

Practice 2.2 ▪ 1 mark

State the colour change of acidified potassium manganate(VII) when it is reduced.

Solution 2.2

Method: Electron transfer

Worked steps

from purple to colourless B1.

Exam-style 3.1 ▪ 1 mark

In the reaction $Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$, the zinc is:

A reduced (gains electrons)

B oxidised (loses electrons)

C the oxidising agent

D unchanged

Solution 3.1

A reduced (gains electrons)

B oxidised (loses electrons) ✓

C the oxidising agent

D unchanged

Worked steps

B. Zinc loses electrons to become Zn^{2+} — it is oxidised.

Exam-style 3.2 ▪ 2 marks

Consider $\mathrm{Mg} + \mathrm{CuO} \rightarrow \mathrm{MgO} + \mathrm{Cu}$.
(a) State which substance is oxidised and which is reduced (using oxygen).
(b) Name the reducing agent.

Solution 3.2

Method: Electron transfer

Worked steps

(a) magnesium is oxidised (gains oxygen); copper oxide is reduced (loses oxygen) B1 B1.

(b) magnesium B1.

Exam-style 3.3 ▪ 2 marks

Explain why oxidation and reduction must always happen together in a redox reaction.

Solution 3.3

Method: Electron transfer

Worked steps

electrons lost by one substance must be gained by another M1; so when one is oxidised, another is reduced at the same time A1.