

6.4 Redox

Name: _____ Class: _____ Date: _____

Total: 8 marks

KEY WORDS oxidation • electrons • reducing agent • oxidising agent
• reduction

Objective

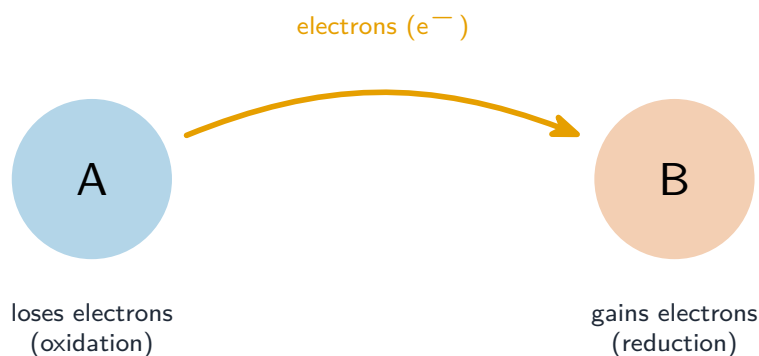
Build the skills to answer exam questions on **redox** – oxidation and reduction in terms of oxygen and **electrons**, **oxidising/reducing agents** / , and colour tests.

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

1 Key knowledge and worked examples

■ Electron transfer



OIL RIG: Oxidation Is Loss, Reduction Is Gain (of electrons) – they always happen together

- **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) → colourless when it acts as an oxidising agent.

2 Practice

2.1 Define oxidation in terms of electrons. [1]

2.2 State the colour change of acidified potassium manganate(VII) when it is reduced. [1]

3 Exam-style questions

3.1 In the reaction $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu}$, the zinc is: [1]

- ☐ **A** reduced (gains electrons)
B oxidised (loses electrons)
C the oxidising agent
D unchanged

3.2 Consider $\text{Mg} + \text{CuO} \rightarrow \text{MgO} + \text{Cu}$.

(a) State which substance is oxidised and which is reduced (using oxygen). [2]

(b) Name the reducing agent. [1]

3.3 Explain why oxidation and reduction must always happen together in a redox reaction. [2]

Solutions

Each answer shows the steps, then the **result**.

2.1

- oxidation (electrons) is the **loss of electrons**

2.2

- acidified potassium manganate(VII) goes **purple to colourless**

3.1 B

- zinc **loses electrons** to become Zn^{2+} – it is **oxidised**
- A is the copper ion; C is copper(II); D is false

3.2

(a)

- **magnesium is oxidised** (gains oxygen)
- **copper oxide is reduced** (loses oxygen)

(b)

- the reducing agent is **magnesium**

3.3

- electrons lost by one substance must be **gained by another**
- so oxidation and reduction **always happen together**