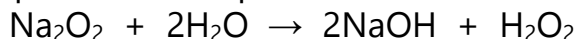


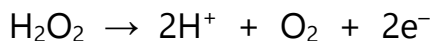
Activity 3.3 – calculation questions in the SAMs

Here is an example of a calculation question in the SAMs.

A 0.161 g sample of sodium peroxide was reacted with water.



The hydrogen peroxide produced was determined by titration with a solution containing cerium(IV) ions. In this reaction the hydrogen peroxide is converted into oxygen.



The solution reacted with exactly 19.85 cm³ of a 0.208 mol dm⁻³ solution of cerium(IV) ions, Ce⁴⁺.

Deduce the formula of the cerium ion present in the final solution. Support your answer with a calculation. (4)

The mark scheme shows how the marks are awarded.

- calculation of amount of Na₂O₂
- calculation of amount of Ce⁴⁺
- determination of the ratio Na₂O₂ : Ce⁴⁺
- formula of cerium ion is Ce³⁺

Example of answer:

$$n(\text{Na}_2\text{O}_2) = 0.161 \div 78.0 = 0.0020641 \text{ (mol)}$$

$$n(\text{Ce}^{4+}) = 0.208 \times \frac{19.85}{1000} = 0.004129 \text{ (mol)}$$

$$n(\text{Na}_2\text{O}_2) : n(\text{Ce}^{4+}) = \frac{0.0020641}{0.004129} = 1 : 2$$

- ✓ Consider which of the four bulleted steps count as Level 2 maths.
- ❖ Are there any Level 2 or higher maths skills your students will need help with, perhaps because they haven't mastered them at GCSE level or are not doing A level maths?