

Finding concentration by titration

Chemistry grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Lab answers

The answers use the sample results. Your own titres will differ slightly, but your method for choosing concordant titres and for calculating the concentration should match.

Level: Chemistry grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** GCSE C4 RP

Question 1 Select the concordant titres

Runs 1, 2 and 3 (**20.10, 20.05 and 20.00 cm³**) are within 0.10 cm³ of each other. The rough titre is excluded.

Question 2 Mean titre

$(20.10 + 20.05 + 20.00) \div 3 = \mathbf{20.05 \text{ cm}^3}$.

Question 3 Moles of acid

$n = 0.100 \times 0.02005 = \mathbf{0.002005 \text{ mol}}$.

Question 4 Concentration of NaOH

The ratio is 1 : 1, so $n(\text{NaOH}) = 0.002005 \text{ mol}$ and $c = 0.002005 \div 0.0250 = \mathbf{0.0802 \text{ mol/dm}^3}$.

Question 5 Concentration in g/dm³

$M(\text{NaOH}) = 40 \text{ g/mol}$; $0.0802 \times 40 = \mathbf{3.21 \text{ g/dm}^3}$.

Question 6 Uncertainty

A titre uses two readings, so the uncertainty is $\pm 0.10 \text{ cm}^3$. $0.10 \div 20.05 \times 100 = \mathbf{0.50\%}$.

Question 7 Why swirl and go slowly

One drop of acid is about 0.05 cm³. Slow addition lets you stop when **one drop causes the permanent colour change**, giving a precise titre.

Question 8 Improving the lab

Use a **white tile** and a **wash bottle** to rinse the walls of the flask, and repeat the titration until three titres agree within 0.10 cm³.