

Finding concentration by titration

Chemistry grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Test answers (mark scheme)

Model answers and mark schemes for the test. Award method marks even if an earlier error is carried forward, and credit correct alternative explanations about technique.

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

Question 1 Apparatus (2 marks)

- a. A **pipette**.
- b. It makes the **colour change at the end point easier to see**.

Marking: 1 mark each.

Question 2 Reading a burette (2 marks)

- a. The meniscus is at **23.30 cm³**.
- b. $23.30 - 0.10 = \mathbf{23.20\text{ cm}^3}$.

Marking: 1 mark each; allow error carried forward in part b.

Question 3 The mean titre (2 marks)

- a. The **three accurate titres**, because they are within 0.10 cm³ (concordant); the rough titre is not used.
- b. $(21.30 + 21.20 + 21.25) \div 3 = \mathbf{21.25\text{ cm}^3}$.

Marking: 1 mark each.

Question 4 Potassium hydroxide (3 marks)

- a. $0.0800 \times 0.01875 = \mathbf{0.001500\text{ mol}}$.
- b. Ratio 1 : 1; $c = 0.001500 \div 0.0250 = \mathbf{0.0600\text{ mol/dm}^3}$.

Marking: 1 mark for moles; 1 mark for the ratio; 1 mark for the concentration.

Question 5 Sulfuric acid (4 marks)

- a. $0.100 \times 0.02800 = \mathbf{0.00280\text{ mol}}$.
- b. Ratio 1 : 2, so **0.00140 mol**.

c. $0.00140 \div 0.0250 = \mathbf{0.0560 \text{ mol/dm}^3}$.

d. $0.0560 \times 98 = \mathbf{5.49 \text{ g/dm}^3}$.

Marking: 1 mark each; allow error carried forward.

Question 6 Choosing an indicator (3 marks)

a. **Methyl orange.**

b. The end point is slightly acidic (about pH 5), but phenolphthalein changes colour only in alkaline solution, so it would **change before the end point** and give a wrong titre.

Marking: 1 mark for the indicator; 1 mark for the end-point pH; 1 mark for the consequence.

Question 7 Effect of an error (2 marks)

a. The acid is diluted, so a **larger volume** is needed to reach the end point.

b. The calculated concentration is **too high**.

Marking: 1 mark each.

Question 8 Mass concentration and rough titre (2 marks)

a. $M = 56; 0.0600 \times 56 = \mathbf{3.36 \text{ g/dm}^3}$.

b. It shows **approximately where the end point is**, so the accurate runs can slow down at the right moment.

Marking: 1 mark each.