

Finding concentration by titration

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

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

This test has eight questions worth 20 marks in total. Show every step of the calculations, convert volumes to dm^3 and quote the final answer with the correct unit. You may use a calculator.

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

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

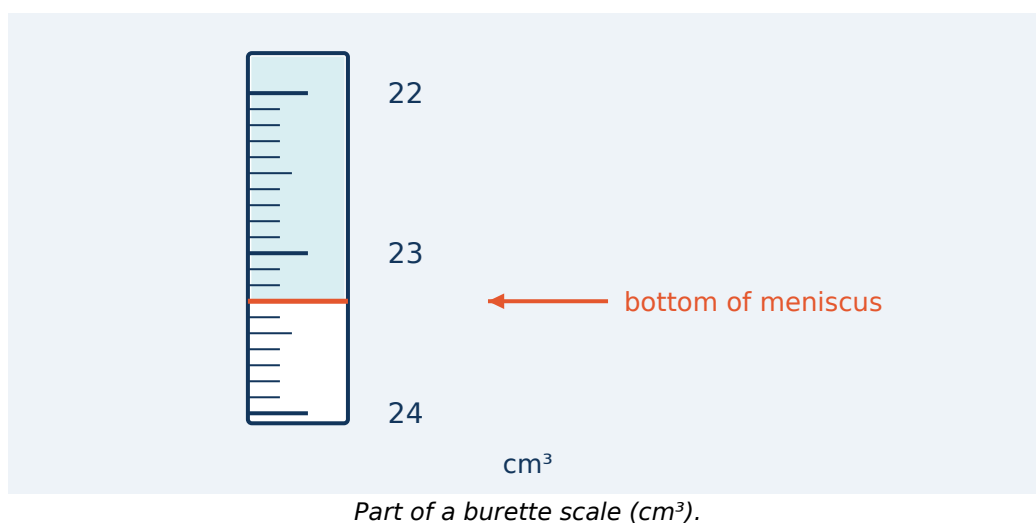
Question 1 Apparatus (2 marks)

- Name the piece of apparatus that measures exactly 25.0 cm^3 of alkali into the flask. (1 mark)
- Explain why a white tile is placed under the flask. (1 mark)

Question 2 Reading a burette (2 marks)

The diagram shows the final level in a burette.

- Read the burette to two decimal places. (1 mark)
- The starting reading was 0.10 cm^3 . Calculate the titre. (1 mark)



Question 3 The mean titre (2 marks)

Titres: rough 22.10; then 21.30, 21.20 and 21.25 cm^3 .

- a. State which results are used and why. (1 mark)
- b. Calculate the mean. (1 mark)

Question 4 Potassium hydroxide (3 marks)

A 25.0 cm³ sample of potassium hydroxide needs 18.75 cm³ of 0.0800 mol/dm³ HCl: $\text{KOH} + \text{HCl} \rightarrow \text{KCl} + \text{H}_2\text{O}$.

- a. Calculate the moles of HCl. (1 mark)
- b. Calculate the concentration of the potassium hydroxide in mol/dm³. (2 marks)

Question 5 Sulfuric acid (4 marks)

A 25.0 cm³ sample of sulfuric acid needs 28.00 cm³ of 0.100 mol/dm³ NaOH: $\text{H}_2\text{SO}_4 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$.

- a. Calculate the moles of NaOH used. (1 mark)
- b. Calculate the moles of H₂SO₄ in the sample. (1 mark)
- c. Calculate the concentration of H₂SO₄ in mol/dm³. (1 mark)
- d. Calculate it in g/dm³ (Ar: H = 1, S = 32, O = 16). (1 mark)

Question 6 Choosing an indicator (3 marks)

Hydrochloric acid is titrated with ammonia solution, a weak alkali.

- a. Name a suitable indicator. (1 mark)
- b. Explain why phenolphthalein is unsuitable. (2 marks)

Question 7 Effect of an error (2 marks)

The burette was rinsed with water instead of acid.

- a. Explain the effect on the titre. (1 mark)
- b. State the effect on the calculated concentration of the alkali. (1 mark)

Question 8 Mass concentration and rough titre (2 marks)

- a. Convert 0.0600 mol/dm³ KOH to g/dm³ (Ar: K = 39, O = 16, H = 1). (1 mark)
- b. State the purpose of a rough titration. (1 mark)