Titration

Chemistry required practical | AQA GCSE Chemistry 8462 only (not Combined Science) | 14 questions, 35 marks

GCSE science required practicals

This practical online

Name: _____ **Date:** _____ **Score:** _____ **/ 35**

Aim: To find the volume of an acid that exactly neutralises a measured volume of an alkali, and use it to work out the concentration of the alkali.

Equipment: burette and clamp stand; 25.0 cm^3 volumetric pipette and pipette filler; conical flask; small funnel; white tile; dilute hydrochloric acid of known concentration; sodium hydroxide solution of unknown concentration; indicator (phenolphthalein or methyl orange); safety goggles.

Results

Priya titrated 25.0 cm^3 portions of sodium hydroxide solution with 0.100 mol/dm^3 hydrochloric acid, using phenolphthalein. She did one rough run and four accurate runs.

Titration	Start burette reading in cm^3	Final burette reading in cm^3	Titre in cm^3
Rough	0.00	23.55	23.55
1	23.55	46.75	23.20
2	0.50	23.45	22.95
3	1.20	24.10	?
4	0.30	23.25	22.95

Questions

1 Name the piece of equipment used to measure the 25.0 cm^3 of sodium hydroxide, and explain why it is used instead of a measuring cylinder. (2 marks)

2 Give two reasons why the conical flask is placed on a white tile and swirled during the titration. (2 marks)

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3 Give two things Priya must keep the same in each accurate titration, other than the concentration of the acid.

(2 marks)

4 Dilute hydrochloric acid is an irritant. Describe one hazard when filling the burette with the acid and how to reduce the risk.

(2 marks)

5 Calculate the titre for titration 3.

(1 mark)

6 Which accurate titrations are concordant? Explain your answer.

(2 marks)

7 Calculate the mean titre using only the concordant results. Give your answer to 2 decimal places. Show your working.

(3 marks)

8 Suggest why the rough titre is larger than the accurate ones, and why it is not used in the mean.

(2 marks)

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9 **Higher tier**

Use your mean titre from question 7 to calculate the number of moles of hydrochloric acid that reacted. The acid concentration is 0.100 mol/dm^3.

(2 marks)

10 **Higher tier**

The equation is NaOH + HCl → NaCl + H_2O. Use your answer to question 9 to calculate the concentration of the sodium hydroxide solution in mol/dm^3. Give your answer to 3 significant figures. Show your working.

(3 marks)

11 **Higher tier**

Convert your answer to question 10 into a concentration in g/dm^3. The relative formula mass (M_r) of NaOH is 40.

(2 marks)

12 Oliver forgot to remove the air bubble from the tip of his burette, and it came out during his first accurate titration. Explain the effect on his titre, and say how he should have avoided it.

(3 marks)

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13 Burette readings are recorded to the nearest 0.05 cm^3. Explain the difference between the results being precise and being accurate, using Priya's titres as an example. (3 marks)

14 A school has a bottle of dilute sulfuric acid with no label for its concentration. A technician has potassium hydroxide solution of known concentration. Plan a titration to find the volume of the potassium hydroxide solution that exactly neutralises 25.0 cm^3 of the acid. (6 marks)

End of questions | Total 35 marks | The answers sheet has the full method as revision notes.

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