

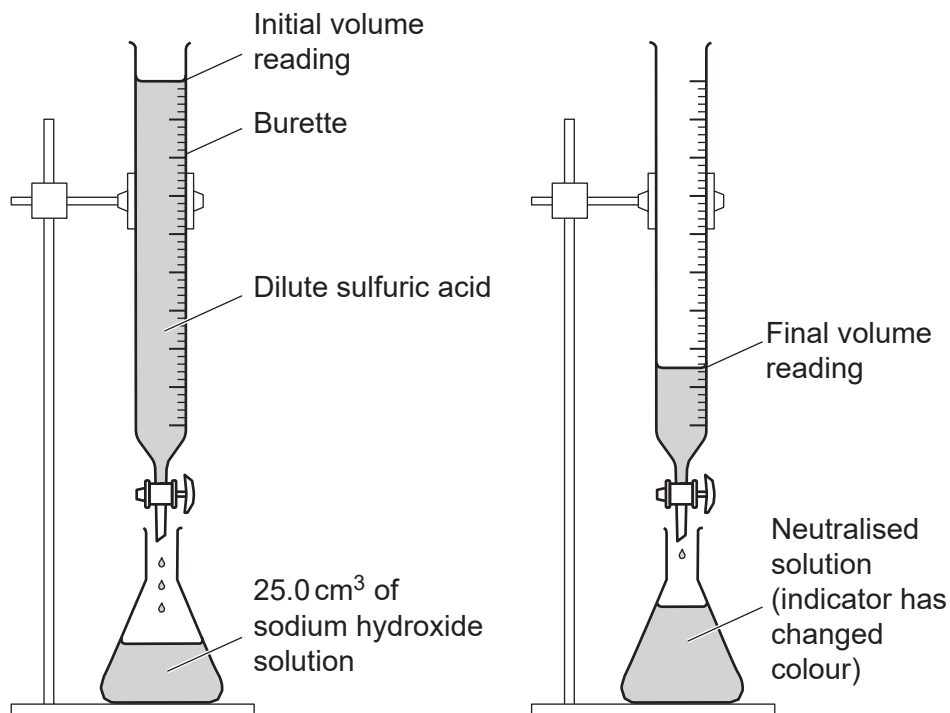
**GCSE Chemistry A (Gateway Science)**

**J248/02 C4-C6 and C7 Foundation (Foundation Tier)**

**Question Set 18**

1 A student does a titration with an acid and an alkali.

He uses dilute sulfuric acid, sodium hydroxide solution and an indicator solution.



The student's method is:

- Use a measuring cylinder to pour 25.0 cm<sup>3</sup> of sodium hydroxide solution into a conical flask
- Add a few drops of an indicator to the sodium hydroxide solution
- Use a burette to add dilute sulfuric acid to the sodium hydroxide solution until the indicator changes colour.

(a) The student wants to get a more accurate value for how much acid reacts with 25.0 cm<sup>3</sup> of sodium hydroxide solution.

Describe and explain how the student could improve his experiment to get a more accurate value.

[4]

- (b) Another student does a titration. She also uses dilute sulfuric acid, sodium hydroxide solution and an indicator solution.

The table shows her results.

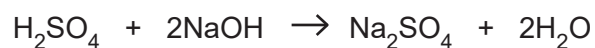
Titration number	1	2	3	4
Volume of acid (cm <sup>3</sup> )	26.4	25.2	25.6	25.4

The student decides that the best value for the mean (average) volume of acid is 25.4 cm<sup>3</sup>.

Show how she calculated this value.

[2]

- (c) The equation for this reaction is



	Relative formula mass, $M_r$
H <sub>2</sub> SO <sub>4</sub>	98
NaOH	40
Na <sub>2</sub> SO <sub>4</sub>	142
H <sub>2</sub> O	18

Water is a waste product in this reaction.

Calculate the **atom economy** for the reaction.

Give your answer to **1** decimal place.

Answer = ..... [3]

**Total Marks for Question Set 18: 9**

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