Acid-alkali titration

AQA 8462 Separate Chemistry · Foundation and Higher

Show your working where needed.

Name _____ Date _____

1. Calculate the titre

A burette reads 1.20 cm^3 before a titration and 23.65 cm^3 at the end point. Calculate the volume delivered.

2. Find the final reading

The initial reading is 2.45 cm^3. The titre is 19.80 cm^3. What is the final burette reading?

3. Use the repeat titres

The rough titre is 21.60 cm^3. Further titres are 21.45, 21.50 and 22.10 cm^3.

Choose two repeat titres within 0.10 cm^3 of one another. Give a reason for your choice and calculate the mean to two decimal places.

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4. Transfer the alkali

A student plans to transfer 25.0 cm^3 of alkali to a conical flask using a measuring cylinder. Name a more suitable piece of apparatus for that transfer and explain why it is better suited to the job.

5. Near the end point

A student has put a suitable indicator into the flask. Explain how they can tell when enough acid has been added. Describe how they should add the acid just before that point.

6. Rinsing the flask wall

A student rinses drops of alkali from the wall of the conical flask with distilled water. No alkali leaves the flask. Predict whether the volume of acid needed to neutralise the alkali increases, decreases or stays the same. Explain your answer.

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7. Sodium hydroxide concentration (Higher)

HCl + NaOH → NaCl + H_2O. A 25.0 cm^3 sample of NaOH reacts with 19.5 cm^3 of 0.100 mol/dm^3 HCl. Calculate the NaOH concentration in mol/dm^3.

8. Sulfuric acid concentration (Higher)

H_2SO_4 + 2NaOH → Na_2SO_4 + $2H_2O$. A 20.0 cm^3 sample of H_2SO_4 reacts with 24.0 cm^3 of 0.150 mol/dm^3 NaOH. Calculate the H_2SO_4 concentration in mol/dm^3.

9. Extra challenge · Check the technician’s calculation (Higher)

Two repeat titres to neutralise 25.0 cm^3 of 0.120 mol dm^{-3} NaOH are 20.10 and 20.20 cm^3. A rough titre was 20.60 cm^3. The reaction is H_2SO_4 + 2NaOH → Na_2SO_4 + $2H_2O$. Use the two repeat titres to calculate the sulfuric acid concentration to 3 significant figures. A technician doubles the amount of alkali to obtain the amount of acid. Explain why that step is wrong.

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