Titration calculations

Chemistry calculations | AQA GCSE Chemistry 8462 only (not Combined Science) | 12 questions, 33 marks

GCSE science calculations

Scan for the solutions

Equations for this topic (cover this box to practise recalling them)

- titre = final burette reading - initial burette reading learn this one
- mean titre = $\frac{\text{sum of concordant titres}}{\text{number of concordant titres}}$ learn this one
- concentration (mol/dm^3) = $\frac{\text{moles}}{\text{volume (dm}^3\text{)}}$ learn this one
- concentration (mol/dm^3) = $\frac{\text{concentration (g dm}^{-3}\text{)}}{\text{Mr}}$ learn this one
- concentration (g/dm^3) = concentration (mol/dm^3) × Mr learn this one

Name: _____ **Date:** _____ **Score:** _____ **/ 33**

1 In a titration, the burette reading at the start is 0.50 cm^3. At the end point the burette reading is 23.70 cm^3.

Calculate the titre.

(1 mark)

Answer _____

2 Zainab does not refill her burette between two titrations. The table shows her readings for the second titration.

	Burette reading in cm^3
Initial	12.35
Final	36.80

Calculate the titre for the second titration.

(1 mark)

Answer _____

3 Leon does a titration five times. His titres are shown in the table.

Titration	**Rough**	**1**	**2**	**3**	**4**
Titre in cm^3	25.60	24.90	24.95	25.40	24.85

Concordant results are within 0.10 cm^3 of each other.

Calculate the mean titre using only the concordant results.

(2 marks)

Answer _____

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4 Chloe's titration results are shown in the table.

	Rough	1	2	3
Final reading in cm^3	26.10	26.65	26.10	27.75
Initial reading in cm^3	0.00	1.20	0.45	2.30

Concordant results are within 0.10 cm^3 of each other.

a. Calculate the titre for titration 2.

b. Calculate the mean titre from the concordant results.

(3 marks)

Answer _____

5 **Higher tier**

A pipette delivers 25.0 cm^3 of sodium hydroxide solution into a conical flask. The concentration of the sodium hydroxide solution is 0.100 mol/dm^3.

Calculate the number of moles of sodium hydroxide in the flask.

(2 marks)

Answer _____

6 **Higher tier**

Dev's mean titre is 22.40 cm^3 of hydrochloric acid. The concentration of the acid is 0.150 mol/dm^3.

Calculate the number of moles of hydrochloric acid in the mean titre.

(2 marks)

Answer _____

7 **Higher tier**

A quality-control chemist at a vinegar factory dilutes a sample of vinegar ten times with water. A 20.0 cm^3 portion of the diluted solution contains 0.00180 mol of ethanoic acid.

Calculate the concentration of ethanoic acid in the diluted solution in mol/dm^3.

(2 marks)

Answer _____

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8 **Higher tier**

Mrs Adeyemi predicts that 0.00450 mol of nitric acid will be needed to neutralise the alkali in a flask. The nitric acid has a concentration of 0.200 mol/dm^3.

Calculate the volume of nitric acid needed, in cm^3.

(3 marks)

Answer _____

9 **Higher tier**

A bottle of dilute hydrochloric acid, HCl, is labelled 7.30 g/dm^3.

Relative atomic masses (A_r): H = 1, Cl = 35.5

Calculate the concentration of the acid in mol/dm^3.

(3 marks)

Answer _____

10 **Higher tier**

Tobi titrates 25.0 cm^3 of sodium hydroxide solution with hydrochloric acid of concentration 0.120 mol/dm^3. The mean titre is 21.60 cm^3.

$NaOH + HCl \rightarrow NaCl + H_2O$

Calculate the concentration of the sodium hydroxide solution in mol/dm^3.

Give your answer to 3 significant figures. Show your working.

(4 marks)

Answer _____

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11 **Higher tier**

Priya puts 25.0 cm^3 of 0.150 mol/dm^3 sodium hydroxide solution in a conical flask. She titrates it with sulfuric acid from a burette.

Titration	Rough	1	2	3
Titre in cm^3	19.20	18.60	19.05	18.70

Concordant results are within 0.10 cm^3 of each other.

$H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$

a. Calculate the mean titre from the concordant results.

b. Calculate the concentration of the sulfuric acid in mol/dm^3. Give your answer to 3 significant figures. Show your working.

(5 marks)

Answer _____

12 **Higher tier**

A water treatment works checks a potassium hydroxide solution. A chemist titrates 25.0 cm^3 of the solution with nitric acid of concentration 0.0800 mol/dm^3.

- Rough titre: 24.30 cm^3
- Concordant titres: 23.70 cm^3 and 23.80 cm^3

$KOH + HNO_3 \rightarrow KNO_3 + H_2O$

Relative atomic masses (A_r): H = 1, O = 16, K = 39

a. Calculate the concentration of the potassium hydroxide solution in mol/dm^3.

b. Calculate the concentration of the potassium hydroxide solution in g/dm^3. Give your answer to 2 significant figures. Show your working.

(5 marks)

Answer _____

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End of questions | Total 33 marks

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