

AS level Chemistry A

H032/02 Depth in chemistry

Question Set 7

1. (a) (i) A student carries out a titration to determine the molar mass and structure of a weak acid **A**.

The student follows the method below.

- Dissolve a weighed mass of **A** in 100cm^3 of distilled water and make the solution up to 250cm^3 in a beaker.
- Add the solution of **A** to a burette.
- Titrate the solution of **A** with a standard solution of sodium hydroxide, NaOH.

- (ii) What is meant by the term standard solution?

[1]


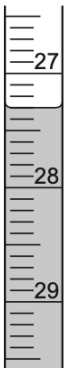

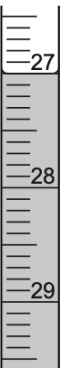


- (b) Sodium hydroxide is an alkali.

What is meant by the term alkali?

[1]

- (c) The student carries out a trial, followed by three further titrations. The diagram shows the initial and final burette readings for the three **further** titrations.

The student measures all burette readings to the nearest 0.05cm^3 .

Titration 1		Titration 2		Titration 3	
Initial reading	Final reading	Initial reading	Final reading	Initial reading	Final reading
					

- (i) Record the student's readings and the titres in the table below.

Calculate the mean titre, to the nearest 0.05cm^3 , that the student should use for analysing the results.

	Titration 1	Titration 2	Titration 3
Final reading/ cm^3			
Initial reading/ cm^3			
Titre/ cm^3			

[4]

- (ii) The uncertainty in each burette reading is $\pm 0.05\text{cm}^3$.

Calculate the percentage uncertainty for the titre in **Titration 1**.

[1]

(iii) The student realised that the solution of **A** had not been prepared correctly.

How should the student have made up the solution?

[1]

(d) A student repeats the titration to determine the molar mass and structure of **A**.

The student prepares a 250.0 cm³ solution from 1.513 g of **A**.

- The solution of **A** is added to the burette and titrated with 25.0 cm³ volumes of 0.112 mol dm⁻³ NaOH(aq).
- 1 mol of **A** reacts with 2 mol of NaOH.
- The student obtains a mean titre of 27.30 cm³.

(i) Calculate the molar mass of **A** from these results.

Give your answer to the nearest whole number.

Show your working.

[4]

(ii) **A** is an organic acid, containing C, H and O only.
One molecule of **A** contains two COOH groups.

Suggest the structure of **A**.

[1]

Total Marks for Question Set 1: 13

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