Oxford Cambridge and RSA

AS Level Chemistry A

H032/01 Breadth in chemistry

Question Set 19

1. A student carries out a titration to determine the concentration of some hydrochloric acid.

The student titrates the hydrochloric acid against a standard solution of sodium carbonate, Na_2CO_3. The equation is shown below.

$$Na_2CO_3(aq) + 2HCl(aq) \rightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$$

- The student prepares 0.150 mol dm^{-3} Na_2CO_3 in a 250.0 cm^3 volumetric flask.
- The hydrochloric acid is added to a 50.0 cm^3 burette.
- The student pipettes the $Na_2CO_3(aq)$ using a 25.0 cm^3 pipette.

(a) The student's burette readings are shown in the table.
The rough titre has been omitted.

(i) Complete the table by adding the titres to the table.

Final reading / cm^3	24.60	48.45	34.30
Initial reading / cm^3	0.40	24.60	10.00
Titre / cm^3	.....	.....	.....

[1]

(ii) Calculate the mean titre of HCl, to the nearest 0.05 cm^3, that the student should use for analysing the results.

[1]

(b) Calculate the concentration, in mol dm^{-3}, of the hydrochloric acid.

Give your answer to **3** significant figures.

[3]

(c) In the titrations, the student measured volumes with a pipette and a burette.

- The pipette had an uncertainty of ± 0.04 cm^3 in the volume measured.
- The burette had an uncertainty of ± 0.05 cm^3 in the volume measured.

Determine whether the volume measured by the pipette or the volume measured by the burette has the greater percentage uncertainty.

[2]

Total Marks for Question Set 19: 7