Oxford Cambridge and RSA

GCSE Chemistry B (Twenty First Century Science)

J258/03 Breadth in chemistry (Higher Tier)

Question Set 25

1 Layla does a titration to find out the concentration of some sodium hydroxide solution. She reacts hydrochloric acid with the sodium hydroxide solution.

(a) Layla says, 'The titration uses a **neutralisation** reaction.'

Define a neutralisation reaction. **[1]**

(b) This is Layla's **incomplete** method for the titration:

- Put the hydrochloric acid in a burette.
- Put the sodium hydroxide solution in a flask.
- Add the hydrochloric acid to the sodium hydroxide solution.
- Stop adding the hydrochloric acid when the sodium hydroxide solution is neutralised.

(i) Layla needs to add another substance to the flask so that she knows when to stop adding the hydrochloric acid.

Which substance does Layla need to add, **and** what will she see? **[2]**

(ii) Layla titrates the hydrochloric acid into a flask from a burette. She wants to make sure her final burette reading is as **accurate** as possible.

Describe **one** thing Layla can do to make her reading as accurate as possible.

[1]

(c) **(i)** Layla's results for her rough titration are shown in **Table 1.1**.

Complete **Table 1.1** by calculating the volume for the rough titration.

	Rough titration
Initial burette reading (cm^3)	0.90
Final burette reading (cm^3)	25.80
Volume for the rough titration (cm^3)	.....

Table 1.1

[1]

(ii) Layla's repeat readings for her careful titrations are shown in **Table 1.2**.

Layla calculates that the mean titration volume is 24.60 cm^3.
Explain why Layla is correct.

Use the information in **Table 1.2** and a calculation in your answer.

	First titration	**Second titration**	**Third titration**	**Fourth titration**
Volume (cm^3)	24.55	24.95	24.65	24.60

Table 1.2

[2]

(iii) Calculate the mass of acid in 1 cm^3 of hydrochloric acid.

Use the formula: mean titration volume = $\frac{0.0908}{\text{mass of acid in 1 cm}^3 \text{ of hydrochloric acid}}$

Give your answer to **2** significant figures.

Mass of acid in 1 cm^3 of hydrochloric acid = ... g **[4]**

Total Marks for Question Set 25 : 11