

AQA – Amount of substance – A2 Chemistry P1 & P3

1. No.2

0	2
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This question is about an experiment to determine the solubility of strontium hydroxide in water at 20 °C

Strontium hydroxide is slightly soluble in water. Strontium hydroxide solution reacts in a similar way to calcium hydroxide solution.

- Some solid strontium hydroxide is added to approximately 1 dm³ of distilled water in a stoppered flask.
- The mixture is kept at 20 °C. Every day, the mixture is checked. If no solid is present in the flask, more solid strontium hydroxide is added.
- On the day when no more solid needs to be added, the flask is opened and the mixture is filtered into another flask and stoppered.
- A 25.0 cm³ sample of the filtrate is transferred to a conical flask with a pipette and a few drops of indicator added.
- This sample is titrated with 0.100 mol dm⁻³ hydrochloric acid.
- The titration is repeated several times with further samples of the filtrate. The results are shown in **Table 1** on page 8.

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Suggest why the solution is kept until no more solid needs to be added.

[1 mark]

0	2	.	2
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Suggest why it is important to remove the undissolved strontium hydroxide before the titration.

[1 mark]

0	2	.	3
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After the filtration, the solution is stored in a stoppered flask.

Suggest a reason for stoppering the flask.

[1 mark]

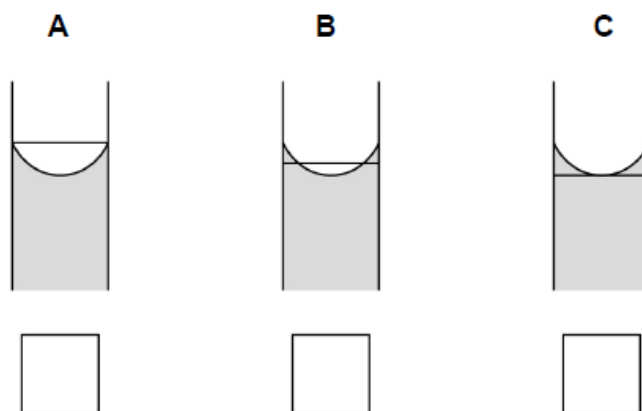
0 2 . 4 The diagrams in **Figure 2** show the part of a pipette with the graduation line.

Which diagram identifies the pipette that is correctly filled?

[1 mark]

Tick (✓) **one** box.

Figure 2



0 2 . 5 Solubility can be quoted as 'g of solute per 100 cm³ of solution'.

Table 1 shows the results of the titrations between strontium hydroxide and hydrochloric acid. These can be used to determine the solubility of strontium hydroxide.

Table 1

Titration	Rough	1	2	3
Final burette reading / cm ³	34.40	38.00	41.05	37.00
Initial burette reading / cm ³	0.00	5.55	8.05	4.60
Titre / cm ³	34.40	32.45	33.00	32.40

Give the equation for the reaction between strontium hydroxide and hydrochloric acid.

Use the results in **Table 1** to calculate the mean titre.

Use the mean titre to calculate the solubility of strontium hydroxide, in g per 100 cm³ of solution, at 20 °C

[6 marks]

Equation

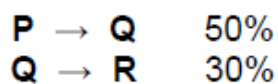
Mean titre _____ cm^3

Solubility of strontium hydroxide _____ g per 100 cm^3 solution

2. No.8

Compound **P** is converted into compound **R** by a two-stage synthesis via compound **Q**.

The yields for the individual steps are:



What is the overall yield of **R** in this synthesis?

[1 mark]

A 15% ☐

B 30% ☐

C 40% ☐

D 80% ☐

3. No.9

What is the formula of ammonium ethanedioate?

[1 mark]

A $\text{NH}_4(\text{C}_2\text{O}_4)_2$ ☐

B $(\text{NH}_4)_2\text{C}_2\text{O}_4$ ☐

C $\text{NH}_4\text{C}_2\text{O}_4$ ☐

D $(\text{NH}_4)_2(\text{C}_2\text{O}_4)_3$ ☐