

1. Helen is making magnesium chloride.

Look at the method Helen uses.

- 1 Measure 50 cm³ of dilute hydrochloric acid into a beaker.
- 2 Add magnesium powder until there is no more effervescence.
- 3 Heat the mixture until saturated.

Helen's method does not make a pure dry sample of magnesium chloride.

How should Helen improve her method to get a **pure dry** sample of magnesium chloride?

[1]

2. A student wants to make solid ammonium sulfate from the solution of ammonium sulfate.

What should the student do first?

- A Distil the solution.
- B Evaporate the solution.
- C Filter the solution.
- D Use chromatography.

Your answer

[1]

3. David wants to make some potassium sulfate solution.

He decides to neutralise an acid with potassium hydroxide.

(i) Which acid should he use?

----- [1]

(ii) David wants to check that a solution of potassium sulfate is neutral.

Write about how he could do this.

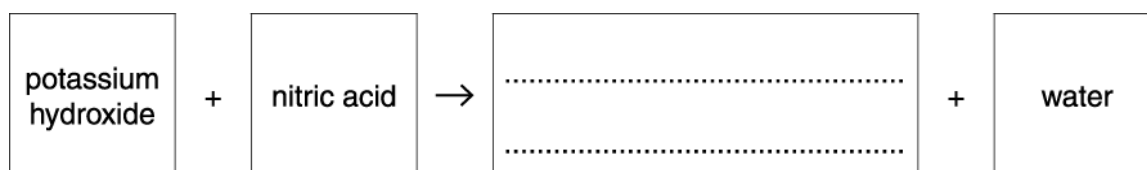
----- [2]

4. Alfie is a scientist. He investigates neutralisation.

He adds dilute nitric acid to potassium hydroxide solution.

He uses an indicator called **litmus** to tell when the solution is neutral.

Complete the word equation for the reaction



[1]

5. David wants to make some potassium sulfate solution.

He decides to neutralise an acid with potassium hydroxide.

(i) Which acid should he use?

----- [1]

(ii) Describe the experimental method he should use to make potassium sulfate solution.

----- [2]

6. Sarah neutralises dilute sulfuric acid with a base.

She uses sodium hydroxide solution as the base.

(i) Write the names of the **two** compounds made when dilute sulfuric acid is neutralised by sodium hydroxide solution.

----- and -----

[2]

(ii) Dilute hydrochloric acid contains hydrogen ions.

Sodium hydroxide solution contains hydroxide ions, OH^- .

Construct the **ionic** equation to show the reaction of hydrogen ions with hydroxide ions.

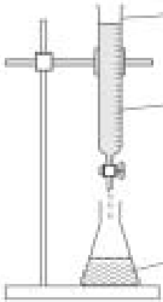
----- [2]

END OF QUESTION PAPER

Mark Scheme

Question		Answer/Indicative content	Marks	Guidance
1		filter off excess magnesium before heating and evaporate to dryness (1) OR filter off excess magnesium before heating, allow to crystallise, filter and dry (1)	1	
		Total	1	
2		B ✓	1 (AO1.2)	Examiner's Comments Some candidates correctly chose evaporation. Distillation and filtration were common wrong choices.
		Total	1	
3	i	sulfuric acid / H ₂ SO ₄ (1)	1	allow hydrogen sulfate
	ii	add universal indicator / pH paper (1) if colour goes green it is neutral / match colour with neutral colour (1)	2	allow add (red and blue) litmus (1) the litmus does not change colour (1) allow use a pH meter (1) and it should be pH 7 (1) allow check the pH see if it is 7 (1) mark for colour change must link correctly to indicator used Examiner's Comments Only about a fifth of candidates could identify the acid needed to make a sulfate. Few candidates knew how to test a solution to see if it was neutral.
		Total	3	
4		potassium nitrate (1)	1	allow potassium nitrate solution / potassium nitrate salt (1) allow KNO ₃ (1) Examiner's Comments The word equation proved difficult with only a minority of candidates correctly giving the product as potassium nitrate.
		Total	1	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
5		i	sulfuric (acid) / H ₂ SO ₄ (1)	1	<p>allow hydrogen sulfate</p> <p>Examiner's Comments</p> <p>Some candidates appreciated that sulfuric acid was needed to prepare potassium sulfate, however other acids such as hydrochloric and nitric acid were also given as answers.</p>
		ii	<p>titration / description of titration (1)</p> <p>alkali added to acid until it is just neutralised or vice versa (1)</p>	2	<p>allow slow or dropwise addition of an acid (to an alkali) or vice versa / aw</p> <p>allow use a burette to add acid (to alkali) or vice versa</p> <p>allow until indicator or named indicator just changes colour / use of pH meter to tell when until pH = 7 / add till it is just neutral</p> <p>allow marks from a labelled diagram</p> <div style="text-align: center;">  </div> <p>allow ecf names of acid from (d)(i) concentrate on the experimental method</p> <p>Examiner's Comments</p> <p>Very few candidates could describe the experimental procedure used in (ii) and often candidates did not attempt the question. The use of a burette or titration was seldom used by candidates and often mixing and evaporation was used.</p>
Total				3	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
6		i	sodium sulfate / sodium hydrogensulfate (1) water (1)	2	allow Na ₂ SO ₄ / NaHSO ₄ (1) allow H ₂ O (1)
		ii	H ⁺ + OH ⁻ → H ₂ O (2) reactants correct (1) product correct (1)	2	allow OH ₂ for water (1) allow ⇌ instead of → allow any correct multiples
			Total	4	