

ACIDS, BASES & TITRATION 4

MARK SCHEME

Q1.

Question	Answer	Extra information	Marks
(i)	hydroxide / OH ⁻	accept H ₂ and NH ₃ ignore incorrect symbols ignore balancing	1
(ii)	H ⁺ + OH ⁻ → H ₂ O	ignore state symbols ignore word equation	1
Total marks			2

Q2.

(a)	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response.		6
0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant content.	There is a simple description of a laboratory procedure for obtaining potassium chloride.	There is a clear description of a laboratory procedure for obtaining potassium chloride from potassium hydroxide solution and hydrochloric acid that does not necessarily allow the procedure to be completed successfully by another person. The answer must include the use of an indicator / pH meter or a method of obtaining crystals.	There is a detailed description of a laboratory procedure for obtaining potassium chloride from potassium hydroxide solution and hydrochloric acid that can be followed by another person. The answer must include the use an indicator / pH meter and a method of obtaining crystals
<p>examples of the chemistry points made in the response</p> <p>One reagent in beaker (or similar)</p> <ul style="list-style-type: none"> • Add (any named) indicator • Add other reagent 			

- Swirl or mix
- Add dropwise near end point
- Stop addition at change of indicator colour
- Note volume of reagent added
- Repeat without indicator, adding same volume of reagent or remove indicator using charcoal
- Pour solution into basin / dish
- Heat (using Bunsen burner)
- Leave to crystallise / leave for water to evaporate / boil off water

Accept any answers based on titration

(b)	nitric (acid)	allow HNO ₃ ignore incorrect formula	1
(c)(i)	because it is a fertiliser / helps plants grow	allow plant food do not accept pesticide / herbicide / neutralising soil	1
(ii)	tick by: 'Should farmers stop using ammonium nitrate on their land?' any two from: <ul style="list-style-type: none"> • cannot be done by experiment • based on opinion / view • ethical or economic issue 	accept difficult to get / not enough evidence allow must be done by survey if top box ticked allow 1 mark for drinking water varies from place to place	1 2
Total marks			11

Q3.

Question	Answer	Extra information	Marks
	any two from: <ul style="list-style-type: none"> • effervescence / bubbles / fizzing • magnesium disappears / dissolves • heat given off / exothermic • change in pH 	allow gas / hydrogen is given off allow volume of gas allow magnesium floats allow change in mass of magnesium allow temperature change do not accept temperature decreases do not accept pH decreases	2
Total marks			2

Q4.

Question	Answer	Extra information	Marks
(i)	hydroxide / OH ⁻	accept phonetic spelling	1
(ii)	neutralisation	accept acid-base allow exothermic	1
(iii)	nitric (acid)	allow HNO ₃ ignore incorrect formula	1
(iv)	(NH ₄) ₂ SO ₄	allow (NH ⁴⁺) ₂ SO ₄ ²⁻	1
Total marks			4

Q5.

Question	Answer	Extra information	Marks
(i)	Sulfuric acid	accept sulphuric ignore formula ignore hydrogen sulfate	1
(ii)	any two from: <ul style="list-style-type: none"> • (hydrogen) gas produced (or any indication of a gas such as bubbles etc.) • magnesium / solid disappears / goes into solution • gets hot 	list principle applies for incorrect observations ignore just hydrogen produced ignore cloudiness / colour changes accept magnesium / magnesium sulfate / solid / it dissolves accept forms a liquid / solution allow exothermic ignore floats	2
Total marks			3

Q6.

Question	Answer	Extra information	Marks
(i)	Sulfuric acid		1
(ii)	1		1
(iii)	to speed up the reaction		1
(iv)	because copper oxide in excess or because acid all used up / neutralised	allow copper oxide unreacted	1
Total marks			4

Q7.

Question	Answer	Extra information	Marks
(a)(i)	(phosphoric) acid	allow phosphoric acid	1
(ii)	hydrogen		1
(b)	H ₂ O	allow HOH or OH ₂	1
Total marks			3

Q8.

Question	Answer	Extra information	Marks
	any two from: <ul style="list-style-type: none"> • increases • until reaches maximum / levels off • quickly at first • then more slowly / rate decreases 	owtte allow 'goes up' owtte owtte allow reaction finished ignore rate increases	2
Total marks			2

Q9.

Question	Answer	Extra information	Marks
(i)	(potassium is) too / very reactive	ignore potassium is a Group 1 / alkali metal	1
	so dangerous / violent reaction	accept hydrogen produced rapidly	1
(ii)	ZnSO ₄ H ₂	accept products in either order ignore names of substances do not accept brackets or charges in the formulae	1 1
Total marks			4