

0 3 This question is about acids and bases.

0 3 . 1 Which ion is found in all acids?

[1 mark]

Tick **one** box.

Cl⁻

H⁺

Na⁺

OH⁻

0 3 . 2 Zinc nitrate can be produced by reacting an acid and a metal oxide.

Name the acid and the metal oxide used to produce zinc nitrate.

[2 marks]

Acid _____

Metal oxide _____

0 3 . 3 In an equation, zinc nitrate is written as Zn(NO₃)₂(aq).

What does (aq) mean?

[1 mark]

Tick **one** box.

Dissolved in water

Insoluble

Not all reacted

Reactant

0 3 . 4 The pH of a solution is 8

Some hydrochloric acid is added to the solution.

Suggest the pH of the solution after mixing.

[1 mark]

pH = _____

Turn over ►



0 3 . 5

Table 2 shows the solubility of three solids in water at room temperature.

Table 2

Solid	The mass of the solid that dissolves in 100 cm ³ of water
Phosphorus oxide	50 g
Silicon dioxide	0 g
Sodium hydroxide	100 g

A teacher labelled these three solids **A**, **B** and **C**.

She gave a student the information shown in **Table 3**

Table 3

Solid	Observation when added to water	pH of the solid in water
A	colourless solution	14
B	colourless solution	2
C	solid does not dissolve	7

Describe a method that could be used to identify each of the three solids **A**, **B** and **C**.

You must use an indicator in the method.

Use information in **Table 2** and **Table 3**

[4 marks]



Question	Answers	Extra information	Mark	AO / Spec. Ref.
03.1	H ⁺		1	AO1 5.4.2.4
03.2	nitric (acid) or HNO ₃ zinc (oxide) or ZnO	this order only	1 1	AO2 5.4.2.3
03.3	dissolved in water		1	AO1 5.1.1.1
03.4	any value from 0 to less than 8		1	AO2 5.4.2.4
03.5	Level 2: The method would lead to the production of a valid outcome. Key steps are identified and logically sequenced.		3–4	AO3
	Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.		1–2	AO2
	No relevant content		0	
	Indicative content <ul style="list-style-type: none"> add universal indicator or wide range indicator indicator turns blue / purple / violet (because pH = 14) or has highest pH or is an alkali so A is sodium hydroxide indicator turns red (because pH = 2) or has lowest pH or is an acid so B is phosphorus oxide indicator turns green (because pH = 7) or neutral so C is silicon dioxide <ul style="list-style-type: none"> add solid to water A and B dissolve; C does not so C is silicon dioxide		5.1.2.3 5.4.2.4	
Total			9	