Acids

1. Which equation does **not** represent a neutralisation reaction?

A $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
B $2NH_3 + H_2SO_4 \rightarrow (NH_4)_2SO_4$
C $Na_2CO_3 + 2CH_3COOH \rightarrow 2CH_3COONa + CO_2 + H_2O$
D $CuO + 2HNO_3 \rightarrow Cu(NO_3)2 + H_2O$

Your answer ☐ **[1]**

2. The burette readings from a titration are shown below.

Final reading / cm^3	24.95
Initial reading / cm^3	5.00

The burette used has an uncertainty of ±0.05 cm^3 in each reading.
What is the percentage uncertainty of the resulting titre?

A 0.20%
B 0.25%
C 0.45%
D 0.50%

Your answer ☐ **[1]**

3. Which equation is **not** a neutralisation reaction?

A $Ca(s) + 2HCl(aq) \rightarrow CaCl_2(aq) + H_2(g)$
B $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$
C $K_2CO_3(s) + 2HNO_3(aq) \rightarrow 2KNO_3(aq) + H_2O(l) + CO_2(g)$
D $NH_3(aq) + HCl(aq) \rightarrow NH_4Cl(aq)$

Your answer ☐

[1]

4. The equation for the reaction of aqueous phosphoric(V) acid, H_3PO_4, with aqueous sodium hydroxide, NaOH(aq) is shown below.

$$H_3PO_4(aq) + 3NaOH(aq) \rightarrow Na_3PO_4(aq) + 3H_2O(l)$$

25.0 cm^3 of a 0.200 mol dm^{-3} $H_3PO_4(aq)$ is titrated with 0.600 mol dm^{-3} NaOH(aq).

Which statement is correct?

A. The end point occurs when 25.00 cm^3 of NaOH(aq) has been added.
B. The end point occurs when 75.00 cm^3 of NaOH(aq) has been added.
C. After titration the final solution contains 0.0150 mol of Na_3PO_4.
D. After titration the final solution contains 0.0150 mol of H_2O.

Your answer ☐

[1]

5. A student prepares a standard solution and carries out a titration.
The standard solution is placed in the burette.

Which of the following would result in a titre that is larger than it should be?

1: Water is added to completely fill the volumetric flask, rather than to the graduation line.

2: The conical flask is washed out with water before carrying out each titration.

3: The pipette is washed out with water before carrying out each titration.

A. 1, 2 and 3
B. Only 1 and 2
C. Only 2 and 3
D. Only 1

Your answer ☐

[1]

6. Which reagent would exactly neutralise 100 cm^3 of 1.00 mol dm^{-3} $H_2SO_4(aq)$?

A. 0.100 mol $Al(OH)_3$
B. 0.100 mol NH_3
C. 0.100 mol $Ba(OH)_2$
D. 0.100 mol NaOH

Your answer ☐

[1]

END OF QUESTION PAPER

Mark scheme – Acids (MCQ)

Question			Answer/Indicative content	Marks	Guidance
1			**A**	**1**	**Examiner's Comments** Candidates found this part difficult with many selecting B, the equation that looked a little different, rather than the correct answer of A (a redox equation). This suggests that many candidates are unaware of the role of ammonia as a base.
			Total	**1**	
2			D	**1**	**Examiner's Comments** This question differentiated well. It appeared as if many candidates did not multiply the maximum error by 2 or used the final reading as opposed to a calculated titre.
			Total	**1**	
3			A	1	**Examiner's Comments** Candidates were clearly unsure on how to classify a neutralisation reaction, with D being a common incorrect answer.
			Total	**1**	
4			A	1	
			Total	**1**	
5			D	1	
			Total	**1**	
6			C	1	
			Total	**1**	