

# Acids

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

- A  $\text{Zn} + 2\text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
- B  $2\text{NH}_3 + \text{H}_2\text{SO}_4 \rightarrow (\text{NH}_4)_2\text{SO}_4$
- C  $\text{Na}_2\text{CO}_3 + 2\text{CH}_3\text{COOH} \rightarrow 2\text{CH}_3\text{COONa} + \text{CO}_2 + \text{H}_2\text{O}$
- D  $\text{CuO} + 2\text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{H}_2\text{O}$

Your answer

[1]

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

Final reading / $\text{cm}^3$	24.95
Initial reading / $\text{cm}^3$	5.00

The burette used has an uncertainty of  $\pm 0.05 \text{ cm}^3$  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]

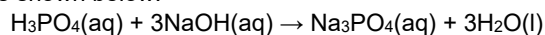
3. Which equation is **not** a neutralisation reaction?

- A  $\text{Ca}(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{CaCl}_2(\text{aq}) + \text{H}_2(\text{g})$
- B  $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$
- C  $\text{K}_2\text{CO}_3(\text{s}) + 2\text{HNO}_3(\text{aq}) \rightarrow 2\text{KNO}_3(\text{aq}) + \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$
- D  $\text{NH}_3(\text{aq}) + \text{HCl}(\text{aq}) \rightarrow \text{NH}_4\text{Cl}(\text{aq})$

Your answer

[1]

4. The equation for the reaction of aqueous phosphoric(V) acid,  $\text{H}_3\text{PO}_4$ , with aqueous sodium hydroxide,  $\text{NaOH}(\text{aq})$  is shown below.



25.0  $\text{cm}^3$  of a 0.200  $\text{mol dm}^{-3}$   $\text{H}_3\text{PO}_4(\text{aq})$  is titrated with 0.600  $\text{mol dm}^{-3}$   $\text{NaOH}(\text{aq})$ .

Which statement is correct?

- A. The end point occurs when 25.00  $\text{cm}^3$  of  $\text{NaOH}(\text{aq})$  has been added.
- B. The end point occurs when 75.00  $\text{cm}^3$  of  $\text{NaOH}(\text{aq})$  has been added.
- C. After titration the final solution contains 0.0150 mol of  $\text{Na}_3\text{PO}_4$ .
- D. After titration the final solution contains 0.0150 mol of  $\text{H}_2\text{O}$ .

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  $\text{cm}^3$  of 1.00  $\text{mol dm}^{-3}$   $\text{H}_2\text{SO}_4(\text{aq})$ ?

- A. 0.100 mol  $\text{Al}(\text{OH})_3$
- B. 0.100 mol  $\text{NH}_3$
- C. 0.100 mol  $\text{Ba}(\text{OH})_2$
- D. 0.100 mol  $\text{NaOH}$

Your answer

[1]

END OF QUESTION PAPER

# Mark scheme – Acids (MCQ)

Question			Answer/Indicative content	Marks	Guidance
1			A	1	<p><b><u>Examiner's Comments</u></b></p> <p>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.</p>
			<b>Total</b>	<b>1</b>	
2			D	1	<p><b><u>Examiner's Comments</u></b></p> <p>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.</p>
			<b>Total</b>	<b>1</b>	
3			A	1	<p><b><u>Examiner's Comments</u></b></p> <p>Candidates were clearly unsure on how to classify a neutralisation reaction, with D being a common incorrect answer.</p>
			<b>Total</b>	<b>1</b>	
4			A	1	
			<b>Total</b>	<b>1</b>	
5			D	1	
			<b>Total</b>	<b>1</b>	
6			C	1	
			<b>Total</b>	<b>1</b>	