

# The Characteristic Properties of Acids and Bases

## Question Paper 3

Level	IGCSE
Subject	Chemistry (0620/0971)
Exam Board	Cambridge International Examinations (CIE)
Topic	Acids, bases and salts
Sub-Topic	The characteristic properties of acids and bases
Booklet	Question Paper 3

**Time Allowed:** 18 minutes

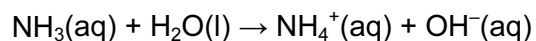
**Score:** /15

**Percentage:** /100

### Grade Boundaries:

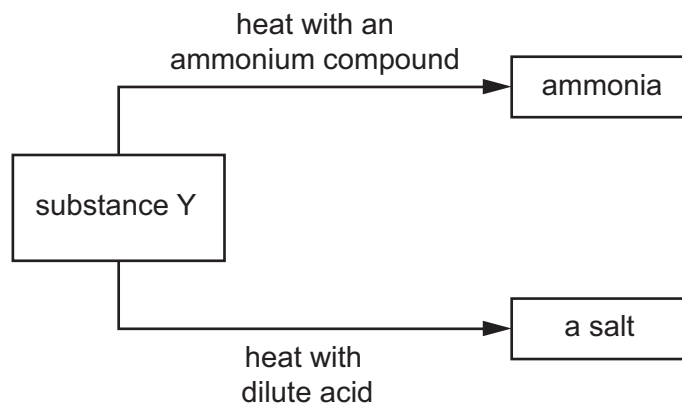
9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	53%	48%	40%	33%	<25%

- 1 Acids are compounds which donate protons (hydrogen ions).



Which compound in this equation is behaving as an acid?

- A ammonia
  - B ammonium hydroxide
  - C none of them
  - D water
- 2 The diagram shows some reactions of substance Y.



Which type of substance is Y?

- A an alcohol
- B a base
- C a catalyst
- D a metal

3 Carbon dioxide gas reacts with aqueous sodium hydroxide.

Which type of reaction takes place?

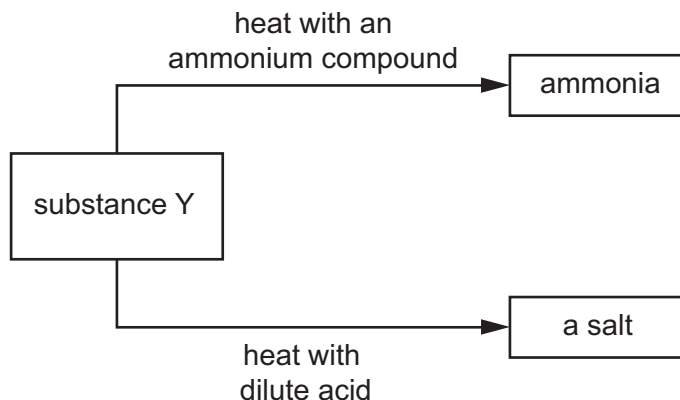
- A decomposition
- B fermentation
- C neutralisation
- D oxidation

4 An aqueous solution of the organic compound methylamine has a pH greater than 7.

Which statement about methylamine is correct?

- A It neutralises an aqueous solution of sodium hydroxide.
- B It reacts with copper(II) carbonate to give carbon dioxide.
- C It reacts with hydrochloric acid to form a salt.
- D It turns blue litmus red.

5 The diagram shows some reactions of substance Y.



Which type of substance is Y?

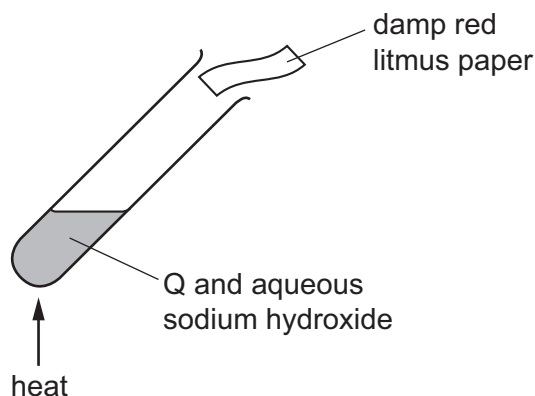
- A an alcohol
  - B a base
  - C a catalyst
  - D a metal
- 6 What is **not** a typical characteristic of acids?
- A They react with alkalis producing water.
  - B They react with **all** metals producing hydrogen.
  - C They react with carbonates producing carbon dioxide.
  - D They turn blue litmus paper red.
- 7 A chemical reaction is carried out on substance X.

A gas is produced that turns red litmus paper blue.

What is this reaction?

- A the reaction of an acid with a metal carbonate
- B the reaction of an acid with an ammonium salt
- C the reaction of an alkali with a metal carbonate
- D the reaction of an alkali with an ammonium salt

8 Compound Q is heated with aqueous sodium hydroxide.



The damp red litmus paper turns blue.

What is Q?

- A ammonium chloride
- B copper(II) chloride
- C iron(III) chloride
- D sodium chloride

9 When compound P is added to sodium carbonate, carbon dioxide is produced.

When compound Q is added to ammonium chloride, ammonia is produced.

What are P and Q?

	P	Q
<b>A</b>	a base	a base
<b>B</b>	a base	an acid
<b>C</b>	an acid	a base
<b>D</b>	an acid	an acid

- 10 Three separate experiments are carried out on a solution of substance X.
- 1 A gas is produced when X is heated with ammonium chloride.
  - 2 Methyl orange is yellow when added to X.
  - 3 There is no reaction between X and sodium carbonate.

Which type of substance is X?

- A** acid
- B** base
- C** indicator
- D** salt
- 11 Which row shows how the hydrogen ion concentration and pH of ethanoic acid compare to those of hydrochloric acid of the same concentration?

ethanoic acid compared to hydrochloric acid		
	hydrogen ion concentration	pH
<b>A</b>	higher	higher
<b>B</b>	higher	lower
<b>C</b>	lower	higher
<b>D</b>	lower	lower

12 Which statements about a weak acid, such as ethanoic acid, are correct?

- 1 It reacts with a carbonate.
- 2 It does not neutralise aqueous sodium hydroxide solution.
- 3 It turns red litmus blue.
- 4 It is only partially ionised in aqueous solution.

**A** 1 and 3      **B** 1 and 4      **C** 2 and 3      **D** 3 and 4

13 Chloric(I) acid,  $\text{HClO}$ , is formed when chlorine dissolves in water. It is a weak acid.

What is meant by the term *weak acid*?

- A** It contains fewer hydrogen atoms than a strong acid.
- B** It is easily neutralised by a strong alkali.
- C** It is less concentrated than a strong acid.
- D** It is only partially ionised in solution.

14 Which reaction is a neutralisation reaction?

- A**  $\text{AgNO}_3 + \text{HCl} \rightarrow \text{AgCl} + \text{HNO}_3$
- B**  $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
- C**  $4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$
- D**  $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

15 A student investigates two acids W and X.

The same volumes of W and X are reacted separately with excess magnesium.

The student makes the following observations.

- 1 Hydrogen gas is produced at a faster rate with W than with X.
- 2 The total volume of hydrogen gas produced is the same for both acids.

Which statement explains these observations?

- A** The pH of W is higher than the pH of X.
- B** W is an organic acid.
- C** W is a stronger acid than X.
- D** W is more concentrated than X.