

# The Characteristic Properties of Acids and Bases

## Question Paper 2

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 2

**Time Allowed:** 20 minutes

**Score:** /17

**Percentage:** /100

### Grade Boundaries:

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

1. A colourless solution is tested by the following reactions.

Which reaction is **not** characteristic of an acid?

- A** A piece of magnesium ribbon is added. Bubbles are seen and the magnesium disappears.
- B** A pungent smelling gas is produced when ammonium carbonate is added.
- C** Copper oxide powder is added and the mixture is warmed. The solution turns blue.
- D** The solution turns blue litmus red.

2. Which statements about alkalis are correct?

- 1 When reacted with an acid, the pH of the alkali increases.
- 2 When tested with litmus, the litmus turns blue.
- 3 When warmed with an ammonium salt, ammonia gas is given off.

- A** 1, 2 and 3      **B** 1 and 2 only      **C** 1 and 3 only      **D** 2 and 3 only

3. Different plants grow best under different pH conditions.

Which plant grows best in alkaline soil?

	plant	grows best in soil at pH
<b>A</b>	cabbage	6-8
<b>B</b>	potato	4-7
<b>C</b>	strawberry	5-7
<b>D</b>	wheat	6-7

4. Which property is **not** characteristic of a base?

- A** It reacts with a carbonate to form carbon dioxide.
- B** It reacts with an acid to form a salt.
- C** It reacts with an ammonium salt to form ammonia.
- D** It turns universal indicator paper blue.

5. A sting from insect X has a pH of 6 and a sting from insect Y has a pH of 8.

The table shows the pH of four substances.

substance	pH
hydrochloric acid	1
sodium hydrogen carbonate	8
sodium hydroxide	14
vinegar	5

Which substances are used to treat the two stings?

	X	Y
<b>A</b>	hydrochloric acid	sodium hydroxide
<b>B</b>	sodium hydrogen carbonate	vinegar
<b>C</b>	sodium hydroxide	hydrochloric acid
<b>D</b>	vinegar	sodium hydrogen carbonate

6. Three liquids, P, Q and R, are added to a mixture of hydrochloric acid and Universal Indicator solution.

The following observations are made.

- P the colour of the indicator turns purple.
- Q the colour of the indicator does not change.
- R there is effervescence and the indicator turns blue.

What are P, Q and R?

	P	Q	R
<b>A</b>	sodium carbonate solution	water	sodium hydroxide solution
<b>B</b>	sodium hydroxide solution	water	sodium carbonate solution
<b>C</b>	water	sodium carbonate solution	sodium hydroxide solution
<b>D</b>	water	sodium hydroxide solution	sodium carbonate solution

7. Which property is **not** characteristic of a base?

- A** It reacts with a carbonate to form carbon dioxide.
- B** It reacts with an acid to form a salt.
- C** It reacts with an ammonium salt to form ammonia.
- D** It turns universal indicator paper blue.

8. The table shows the pH of four aqueous solutions, W, X, Y and Z.

substance	pH
W	7
X	9
Y	2
Z	5

Universal Indicator is added to each solution.

Which row shows the colour of each solution after the indicator is added?

	W	X	Y	Z
<b>A</b>	blue	green	orange	red
<b>B</b>	green	blue	red	orange
<b>C</b>	orange	red	blue	green
<b>D</b>	red	orange	green	blue

9. Hydrochloric acid is used to clean metals.

The acid reacts with the oxide layer on the surface of the metal, forming a salt and water.

Which word describes the metal oxide?

- A** alloy
- B** base
- C** element
- D** indicator

10. Which statement is **not** correct?

- A** When a base reacts with an ammonium salt, ammonia is given off.
- B** When an acid reacts with a base, neutralisation takes place.
- C** When an acid reacts with a carbonate, carbon dioxide is given off.
- D** When the acidity of a solution increases, the pH increases.

11. Which reaction is **not** characteristic of an acid?
- A** It dissolves magnesium oxide.  
**B** It produces ammonia from ammonium compounds.  
**C** It produces carbon dioxide from a carbonate.  
**D** It produces hydrogen from zinc metal.
12. Which equation for the reaction between sodium carbonate and dilute hydrochloric acid is correct?
- A**  $\text{Na}_2\text{CO}_3(\text{s}) + \text{HCl}(\text{aq}) \rightarrow \text{NaCl}(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$   
**B**  $\text{Na}_2\text{CO}_3(\text{s}) + \text{HCl}(\text{aq}) \rightarrow \text{Na}_2\text{Cl}(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$   
**C**  $\text{Na}_2\text{CO}_3(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{NaCl}(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$   
**D**  $\text{Na}_2\text{CO}_3(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow 2\text{NaCl}(\text{aq}) + \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$
13. Three chemicals, P, Q and R, were each dissolved in water. The table shows some of the reactions of these solutions.

solution	reaction when solid sodium carbonate is added	reaction when heated with solid ammonium chloride
P	gas evolved	no reaction
Q	no reaction	gas evolved
R	no reaction	no reaction

The pH of the three solutions was also measured.

What are the correct pH values of these solutions?

	P	Q	R
<b>A</b>	2	7	13
<b>B</b>	2	13	7
<b>C</b>	7	2	13
<b>D</b>	13	7	2



17 Concentrated hydrochloric acid is a *strong acid*.

What is meant by the terms 'strong' and 'acid'?

	strong	acid
<b>A</b>	contains a low proportion of water	accepts protons
<b>B</b>	contains a low proportion of water	donates protons
<b>C</b>	fully ionised	accepts protons
<b>D</b>	fully ionised	donates protons