

The Characteristic Properties of Acids and Bases

Question Paper 1

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 1

Time Allowed: 30 minutes

Score: /25

Percentage: /100

Grade Boundaries:

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

1. The diagram shows the pH values of four solutions.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
			↑			↑		↑				↑	
			P			Q		R				S	

Which of these solutions are alkaline?

- A P only
- B P and Q only
- C Q, R and S only
- D R and S only

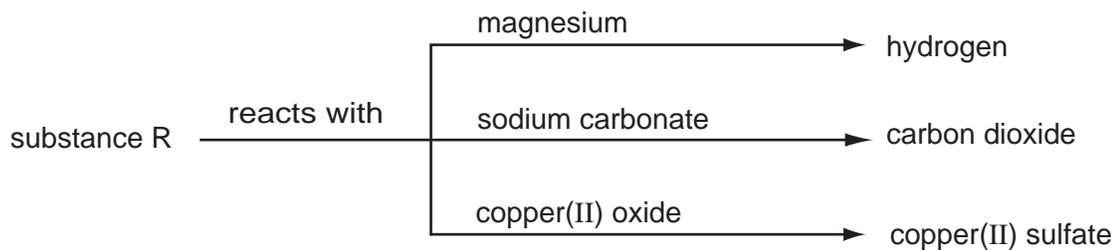
2. An element E is burned in air. A white solid oxide is formed.

The oxide is tested with damp red litmus paper. The paper turns blue.

What is element E?

- A calcium
- B carbon
- C iodine
- D sulfur

3. Some reactions of a substance, R, are shown in the diagram.



What type of substance is R?

- A** an acid
- B** a base
- C** an element
- D** a salt

4. Substance K reacts with sodium carbonate to form a gas.

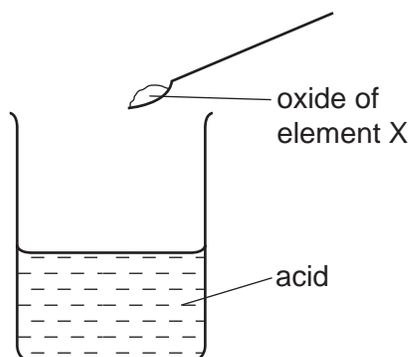
The gas turns limewater cloudy.

What is substance K and which process takes place in the reaction?

	K	process
A	ethanol	combustion
B	ethanol	neutralisation
C	hydrochloric acid	combustion
D	hydrochloric acid	neutralisation

5. Which reaction will result in a decrease in pH?
- A** adding calcium hydroxide to acid soil
 - B** adding citric acid to sodium hydrogen carbonate solution
 - C** adding sodium chloride to silver nitrate solution
 - D** adding sodium hydroxide to hydrochloric acid

6. The oxide of element X was added to an acid. It reacted to form a salt and water.



What is the pH of the acid before the reaction and what type of element is X?

	pH	type of element X
A	greater than 7	metal
B	greater than 7	non-metal
C	less than 7	metal
D	less than 7	non-metal

7. 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.

8. Which type of reaction always forms a salt and water?

- A exothermic
- B neutralisation
- C oxidation
- D polymerisation

9. An alloy contains copper and zinc.

Some of the zinc has become oxidised to zinc oxide.

What is the result of adding an excess of dilute sulfuric acid to the alloy?

- A A blue solution and a white solid remains.
- B A colourless solution and a pink/brown solid remains.
- C The alloy dissolves completely to give a blue solution.
- D The alloy dissolves completely to give a colourless solution.

10. Which is **not** a typical property of an acid?

- 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 litmus paper red.

11. Which of these pairs of aqueous ions **both** react with dilute sulfuric acid to give a visible result?

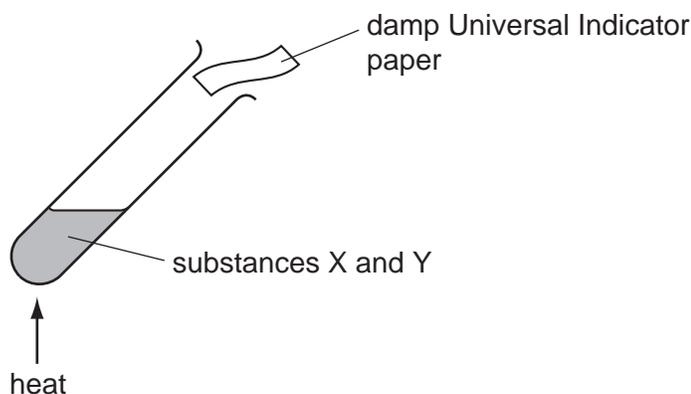
- A Ba^{2+} and Cl^-
- B Ba^{2+} and CO_3^{2-}
- C NH_4^+ and Cl^-
- D NH_4^+ and CO_3^{2-}

12. Barium hydroxide is an alkali. It reacts with hydrochloric acid.

How does the pH of the hydrochloric acid change as an excess of aqueous barium hydroxide is added?

- A The pH decreases from 14 and becomes constant at 7.
- B The pH decreases from 14 to about 1.
- C The pH increases from 1 and becomes constant at 7.
- D The pH increases from 1 to about 14.

13. The diagram shows two substances, X and Y, being heated together.



The Universal Indicator paper turns blue during the experiment.

What are substances X and Y?

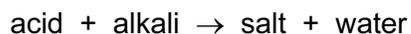
- A ammonium nitrate and hydrochloric acid
- B ammonium nitrate and sodium hydroxide
- C sodium carbonate and hydrochloric acid
- D sodium carbonate and sodium hydroxide

14. A gas is escaping from a pipe in a chemical plant.
A chemist tests this gas and finds that it is alkaline.

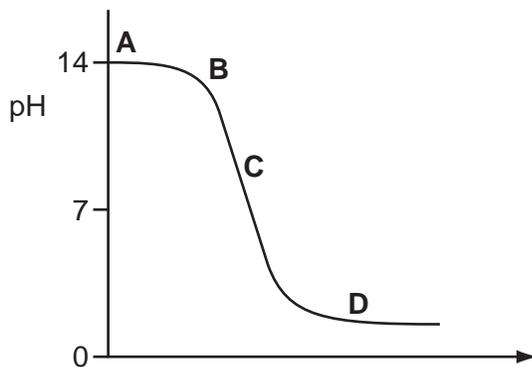
What is this gas?

- A ammonia
- B chlorine
- C hydrogen
- D sulfur dioxide

15. The graph shows how the pH changes as an acid is added to an alkali.



Which letter represents the area of the graph where both acid and salt are present?



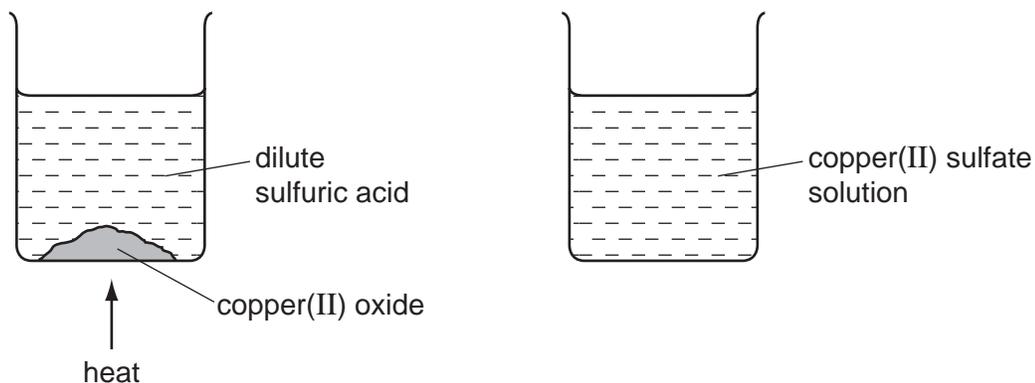
16. Dilute hydrochloric acid is added to a solid, S.

A flammable gas, G, is formed. Gas G is less dense than air.

What are S and G?

	solid S	gas G
A	copper	hydrogen
B	copper carbonate	carbon dioxide
C	zinc	hydrogen
D	zinc carbonate	carbon dioxide

17. An aqueous solution of copper(II) sulfate was made by adding excess copper(II) oxide to dilute sulfuric acid. The mixture was heated, stirred and then filtered.



What was the pH of the acid before adding the copper(II) oxide and of the solution after filtration?

	pH of acid before adding copper(II) oxide	pH of solution after filtration
A	greater than 7	7
B	greater than 7	less than 7
C	less than 7	7
D	less than 7	greater than 7

18. Which are properties of an acid?

- 1 reacts with ammonium sulfate to form ammonia
- 2 turns red litmus blue

	1	2
A	✓	✓
B	✓	x
C	x	✓
D	x	x

19. Carbon dioxide is produced when

X reacts with ethanol.

Y reacts with sodium carbonate.

What are X and Y?

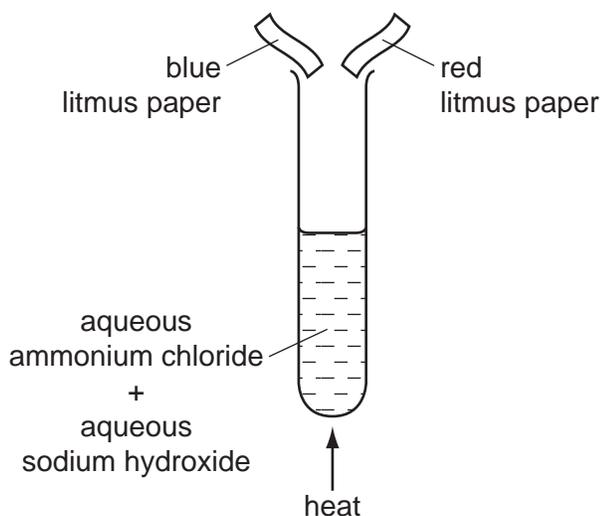
	X	Y
A	H ₂	HCl
B	H ₂	NaOH
C	O ₂	HCl
D	O ₂	NaOH

20. Ant stings hurt because of the methanoic acid produced by the ant.

Which substance could, **most safely**, be used to neutralise the acid?

	substance	pH
A	baking soda	8
B	car battery acid	1
C	lemon juice	3
D	oven cleaner	14

21. The diagram shows an experiment.



What happens to the pieces of litmus paper?

	blue litmus paper	red litmus paper
A	changes colour	changes colour
B	changes colour	no colour change
C	no colour change	changes colour
D	no colour change	no colour change

22. Two indicators, bromophenol blue and Congo red, show the following colours in acidic solutions and in alkaline solutions.

indicator	acid	alkali
bromophenol blue	yellow	blue
Congo red	violet	red

A few drops of each indicator are added to separate samples of a solution of pH 2.

What are the colours of the indicators in this solution?

	in a solution of pH 2	
	bromophenol blue is	Congo red is
A	blue	red
B	blue	violet
C	yellow	red
D	yellow	violet

23. Which statement about the reaction of acids is correct?
- A They react with ammonium salts to form a salt and ammonia only.
 - B They react with metal carbonates to give a salt and carbon dioxide only.
 - C They react with metal hydroxides to give a salt and water only.
 - D They react with metals to give a salt, hydrogen and water only.

24. Which substance is the most acidic?

	substance	pH
A	calcium hydroxide	12
B	lemon juice	4
C	milk	6
D	washing up liquid	8

25. The graph shows how the pH of soil in a field changes over time.

At which point was the soil neutral?

