

8.4 Identification of Ions and Gases

Question Paper

Level	IGCSE
Subject	Chemistry (0620)
Exam Board	Cambridge International Examinations (CIE)
Topic	Acids Bases and Salts
Sub-Topic	8.4 Identification of Ions and Gases
Booklet	Question Paper

Time Allowed: 29 minutes

Score: /24

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

1 The results of two tests on solid X are shown.

test	observation
aqueous sodium hydroxide added	green precipitate formed
acidified silver nitrate added	yellow precipitate formed

What is X?

- A copper(II) chloride
- B copper(II) iodide
- C iron(II) chloride
- D iron(II) iodide

2 The following tests are carried out on an aqueous solution of salt X.

test	observa
sodium hydroxide solution is added	a green precipitate is formed which dissolves in excess
a small piece of aluminium foil is then added to the mixture and the mixture is heated	a gas is given off which turns damp, red litmus paper blue

What is X?

- A aluminium nitrate
- B ammonium sulfate
- C chromium(III) nitrate
- D iron(II) nitrate

3 A solution containing substance X was tested. The table shows the results.

test	result
flame test	lilac colour
acidified silver nitrate solution added	yellow precipitate

What is X?

- A lithium bromide
- B lithium iodide
- C potassium bromide
- D potassium iodide

6 Which two compounds give a white precipitate when their aqueous solutions are mixed?

- A silver nitrate and sodium chloride
- B silver nitrate and sodium iodide
- C sodium hydroxide and copper(II) sulfate
- D sodium hydroxide and iron(II) chloride

7 Two tests are carried out to identify an aqueous solution of X.

test 1 Aqueous sodium hydroxide is added and a blue precipitate is produced.

test 2 Dilute nitric acid is added followed by aqueous silver nitrate and a white precipitate is produced.

What is X?

- A copper carbonate
- B copper chloride
- C iron(III) carbonate
- D iron(III) chloride

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- 8 Which statement about aqueous sodium hydroxide is correct?
- A When it is added to a solution containing sulfate ions, a white precipitate is formed.
 - B When it is added to a solution of copper(II) ions, a blue precipitate is formed which dissolves in excess to give deep blue solution.
 - C When it is added to a solution of iron(II) ions, a green precipitate is formed which does not dissolve in excess.
 - D When it is added to ammonium chloride, a gas is produced which turns blue litmus red.

- 9 Aqueous sodium hydroxide is added to solid X and the mixture is heated.

A green precipitate is formed and an alkaline gas is given off.

Which ions are present in X?

- A NH_4^+ and Fe^{2+}
 - B NH_4^+ and Fe^{3+}
 - C OH^- and Fe^{2+}
 - D OH^- and Fe^{3+}
- 10 Compound X is tested and the results are shown in the table.

test	result
aqueous sodium hydroxide is added, then heated gently	gas given off which turns damp red litmus paper blue
dilute hydrochloric acid is added	effervescence, gas given off which turns limewater milky

Which ions are present in compound X?

- A ammonium ions and carbonate ions
- B ammonium ions and chloride ions
- C calcium ions and carbonate ions
- D calcium ions and chloride ions

- 11 The cations shown are identified by the colour of the precipitates formed when an excess of an aqueous solution of X is added.

cations present	effect of adding an excess of aqueous X
iron(II) (Fe^{2+})	green precipitate
copper(II) (Cu^{2+})	light blue precipitate
iron(III) (Fe^{3+})	red-brown precipitate

What is X?

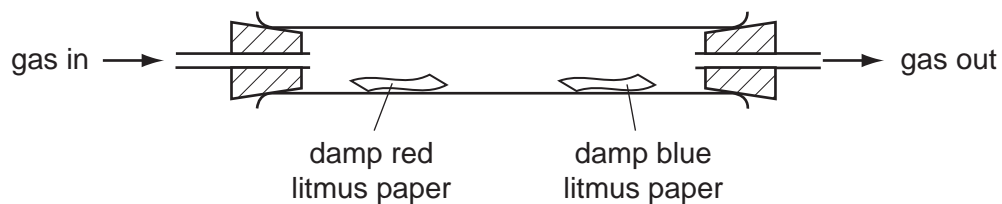
- A ammonia
 - B limewater
 - C silver nitrate
 - D sodium hydroxide
- 12 The results of three tests on a solution of compound X are shown in the table.

test	result
aqueous sodium hydroxide added	white precipitate formed, soluble in excess
aqueous ammonia added	white precipitate formed, insoluble in excess
acidified silver nitrate added	white precipitate formed

What is compound X?

- A aluminium bromide
- B aluminium chloride
- C zinc bromide
- D zinc chloride

13 Four different gases are passed through the apparatus shown.



Which gas has no effect on either piece of litmus paper?

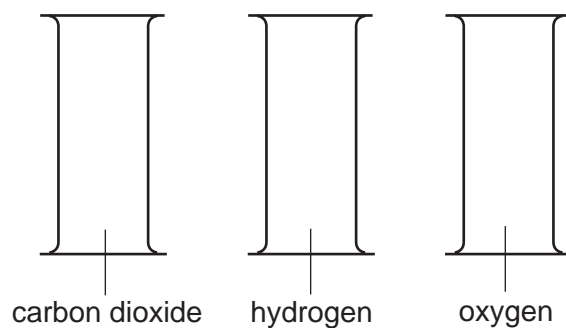
- A ammonia
- B carbon dioxide
- C chlorine
- D hydrogen

14 Aqueous potassium iodide is added to aqueous silver nitrate.

What are the colours of the final precipitate and solution?

	precipitate	solution
A	brown	colourless
B	white	yellow
C	yellow	colourless
D	yellow	white

15 Three gas jars contain carbon dioxide, hydrogen and oxygen, as shown.



Which one of the following tests could be used to discover which gas is in each jar?

- A** a glowing splint
- B** a lighted splint
- C** damp blue litmus paper
- D** limewater

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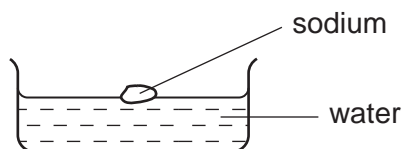
16 The results of three tests on a solution of compound **X** are shown.

test	result
aqueous sodium hydroxide added	white precipitate formed, soluble in excess
aqueous ammonia added	white precipitate formed, soluble in excess
dilute hydrochloric acid added	bubbles of gas

What is compound **X**?

- A** aluminium carbonate
- B** aluminium chloride
- C** zinc carbonate
- D** zinc chloride

17 When sodium reacts with water, a solution and a gas are produced.



The solution is tested with litmus paper and the gas is tested with a splint.

What happens to the litmus paper and to the splint?

	litmus paper	splint
A	blue to red	glowing splint relights
B	blue to red	lighted splint 'pops'
C	red to blue	glowing splint relights
D	red to blue	lighted splint 'pops'

18 A solution contains barium ions and silver ions.

What could the anion be?

- A chloride only
- B nitrate only
- C sulfate only
- D chloride or nitrate or sulfate

19 A mixture containing two anions was tested and the results are shown below.

test	result
dilute nitric acid added	effervescence of a gas which turned limewater milky
dilute nitric acid added, followed by aqueous silver nitrate	yellow precipitate formed

Which anions were present?

- A carbonate and chloride
 - B carbonate and iodide
 - C sulfate and chloride
 - D sulfate and iodide
- 20 Some barium iodide is dissolved in water.

Aqueous lead(II) nitrate is added to the solution until no more precipitate forms.

This precipitate, X, is filtered off.

Dilute sulfuric acid is added to the filtrate and another precipitate, Y, forms.

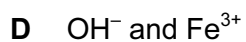
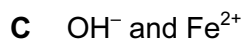
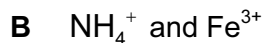
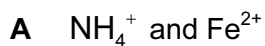
What are the colours of precipitates X and Y?

	X	Y
A	white	white
B	white	yellow
C	yellow	white
D	yellow	yellow

21 Aqueous sodium hydroxide is added to a solid, X, and the mixture is heated.

A green precipitate is formed and an alkaline gas is given off.

Which ions are present in X?



22 An aqueous solution Y contains both barium ions and silver ions.

In separate experiments, dilute sulfuric acid and dilute hydrochloric acid are added to solution Y.

Which of these acids causes a precipitate to form in solution Y?

	dilute sulfuric acid	dilute hydrochloric acid
A	✓	✓
B	✓	x
C	x	✓
D	x	x

- 23 Aqueous sodium hydroxide is added to a solution of a salt. A blue precipitate is formed which does not dissolve in excess.

Aluminium foil is added to the mixture and the mixture is warmed. A gas is produced that turns damp red litmus paper blue.

What is the name of the salt?

- A** ammonium nitrate
 - B** ammonium sulfate
 - C** copper(II) nitrate
 - D** copper(II) sulfate
- 24 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