

Identification of Ions and Gases

Question Paper 2

Level	IGCSE
Subject	Chemistry (0620/0971)
Exam Board	Cambridge International Examinations (CIE)
Topic	Acids, bases and salts
Sub-Topic	Identification of ions and gases
Booklet	Question Paper 2

Time Allowed: 22 minutes

Score: /18

Percentage: /100

Grade Boundaries:

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

1 A solution contains barium ions and silver ions and one type of anion.

What could the anion be?

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

2 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
- 3 What is used to test for chlorine?
- A a glowing splint
 - B damp litmus paper
 - C limewater
 - D potassium manganate(VII) solution

- 4 A mixture produces a gas both when it reacts with an acid and when it reacts with an alkali.

Which ions are present in the mixture?

- A ammonium ions and carbonate ions
 - B ammonium ions and oxide ions
 - C hydrogen ions and carbonate ions
 - D hydrogen ions and oxide ions
- 5 Compound P reacts with hydrochloric acid to produce a gas that turns limewater milky.
- What is P?
- A sodium carbonate
 - B sodium chloride
 - C sodium hydroxide
 - D sodium sulfate
- 6 Which ion forms a green precipitate with aqueous sodium hydroxide that dissolves in an excess of aqueous sodium hydroxide?
- A Ca^{2+}
 - B Cr^{3+}
 - C Cu^{2+}
 - D Fe^{2+}

7 Substance X reacts with warm dilute hydrochloric acid to produce a gas which decolourises acidified aqueous potassium manganate(VII). Substance X gives a yellow flame in a flame test. What is X?

- A potassium chloride
- B potassium sulfite
- C sodium chloride
- D sodium sulfite

8 Dilute sulfuric acid is added to two separate aqueous solutions, X and Y. The observations are shown.

solution X	white precipitate
solution Y	bubbles of a colourless gas

Which row shows the ions present in the solutions?

	solution X	solution Y
A	Ba^{2+}	CO_3^{2-}
B	Ca^{2+}	Cl^-
C	Cu^{2+}	CO_3^{2-}
D	Fe^{2+}	NO_3^-

- 9 Aqueous sodium hydroxide reacts with an aqueous solution of compound Y to give a green precipitate.

Aqueous ammonia also reacts with an aqueous solution of compound Y to give a green precipitate.

In each case the precipitate is insoluble when an excess of reagent is added.

Which ion is present in Y?

- A chromium(III)
- B copper(II)
- C iron(II)
- D iron(III)

- 10 Silver chloride is a white solid which is insoluble in water.

Which statement describes how a sample of pure silver chloride can be made?

- A Add aqueous silver nitrate to aqueous sodium chloride and then filter.
- B Add aqueous silver nitrate to dilute hydrochloric acid, evaporate and then crystallise.
- C Add silver carbonate to dilute hydrochloric acid, evaporate and then crystallise.
- D Add silver to dilute hydrochloric acid, filter and then wash the residue.

- 11 A student is given an unknown solution.

Which two tests provide evidence that the solution is copper(II) sulfate?

- 1 adding dilute hydrochloric acid
- 2 adding aqueous sodium hydroxide
- 3 adding dilute nitric acid, then silver nitrate solution
- 4 adding dilute nitric acid, then barium nitrate solution

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

12 Ammonia is produced when a mixture of ammonium chloride and substance X is heated.

What is substance X?

- A ammonium sulfate
- B barium chloride
- C calcium hydroxide
- D silver nitrate

13 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

14 Three solids, P, Q and R, all react with dilute sulfuric acid to produce zinc sulfate.

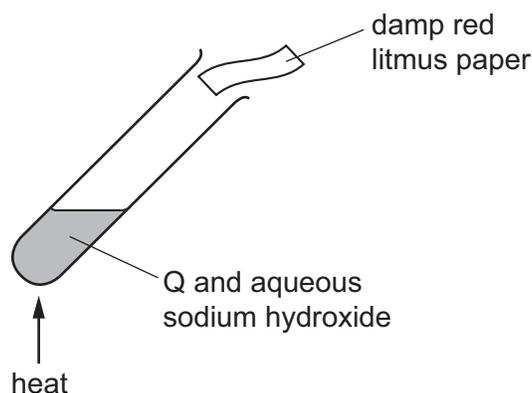
P and R produce gases during the reaction.

The gas produced when P reacts will not burn. The gas produced when R reacts will burn.

What are P, Q and R?

	P	Q	R
A	zinc	zinc hydroxide	zinc carbonate
B	zinc carbonate	zinc	zinc oxide
C	zinc carbonate	zinc hydroxide	zinc
D	zinc oxide	zinc carbonate	zinc

15 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

16 Information about the nitrates and carbonates of two metals, Q and R, is shown.

	appearance	solubility in water	effect of heat
nitrate of Q	white solid	soluble	colourless gas evolved which relights a glowing splint
carbonate of Q	white solid	soluble	no reaction
nitrate of R	white solid	soluble	brown gas evolved
carbonate of R	white solid	insoluble	colourless gas evolved which turns limewater milky

Which statement is correct?

- A Q is calcium and R is magnesium.
- B Q is magnesium and R is sodium.
- C Q is potassium and R is copper.
- D Q is sodium and R is calcium.

17 A solid fertiliser contains ammonium sulfate.

A sample of the fertiliser is shaken with water.

To show the presence of ammonium ions in the solution,1..... is added and the gas produced is tested with damp2..... litmus paper.

Which words complete gaps 1 and 2?

	1	2
A	aqueous sodium hydroxide	blue
B	aqueous sodium hydroxide	red
C	dilute hydrochloric acid	blue
D	dilute hydrochloric acid	red

18 A farmer wrongly adds two substances to the soil at the same time.

They react together to form a gas which turns damp red litmus blue.

What are the two substances?

- A** a basic oxide and a potassium salt
- B** a basic oxide and an ammonium salt
- C** an acidic oxide and a potassium salt
- D** an acidic oxide and an ammonium salt