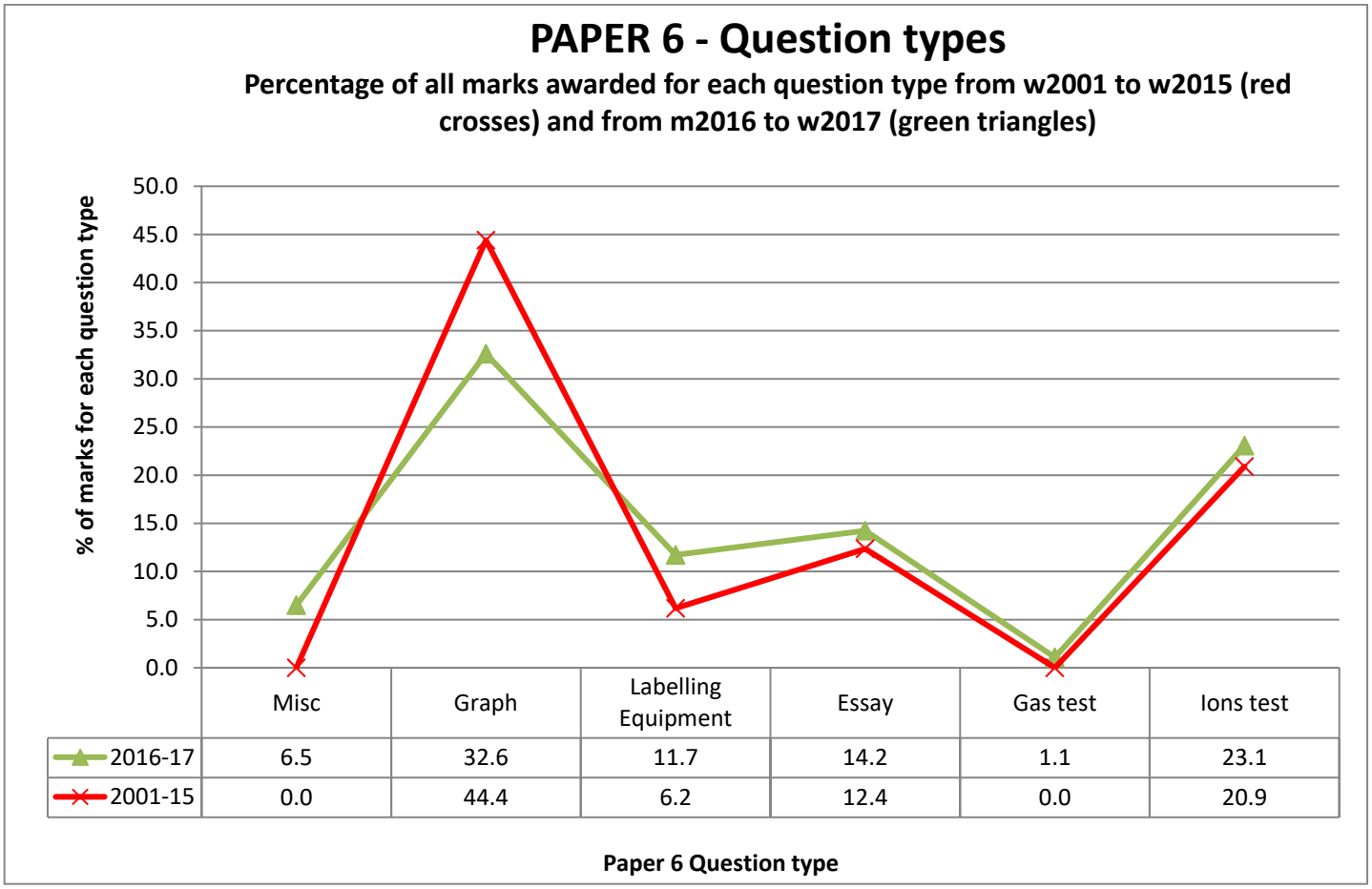
iG Chem 8 EQ P6 17w to 16m Ions Tests 128marks



Experimental skills tested in Paper 5 Practical Test and Paper 6 Alternative to Practical

Candidates may be asked questions on the following experimental contexts:

- identification of ions and gases (Paper 5 will include notes on qualitative analysis for the use of candidates in the examination).

Tests for aqueous cations

cation	effect of aqueous sodium hydroxide	effect of aqueous ammonia
aluminium (Al^{3+})	white ppt., soluble in excess, giving a colourless solution	white ppt., insoluble in excess
ammonium (NH_4^+)	ammonia produced on warming	–
calcium (Ca^{2+})	white ppt., insoluble in excess	no ppt. or very slight white ppt.
chromium(III) (Cr^{3+})	green ppt., soluble in excess	grey-green ppt., insoluble in excess
copper(II) (Cu^{2+})	light blue ppt., insoluble in excess	light blue ppt., soluble in excess, giving a dark blue solution
iron(II) (Fe^{2+})	green ppt., insoluble in excess	green ppt., insoluble in excess
iron(III) (Fe^{3+})	red-brown ppt., insoluble in excess	red-brown ppt., insoluble in excess
zinc (Zn^{2+})	white ppt., soluble in excess, giving a colourless solution	white ppt., soluble in excess, giving a colourless solution

Tests for gases

gas	test and test result
ammonia (NH_3)	turns damp red litmus paper blue
carbon dioxide (CO_2)	turns limewater milky
chlorine (Cl_2)	bleaches damp litmus paper
hydrogen (H_2)	'pops' with a lighted splint
oxygen (O_2)	relights a glowing splint
sulfur dioxide (SO_2)	turns acidified aqueous potassium manganate(VII) from purple to colourless

Flame tests for metal ions

metal ion	flame colour
lithium (Li^+)	red
sodium (Na^+)	yellow
potassium (K^+)	lilac
copper(II) (Cu^{2+})	blue-green

8.4 Identification of ions and gases

Core

- Describe the following tests to identify:

  aqueous cations:

  aluminium, ammonium, calcium, chromium(III), copper(II), iron(II), iron(III) and zinc (using aqueous sodium hydroxide and aqueous ammonia as appropriate). (Formulae of complex ions are **not** required.)

  cations:

  use of the flame test to identify lithium, sodium, potassium and copper(II)

  anions:

  carbonate (by reaction with dilute acid and then limewater), chloride, bromide and iodide (by reaction under acidic conditions with aqueous silver nitrate), nitrate (by reduction with aluminium), sulfate (by reaction under acidic conditions with aqueous barium ions) and sulfite (by reaction with dilute acids and then aqueous potassium manganate(VII))

  gases:

  ammonia (using damp red litmus paper), carbon dioxide (using limewater), chlorine (using damp litmus paper), hydrogen (using lighted splint), oxygen (using a glowing splint), and sulfur dioxide (using aqueous potassium manganate(VII))

3 Two solids, **E** and **F**, which are both salts, were analysed. Solid **F** was lithium chloride.
Tests were carried out on each solid.
Some of the tests and observations are shown.

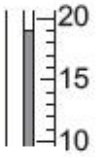
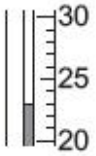
tests on solid E

tests on solid **E**	observations
test 1 A flame test was carried out on solid **E**.	yellow colour

test 2

10 cm^3 of distilled water were poured into a boiling tube. The initial temperature of the water was measured.
Solid **E** was added to the boiling tube and the boiling tube was shaken to dissolve solid **E**. The temperature of the solution was measured after 1 minute.

(a) Use the thermometer diagrams in the table to record the temperatures and complete the table.

temperature of the solution after 1 minute / °C		
initial temperature of the water / °C		
temperature difference / °C		

[2]

The solution was divided into two equal portions in two test-tubes and the following tests carried out.

tests on solid **E**	observations
test 3 Dilute hydrochloric acid was added to the first portion of the solution. The gas given off was tested with filter paper dipped into acidified aqueous potassium manganate(VII).	filter paper turned from purple to colourless
test 4 An excess of aqueous sodium hydroxide was added to the second portion of the solution.	no change

(b) What does the temperature change tell you about the process occurring in **test 2**?

..... [1]

(c) Name the gas given off in **test 3**.

..... [1]

(d) Identify solid **E**.

..... [2]

tests on solid F

Complete the expected observations.

(e) A flame test was carried out on solid **F**.

observations ..... [1]

Solid **F** was added to distilled water in a test-tube and the test-tube shaken to dissolve solid **F**.

(f) Dilute nitric acid and aqueous silver nitrate were added to the solution.

observations ..... [2]

Q# 2/ iGCSE Chemistry/Paper 6/2016/m/ Time Zone 2/

3 Two solids, **L** and **M**, were analysed. Solid **L** was copper(II) chloride and solid **M** was a different salt.
The tests on the solids, and some of the observations, are shown.

tests on solid L

(a) Describe the appearance of solid **L**.

observation ..... [1]

(b) Distilled water was added to solid **L** and shaken to dissolve.

The solution was divided into four equal portions in four test-tubes and the following tests carried out.

(i) Drops of aqueous ammonia were added to the first portion of the solution.

Excess ammonia solution was then added to the mixture and shaken.

observation .....

.....

.....

..... [4]

(ii) Excess aqueous sodium hydroxide was added to the second portion of the solution.

observation .....

..... [1]

(iii) Dilute nitric acid was added to the third portion of the solution followed by aqueous silver nitrate.

observation ..... [1]

(iv) Dilute nitric acid was added to the fourth portion of the solution followed by aqueous barium nitrate.

observation ..... [1]

tests on solid M

Tests are carried out and the following observations made.

tests on solid **M**	observations
Appearance of the solid.	white crystals
The solid was heated and the gas given off was tested with damp red litmus paper.	a sublimate formed on the sides of the test-tube litmus paper turned blue
Solid **M** was dissolved in water to form a solution. Aqueous sodium hydroxide was added to the solution and the mixture heated. The gas given off was tested.	pungent gas evolved pH paper showed pH 10
Dilute nitric acid was added to the solution followed by aqueous silver nitrate.	yellow precipitate

(c) Identify solid **M**.

.....

..... [2]

3 Two substances, **C** and **D**, were analysed. Solid **C** was a salt and solution **D** was an aqueous solution of chromium(III) chloride.
The tests on solid **C**, and some of the observations, are in the following table.

tests	observations
<u>tests on solid **C**</u> Solid **C** was added to distilled water in a test-tube and shaken to dissolve. The solution was divided into two portions in test-tubes, and the following tests carried out. Appearance of the solution. The pH of the first portion of the solution was tested.	 colourless liquid pH = 7
Dilute nitric acid was added to the second portion of the solution followed by aqueous silver nitrate.	cream precipitate
A flame test was carried out on solid **C**.	yellow flame colour

(a) Identify solid **C**.

..... [2]

(b) Describe the appearance of solution **D**.

..... [1]

(c) Tests were carried out on solution **D**.

Complete the observations for tests 1, 2 and 3.

(i) test 1

Drops of aqueous sodium hydroxide were added to solution **D**.

Excess aqueous sodium hydroxide was then added to the mixture.

observations .....

..... [3]

(ii) test 2

Excess aqueous ammonia was added to solution **D**.

observations ..... [2]

(iii) test 3

Dilute nitric acid was added to solution **D** followed by aqueous silver nitrate.

observations ..... [1]

(d) Chromium(III) can be converted to chromium(VI). Chromium(VI) is hazardous.

Suggest **one** safety precaution when using chromium(VI).

..... [1]

Q# 4/ iGCSE Chemistry/Paper 6/2016/s/ Time Zone 2/

3 Two solids, **E** and **F**, were analysed. Solid **E** was sodium sulfite. Both solids were found to be water soluble.
The tests on the solids, and some of the observations, are shown below.

tests on solid E

(a) Describe the appearance of the solid.

..... [1]

(b) Distilled water was added to solid **E** in a test-tube and shaken to dissolve.

The solution was divided into two portions in two test-tubes and the following tests carried out.

(i) Aqueous sodium hydroxide was added to the first portion of the solution.

observations ..... [1]

(ii) Dilute hydrochloric acid was added to the second portion of the solution. The mixture was warmed. The gas given off was tested with a piece of filter paper soaked in aqueous acidified potassium manganate(VII) solution.

observations .....

..... [2]

(c) A flame test was carried out on solid **E**.

observations ..... [1]

tests on solid E

(a) Describe the appearance of the solid.

..... [1]

(b) Distilled water was added to solid **E** in a test-tube and shaken to dissolve.

The solution was divided into two portions in two test-tubes and the following tests carried out.

(i) Aqueous sodium hydroxide was added to the first portion of the solution.

observations ..... [1]

(ii) Dilute hydrochloric acid was added to the second portion of the solution. The mixture was warmed. The gas given off was tested with a piece of filter paper soaked in aqueous acidified potassium manganate(VII) solution.

observations .....

..... [2]

(c) A flame test was carried out on solid **E**.

observations ..... [1]

tests on solid F

tests	observations
The solid was heated. The gas given off was tested with damp, red litmus paper.	pungent gas evolved red litmus paper turned blue
Aqueous sodium hydroxide was added to solid **F** and the mixture heated. The gas given off was tested.	pungent gas evolved Universal Indicator paper showed pH 10

(d) Identify the gas given off in the tests on solid **F**.

..... [1]

(e) Identify **one** of the ions in solid **F**.

..... [1]

3 A mixture of two solids, **G** and **H**, was analysed. Solid **G** was zinc nitrate, which is water soluble, and solid **H** is insoluble in water.
The tests on the mixture, and some of the observations, are shown.

Distilled water was added to the mixture in a boiling tube and shaken. The contents of the boiling tube were filtered keeping the filtrate and the residue.

tests on filtrate

(a) The filtrate was divided into four test-tubes and the following tests carried out.

(i) Drops of aqueous sodium hydroxide were added to the first portion of the solution. Excess aqueous sodium hydroxide was then added to the test-tube.

observations .....

.....

..... [3]

(ii) Using the second portion of the solution, the test in **(a)(i)** was repeated using aqueous ammonia instead of aqueous sodium hydroxide.

observations .....

..... [2]

(iii) Dilute nitric acid was added to the third portion of the solution followed by aqueous silver nitrate.

observations ..... [1]

(iv) Aqueous sodium hydroxide and aluminium foil were added to the fourth portion of the solution.
The mixture was warmed and the gas given off was tested.

observations .....

.....

..... [3]

tests on residue

Two tests are carried out and the following observations made.

tests	observations
A spatula was used to transfer some of the residue into a test-tube. Dilute hydrochloric acid was added to the residue. The gas given off was tested.	rapid effervescence, limewater turned milky

A flame test was carried out on the residue.	red flame colour

(b) Identify solid **H**.

.....

..... [2]

Q# 6/ iGCSE Chemistry/Paper 6/2016/w/ Time Zone 1/Q3

3 Solid **P**, which is an aluminium salt, was analysed.
The tests on solid **P**, and some of the observations, are shown.

tests on solid P

(a) test 1

Solid **P** was divided into three portions. The first portion of solid **P** was heated.

observations *condensation formed on the sides of the test-tube*

Any gases given off were tested with cobalt(II) chloride paper.

observations *cobalt(II) chloride paper turned from blue to pink*

What does **test 1** tell you about solid **P**?

..... [1]

(b) test 2

A flame test was carried out on the second portion of solid **P**.

observations ..... [1]

tests on a solution of P

Distilled water was added to the rest of solid **P** in a test-tube and shaken to dissolve.

(c) The solution was divided into four equal portions in four test-tubes. The following tests were carried out.

(i) test 3

Several drops of aqueous sodium hydroxide were added to the first portion of the solution.

Excess aqueous sodium hydroxide was then added to the mixture.

observations .....

.....

..... [3]

(ii) **test 4**

Several drops of aqueous ammonia were added to the second portion of the solution.

Excess aqueous ammonia was then added to the mixture.

observations .....

..... [2]

Two further tests were carried out and the following observations made.

tests on a solution of **P**	observations
test 5 Dilute nitric acid and aqueous silver nitrate were added to the third portion of the solution.	no visible reaction
test 6 Dilute nitric acid and aqueous barium nitrate were added to the fourth portion of the solution.	white precipitate formed

(d) What does **test 5** tell you about solid **P**?

..... [1]

(e) Identify solid **P**.

..... [1]

(f) Describe the appearance of solid **P**.

..... [1]

Q# 7/ iGCSE Chemistry/Paper 6/2016/w/ Time Zone 2/Q3

3 Two solutions, solution **S** and solution **T**, were analysed. Solution **S** was dilute hydrochloric acid. The tests on solution **S** and solution **T**, and some of the observations, are shown.

tests on solution S

(a) Solution **S** was divided into four equal portions in four test-tubes. The following tests were carried out.

Complete the observations for **tests 1–4**.

(i) **test 1**

The pH of the first portion of solution **S** was tested.

pH ..... [1]

tests on solution T

(b) Tests were carried out on solution **T** and the following observations made.

tests	observations
Solution **T** was divided into three equal portions in three test-tubes. Appearance of the solution.	 yellow solution
Drops of aqueous sodium hydroxide were added to the second portion of the solution and the test-tube shaken. Excess aqueous sodium hydroxide was then added to the test-tube.	red-brown precipitate no visible change
Aqueous sodium hydroxide and aluminium foil were added to the third portion of the solution and the mixture heated. The gas given off was tested with pH indicator paper.	pungent gas formed, pH 10

Identify solution **T**.

.....

..... [2]

Q# 8/ iGCSE Chemistry/Paper 6/2016/w/ Time Zone 3/

3 Two solutions, solution **Q** and solution **R**, were analysed. Solution **Q** was aqueous sulfuric acid.

tests on solution Q

(a) Solution **Q** was divided into four equal portions in four test-tubes. The following tests were carried out.

Complete the observations for **tests 1–4**.

(i) test 1

The pH of the first portion of solution **Q** was measured.

pH ..... [1]

(ii) test 2

Magnesium ribbon was added to the second portion of solution **Q**. The gas given off was tested.

observations .....

..... [3]

(iii) test 3

Sodium carbonate was added to the third portion of solution **Q**. The gas given off was tested.

observations .....

..... [3]

(iv) test 4

Dilute nitric acid and aqueous barium nitrate were added to the fourth portion of solution **Q**.

observations ..... [1]

tests on solution R

Solution **R** was divided into three equal portions in three test-tubes.
The following tests were carried out.

tests	observations
test 5 The pH of the first portion of solution **R** was measured.	pH = 10
test 6 Drops of aqueous sodium hydroxide were added to the second portion of solution **R** and the test-tube shaken. Excess aqueous sodium hydroxide was then added to the test-tube.	white precipitate no visible change
test 7 Aqueous iron(II) sulfate was added to the third portion of solution **R** and the mixture shaken.	green precipitate formed

(b) Identify solution **R**.

.....

..... [2]

tests on solution R

Solution **R** was divided into three equal portions in three test-tubes.
The following tests were carried out.

tests	observations
test 5 The pH of the first portion of solution **R** was measured.	pH = 10
test 6 Drops of aqueous sodium hydroxide were added to the second portion of solution **R** and the test-tube shaken. Excess aqueous sodium hydroxide was then added to the test-tube.	white precipitate no visible change
test 7 Aqueous iron(II) sulfate was added to the third portion of solution **R** and the mixture shaken.	green precipitate formed

(b) Identify solution **R**.

.....

..... [2]

Q# 9/ iGCSE Chemistry/Paper 6/2017/m/ Time Zone 2/

4 When solid barium hydroxide is added to solid ammonium chloride a reaction takes place.

(b) How could you show whether or not the final mixture contains ammonium ions?

.....

.....

.....

..... [2]

3 Two solids, **Q** and **R**, which are both salts, were analysed. Solid **Q** was zinc bromide.
Tests were carried out on each solid.

tests on solid Q

Solid **Q** was dissolved in distilled water.
The solution was divided into three equal portions in three test-tubes, and the following tests were carried out.

Complete the expected observations.

(a) (i) Drops of aqueous sodium hydroxide were added to the first portion of the solution until a change was seen.

observations ..... [2]

(ii) Excess aqueous sodium hydroxide was then added to the mixture.

observations ..... [1]

(b) (i) Drops of aqueous ammonia were added to the second portion of the solution until a change was seen.

observations ..... [1]

(ii) Excess aqueous ammonia was then added to the mixture.

observations ..... [1]

(c) Dilute nitric acid and aqueous silver nitrate were added to the third portion of the solution.

observations ..... [2]

tests on solid R

Tests were carried out and the following observations made.

tests on solid **R**	observations
test 1 A flame test was carried out on solid **R**.	yellow colour
Solid **R** was dissolved in distilled water. The solution was divided into two equal portions in two test-tubes. **test 2** Dilute nitric acid and aqueous barium nitrate were added to the first portion of the solution.	no change

test 3 Dilute nitric acid and aqueous silver nitrate were added to the second portion of the solution.	yellow precipitate formed

(d) Identify solid **R**.

..... [2]

Q# 11/ iGCSE Chemistry/Paper 6/2017/s/ Time Zone 1/

3 Two solids, **E** and **F**, were analysed. Solid **F** was potassium iodide. Tests were carried out on each solid. Some of the observations on solid **E** are shown.

tests on solid **E**	observations
Appearance of solid **E**.	green solid
test 1 Solid **E** was heated gently then strongly.	the solid turned black
test 2 Dilute sulfuric acid was added to solid **E**. The gas given off was tested. Excess aqueous ammonia was then added to the mixture in the test-tube.	rapid effervescence limewater turned milky a pale blue precipitate formed, which then dissolved to form a dark blue solution
test 3 A flame test was carried out on solid **E**.	blue-green colour

(a) **Test 1** states that the solid should be heated gently then strongly.

In terms of safety, explain why it is necessary to heat gently at first.

.....

..... [1]

(b) Identify the gas given off in **test 2**.

..... [1]

(c) Identify solid **E**.

..... [2]

tests on solid F

Complete the expected observations.

(d) Describe the appearance of solid **F**.

..... [1]

Distilled water was added to solid **F** in a test-tube and shaken to dissolve solid **F**.

(e) (i) To the first portion of the solution, an excess of aqueous sodium hydroxide was added.

observations ..... [1]

(ii) To the second portion of the solution, dilute nitric acid and aqueous silver nitrate were added.

observations ..... [2]

(f) A flame test was carried out on solid **F**.

observations ..... [1]

(g) Describe how you would carry out a flame test.

.....

.....

..... [2]

Q# 12/ iGCSE Chemistry/Paper 6/2017/s/ Time Zone 3/

3 Two substances, solid **J** and solution **K**, were analysed. Solution **K** was hydrogen peroxide. Tests on each substance were carried out. The observations are shown.

tests	observations
tests on solid J Appearance of solid **J**.	black solid
test 1 Dilute hydrochloric acid was added to solid **J**. The mixture was heated and the gas given off was tested with damp litmus paper.	blue litmus turned white

tests on solution K Solution **K** was divided into two equal portions in two test-tubes. **test 2** Iron(II) sulfate crystals were added to the first portion of the solution. The mixture was shaken and aqueous sodium hydroxide was added to the mixture.	red-brown precipitate formed
test 3 Solid **J** was added to the second portion of the solution. The gas given off was tested with a splint.	glowing splint relit solid **J** was unchanged

(a) Name the gas given off in **test 1**.

..... [1]

(b) (i) Name the precipitate formed in **test 2**.

..... [2]

(ii) A new **test 2** was carried out. Iron(II) sulfate crystals were added to **water**, the mixture was shaken and then aqueous sodium hydroxide was added.

What would be observed?

..... [2]

Q# 13/ iGCSE Chemistry/Paper 6/2017/w/ Time Zone 1/

3 Two solid salts, **F** and **G**, were analysed. Solid **F** was iron(III) nitrate.
Tests were carried out on each solid.

tests on solid F

Complete the expected observations.

Solid **F** was dissolved in distilled water to produce solution **F**. Solution **F** was divided into three equal portions in three test-tubes.

(a) (i) A few drops of aqueous sodium hydroxide were added to the first portion of solution **F** until a change was seen.

observations ..... [2]

(ii) An excess of aqueous sodium hydroxide was then added to the mixture from **(a)(i)**.

observations ..... [1]

(b) An excess of aqueous ammonia was added to the second portion of solution **F** until a change was seen.

observations ..... [1]

(c) Aluminium foil and aqueous sodium hydroxide were added to the third portion of solution **F**. The mixture was heated and the gas which was produced was tested.

test for gas .....

test result .....
[2]

(d) Identify the gas produced in **(c)**.

..... [1]

tests on solid G

Tests were carried out and the following observations made.

tests on solid **G**	observations
test 1 A flame test was carried out on solid **G**.	red colour
test 2 Dilute nitric acid was added to solid **G**. The gas produced was passed through limewater.	rapid effervescence limewater turned milky

(e) Identify solid **G**.

..... [2]

Q# 14/ iGCSE Chemistry/Paper 6/2017/w/ Time Zone 2/

3 Two solid salts, **U** and **W**, were analysed. Solid **U** was sodium carbonate.
Tests were carried out on each solid.

tests on solid U

Complete the expected observations.

(a) Describe the appearance of solid **U**.

..... [1]

About half of solid **U** was dissolved in distilled water to produce solution **U**. Solution **U** was divided into two equal portions in two test-tubes.

(b) Dilute hydrochloric acid was added to the first portion of solution **U**.
The gas produced was tested.

observations .....

..... [3]

(c) Name the gas produced in **(b)**.

..... [1]

(d) A flame test was carried out on solid **U**.

observations ..... [1]

tests on solid W

Tests were carried out and the following observations made.

tests on solid **W**	observations
Appearance of solid **W**.	white crystals
Solid **W** was dissolved in distilled water to produce solution **W**. The solution was divided into two equal portions in two test-tubes. **test 1** Dilute nitric acid and aqueous silver nitrate were added to the first portion of solution **W**.	white precipitate formed
test 2 The second portion of solution **U** was added to the second portion of solution **W**. An excess of dilute hydrochloric acid was then added to the mixture.	white precipitate formed rapid effervescence white precipitate dissolved

(e) What conclusions can you draw about solid **W**?

..... [2]

Q# 15/ iGCSE Chemistry/Paper 6/2017/w/ Time Zone 3/

3 Two solutions, **Y** and **Z**, were analysed.
Solution **Y** was aqueous chromium(III) nitrate.
Tests were carried out on both solutions.

tests on solution Y

Complete the expected observations.

The solution was divided into two equal portions in two test-tubes.

(a) (i) A few drops of aqueous sodium hydroxide were added to the first portion of solution **Y** and the test-tube shaken to mix the solutions.

observations ..... [2]

(ii) An excess of aqueous sodium hydroxide was then added to the mixture.

observations ..... [1]

(iii) The mixture from **(a)(ii)** was poured into a boiling tube and a small piece of aluminium foil was added.
The mixture was heated and the gas produced was tested.

observations .....

..... [3]

(b) Identify the gas produced in **(a)(iii)**.

..... [1]

tests on solution Z

Tests were carried out and the following observations made.

tests on solution **Z**	observations
Solution **Z** was divided into three equal portions in three test-tubes. **test 1** The pH of the first portion of solution **Z** was tested.	pH 10
test 2 A few drops of aqueous copper(II) sulfate were added to the second portion of solution **Z**. An excess of aqueous copper(II) sulfate was then added to the mixture.	dark blue solution formed light blue precipitate formed
test 3 The second portion of solution **Y** was added to the third portion of solution **Z**.	grey-green precipitate formed

(c) Identify solution **Z**.

..... [1]

Mark Scheme iG Chem 8 EQ P6 17w to 16m Ions Tests 128marks

Q# 1/ iGCSE Chemistry/Paper 6/2017/s/ Time Zone 2/

3(a)	initial temperature and final temperature recorded correctly: 19, 23	1
	temperature difference correctly calculated: 4	1
3(b)	endothermic	1
3(c)	sulfur dioxide	1
3(d)	sodium / Na^+	1
	sulfite / SO_3^{2-}	1
3(e)	red	1
3(f)	white	1
	precipitate	1

Q# 2/ iGCSE Chemistry/Paper 6/2016/m/ Time Zone 2/

3(a)	blue / green (solid / crystals);	1
3(b)(i)	(pale) blue; precipitate; royal / deep blue; dissolves / solution;	4
3(b)(ii)	(pale) blue precipitate;	1
3(b)(iii)	white precipitate;	1
3(b)(iv)	no reaction / change / precipitate;	1
3(c)	ammonium; iodide;	2

Q# 3/ iGCSE Chemistry/Paper 6/2016/s/ Time Zone 1/

3(a)	 sodium; bromide;	2 1 1
3(b)	green;	1
3(c)(i)	 green; precipitate; with excess, green solution / clear / dissolves;	3 1 1 1
3(c)(ii)	 grey-green; precipitate;	2 1 1
3(c)(iii)	white precipitate;	1
3(d)	fume cupboard / protective clothing, e.g. gloves or goggles;	1

Q# 4/ iGCSE Chemistry/Paper 6/2016/s/ Time Zone 2/

3(a)	white (solid / crystals / powder);	1
3(b)(i)	no change;	1
3(b)(ii)	 turns from purple / pink; to colourless / white;	2 1 1
3(c)	yellow / orange (flame);	1
3(d)	ammonia / NH_3;	1
3(e)	ammonium / NH_4^+;	1

Q# 5/ iGCSE Chemistry/Paper 6/2016/s/ Time Zone 3/

3(a)(i)	 white; precipitate; dissolves;	3 1 1 1
3(a)(ii)	 white precipitate; dissolves;	2 1 1
3(a)(iii)	no reaction / change / precipitate;	1
3(a)(iv)	any 3 from: effervescence / fizz / bubbles; red litmus / pH paper; blue / pH > 7; pungent smell;	3

3(b)	lithium; carbonate;	2 1 1

Q# 6/ iGCSE Chemistry/Paper 6/2016/w/ Time Zone 1/

3(a)	water present / hydrated	1
3(b)	no change / colour	1
3(c)(i)	white precipitate dissolves	1 1 1
3(c)(ii)	white precipitate no change	1 1
3(d)	not a halide	1
3(e)	(aluminium) sulfate	1
3(f)	white (crystals)	1

Q# 7/ iGCSE Chemistry/Paper 6/2016/w/ Time Zone 2/

3(a)(i)	pH 1–3	1
3(a)(ii)	solid disappears / dissolves blue / green colour	1 1
3(a)(iii)	solid dissolves limewater turns milky	1 1 1
3(a)(iv)	white precipitate	1
3(b)	iron(III) nitrate	1 1

Q# 8/ iGCSE Chemistry/Paper 6/2016/w/ Time Zone 3/

3(a)(i)	pH 1–3	1
3(a)(ii)	effervescence / fizzing / bubbling / solid disappears / dissolves lighted splint 'pops'	1 1 1
3(a)(iii)	effervescence / fizzing / bubbling / solid disappears / dissolves limewater milky	1 1 1
3(a)(iv)	white precipitate	1
3(b)	calcium / Ca^{2+} hydroxide / OH^-	1 1

Q# 9/ iGCSE Chemistry/Paper 6/2017/m/ Time Zone 2/

4(b)	**M1** add (aqueous) sodium hydroxide (and warm)	1
	M2 gas produced turns (red) litmus blue	1

Q# 10/ iGCSE Chemistry/Paper 6/2017/m/ Time Zone 2/

3(a)(i)	white	1
	precipitate	1
3(a)(ii)	(white precipitate) dissolves	1
3(b)(i)	white precipitate	1
3(b)(ii)	(white precipitate) dissolves	1
3(c)	cream	1
	precipitate	1
3(d)	sodium	1
	iodide	1

Q# 11/ iGCSE Chemistry/Paper 6/2017/s/ Time Zone 1/

3(a)	solid spits out of the tube / the tube might crack	1
3(b)	carbon dioxide	1

3(c)	copper / Cu^{2+}	1
	carbonate / CO_3^{2-}	1
3(d)	white	1
3(e)(i)	no reaction / change	1
3(e)(ii)	yellow	1
	precipitate	1
3(f)	lilac	1

Q# 12/ iGCSE Chemistry/Paper 6/2017/s/ Time Zone 3/

3(a)	chlorine	1
3(b)(i)	iron(III)	1
	hydroxide	1
3(b)(ii)	green	1
	precipitate	1
3(c)	oxygen	1
3(d)	catalyst	1
	transition element compound / manganese oxide	1

Q# 13/ iGCSE Chemistry/Paper 6/2017/w/ Time Zone 1/

3(a)(i)	red-brown	1
	precipitate	1
3(a)(ii)	insoluble / no change	1
3(b)	red-brown precipitate	1
3(c)	(red) litmus paper	1
	turns blue	1
3(d)	ammonia	1
3(e)	lithium	1
	carbonate	1

Q# 14/ iGCSE Chemistry/Paper 6/2017/w/ Time Zone 2/

3(a)	white (crystals)	1
3(b)	bubbles / fizz	1
	limewater	1
	(turns) milky	1
3(c)	carbon dioxide	1
3(d)	yellow	1
3(e)	non-transition metal / Group II metal / barium / calcium / magnesium	1
3(e)	chloride	1

Q# 15/ iGCSE Chemistry/Paper 6/2017/w/ Time Zone 3/

3(a)(i)	green	1
	precipitate	1
3(a)(ii)	green solution / precipitate dissolves	1
3(a)(iii)	bubbles / fizzing / effervescence	1
	(red) litmus paper / Universal Indicator paper	1
	(red litmus paper) turns blue / (Universal Indicator paper) turns purple	1
3(b)	ammonia / NH_3	1
3(c)	(aqueous) ammonia / NH_3	1