01. 0620_w16_qp_21 Q: 21

Information about some silver compounds is shown in the table.

compound	formula	solubility in water
silver carbonate	Ag_2CO_3	insoluble
silver chloride	$AgCl$	insoluble
silver nitrate	$AgNO_3$	soluble
silver oxide	Ag_2O	insoluble

Which equation shows a reaction which **cannot** be used to make a silver salt?

A $AgNO_3(aq) + HCl(aq) \rightarrow AgCl(s) + HNO_3(aq)$

B $Ag_2O(s) + 2HNO_3(aq) \rightarrow 2AgNO_3(aq) + H_2O(l)$

C $Ag_2CO_3(s) + 2HNO_3(aq) \rightarrow 2AgNO_3(aq) + H_2O(l) + CO_2(g)$

D $2Ag(s) + 2HCl(aq) \rightarrow 2AgCl(s) + H_2(g)$

8.4 Identification of ions and gases

02. 0620_m21_qp_22 Q: 18

Magnesium reacts with copper(II) oxide to give magnesium oxide and copper.

Which substance is the oxidising agent in this reaction?

A copper

B copper(II) oxide

C magnesium

D magnesium oxide

---

03. 0620_m21_qp_22 Q: 20

When aqueous sodium hydroxide is added to a solution of a metal ion, a grey-green precipitate forms, which dissolves in excess to form a dark green solution.

What is the identity of the metal ion?

A chromium(III)

B iron(II)

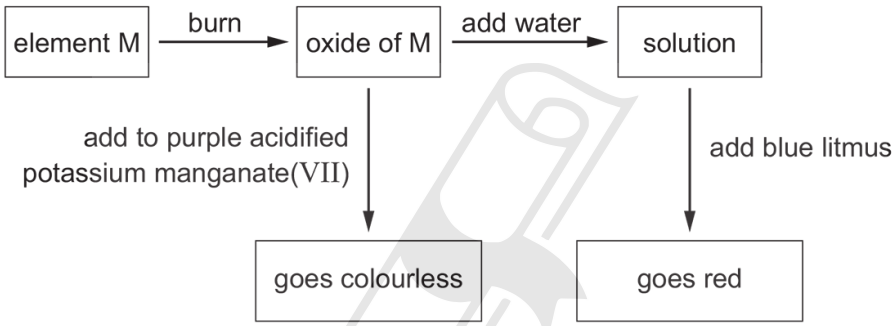
C iron(III)

D copper(II)

---

04. 0620_s21_qp_21 Q: 20

Some reactions of element M are shown.



What is element M?

A carbon

B iron

C magnesium

D sulfur

---

05. 0620_m20_qp_22 Q: 21

Salt S is dissolved in water and three tests are carried out on the solution.

	test	result
1	aqueous sodium hydroxide is added	green precipitate formed, insoluble in excess sodium hydroxide
2	dilute nitric acid is added	no reaction
3	aqueous barium nitrate is added to the acidified solution from test 2	white precipitate formed

What is the identity of S?

A copper(II) chloride

B copper(II) sulfate

C iron(II) chloride

D iron(II) sulfate

---

06. 0620_p20_qp_20 Q: 24

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

---

07. 0620_p20_qp_20 Q: 25

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

---

08. 0620_m19_qp_22 Q: 22

The results of two tests on an aqueous solution of X are shown.

test	observation
aqueous sodium hydroxide added	green precipitate formed
acidified aqueous 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

---

09. 0620_m18_qp_22 Q: 18

A solution of compound Z gives a light blue precipitate with aqueous ammonia. The precipitate dissolves in an excess of ammonia.

A flame test is done on compound Z.

What is the colour of the flame?

A blue-green

B lilac

C red

D yellow

---

10. 0620_m17_qp_22 Q: 20

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

---

11. 0620_s17_qp_21 Q: 21

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

---

12. 0620_s17_qp_22 Q: 21

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^-

---

13. 0620_s17_qp_23 Q: 21

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)

---

14. 0620_w17_qp_21 Q: 20

What is used to test for chlorine?

A a glowing splint

B damp litmus paper

C limewater

D potassium manganate(VII) solution

---

15. 0620_w17_qp_22 Q: 20

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

---

16. 0620_w17_qp_23 Q: 19

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

---

17. 0620_w17_qp_23 Q: 20

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+}

---

18. 0620_m16_qp_22 Q: 21

A substance is heated with aluminium foil in aqueous sodium hydroxide. A gas is produced which turns damp, red litmus paper blue.

Which anion is present in the substance?

A carbonate

B iodide

C nitrate

D sulfate

---

19. 0620_p16_qp_20 Q: 24

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

---

20. 0620_p16_qp_20 Q: 25

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

---

21. 0620_w16_qp_21 Q: 23

Four substances, P, Q, R and S, are tested as shown.

test	substance			
	P	Q	R	S
dilute hydrochloric acid added	gas given off which 'pops' with a lighted splint	gas given off which turns limewater milky	no reaction	no reaction
dilute aqueous sodium hydroxide added and warmed gently	no reaction	no reaction	gas given off which turns damp, red litmus paper blue	no reaction

What are P, Q, R and S?

	P	Q	R	S
A	Mg	Na_2CO_3	NH_4Cl	NaCl
B	Mg	NH_4Cl	Na_2CO_3	NaCl
C	Mg	Na_2CO_3	NaCl	NH_4Cl
D	Na_2CO_3	Mg	NaCl	NH_4Cl

---

22. 0620_w16_qp_22 Q: 23

Aqueous sodium hydroxide was added slowly, until in excess, to separate solutions of W, X, Y and Z.

The results are shown.

solution	initial observation with aqueous sodium hydroxide	final observation with excess aqueous sodium hydroxide
W	white precipitate formed	precipitate dissolves
X	white precipitate formed	no change
Y	pale blue precipitate formed	no change
Z	green precipitate formed	no change

Which row identifies the metal ions in the solutions?

	metal ion in solution W	metal ion in solution X	metal ion in solution Y	metal ion in solution Z
A	aluminium	calcium	copper(II)	iron(II)
B	aluminium	calcium	iron(II)	copper(II)
C	aluminium	iron(II)	calcium	copper(II)
D	calcium	aluminium	copper(II)	iron(II)

---

23. 0620_w16_qp_23 Q: 23

Compound T is added to dilute hydrochloric acid and warmed gently.

The mixture gives off a gas which turns acidified aqueous potassium manganate(VII) from purple to colourless.

A flame test on compound T gives a lilac flame.

What is compound T?

A sodium sulfate

B sodium sulfite

C potassium sulfate

D potassium sulfite

SN	Paper	Q. No.	Answer
01	0620_w16_qp_21	21	D
02	0620_m21_qp_22	18	B
03	0620_m21_qp_22	20	A
04	0620_s21_qp_21	20	D
05	0620_m20_qp_22	21	D
06	0620_p20_qp_20	24	B
07	0620_p20_qp_20	25	B
08	0620_m19_qp_22	22	D
09	0620_m18_qp_22	18	A
10	0620_m17_qp_22	20	D
11	0620_s17_qp_21	21	D
12	0620_s17_qp_22	21	A
13	0620_s17_qp_23	21	C
14	0620_w17_qp_21	20	B
15	0620_w17_qp_22	20	A
16	0620_w17_qp_23	19	C
17	0620_w17_qp_23	20	B
18	0620_m16_qp_22	21	C
19	0620_p16_qp_20	24	B
20	0620_p16_qp_20	25	B
21	0620_w16_qp_21	23	A
22	0620_w16_qp_22	23	A
23	0620_w16_qp_23	23	D