Acids, bases and salts – 2022J O Level 5070

1. June/2022/Paper_11/No.3

Two samples of a colourless solution are tested separately with aqueous sodium hydroxide, NaOH(aq), and aqueous ammonia, $NH_3(aq)$, and the results are recorded.

- A white precipitate is formed with two drops of NaOH(aq). This precipitate dissolves in an excess of NaOH(aq).
- A white precipitate is formed with two drops of $NH_3(aq)$. This precipitate dissolves in an excess of $NH_3(aq)$.

What can be deduced from these results?

A The anion present is Cl^-.

B The anion present is not Cl^-.

C The cation present is Al^{3+}.

D The cation present is Zn^{2+}.

2. June/2022/Paper_11/No.9

A piece of magnesium reacts with dilute hydrochloric acid.

The resulting solution is then evaporated leaving a solid residue of magnesium chloride.

Which statement is correct?

A A covalent solid is formed in this process.

B Each chlorine atom gains one electron in this process.

C Each magnesium atom loses only one electron in this process.

D Molecules of an element are formed during the reaction.

3. June/2022/Paper_11/No.13

Aqueous calcium hydroxide is an alkali. It is neutralised by dilute nitric acid to produce calcium nitrate and water.

What is the **ionic** equation for this reaction?

A $Ca^+ + OH^- + H^+ + NO_3^- \rightarrow CaNO_3 + H_2O$

B $Ca(OH)_2 + 2HNO_3 \rightarrow Ca(NO_3)_2 + H_2O$

C $Ca^{2+}(OH^-)_2 + 2H^+NO_3^- \rightarrow Ca^{2+}(NO_3^-)_2 + H_2O$

D $OH^- + H^+ \rightarrow H_2O$

4. June/2022/Paper_11/No.25

Which statement about acids and bases is correct?

A All strong acids react with carbonates but all weak acids do not.

B The oxides of Group I metals are amphoteric.

C The pH of 1.0 mol / dm^3 ethanoic acid, CH_3COOH, is higher than the pH of 1.0 mol / dm^3 sulfuric acid, H_2SO_4.

D The pH of 1.0 mol / dm^3 nitric acid, HNO_3, is lower than the pH of 1.0 mol / dm^3 hydrochloric acid, HCl.

5. June/2022/Paper_11/No.27

Which method should be used to make a pure sample of potassium chloride?

A adding $AgCl(s)$ to $KNO_3(aq)$

B adding excess $K_2CO_3(s)$ to $HCl(aq)$

C mixing $KNO_3(aq)$ with $NaCl(aq)$

D titrating $KOH(aq)$ with $HCl(aq)$

6. June/2022/Paper_11/No.28

A pure sample of lead sulfate is made by reacting aqueous solutions of two salts. The lead sulfate formed is then separated from the mixture.

Which solutions and method of separation are used?

	salt solution 1	salt solution 2	method of separation
A	lead chloride	sodium sulfate	crystallisation
B	lead chloride	sodium sulfate	filtration
C	lead nitrate	potassium sulfate	crystallisation
D	lead nitrate	potassium sulfate	filtration

7. June/2022/Paper_11/No.29

Which statement is correct?

A Food can be preserved by using sulfur dioxide.

B In the Contact process oxygen reacts with sulfur to make sulfur trioxide.

C Sulfur dioxide is used to kill bacteria present in wood pulp.

D Sulfuric acid is used as a bleach.

8. June/2022/Paper_12/No.26

Three dilute solutions of acid, each with a concentration of 0.01 mol / dm^3, are reacted separately with excess calcium carbonate until there is no further reaction. The same volume of acid is used each time.

The carbon dioxide produced is collected and its volume measured. All measurements are at room temperature and pressure.

acid	pH	volume of carbon dioxide formed / cm^3
1	2.0	20
2	1.7	40
3	3.4	20

What are the possible identities of the acids?

	acid 1	acid 2	acid 3
A	hydrochloric	sulfuric	ethanoic
B	hydrochloric	nitric	ethanoic
C	nitric	sulfuric	hydrochloric
D	sulfuric	hydrochloric	nitric

9. June/2022/Paper_12/No.27

The steps for the preparation of a pure sample of sodium nitrate are listed.

1 Titrate with dilute nitric acid until the end-point is seen.

2 Evaporate to concentrate the solution.

3 Rinse out the conical flask.

4 Add indicator.

5 Pipette a known volume of aqueous sodium hydroxide into a conical flask.

6 Cool and filter to remove crystals.

7 Repeat using the same volumes of aqueous sodium hydroxide and dilute nitric acid but no indicator.

Which order of steps is correct?

A 1 → 7 → 5 → 4 → 2 → 6 → 3

B 3 → 5 → 7 → 1 → 2 → 4 → 6

C 4 → 1 → 3 → 5 → 2 → 6 → 7

D 5 → 4 → 1 → 3 → 7 → 2 → 6

10. June/2022/Paper_12/No.28

A white compound is insoluble in water.

Which cations and anions could be present in the compound?

	sodium	calcium	carbonate	nitrate
A	✓	✓	✗	✓
B	✓	✗	✓	✗
C	✗	✓	✓	✗
D	✗	✓	✓	✓

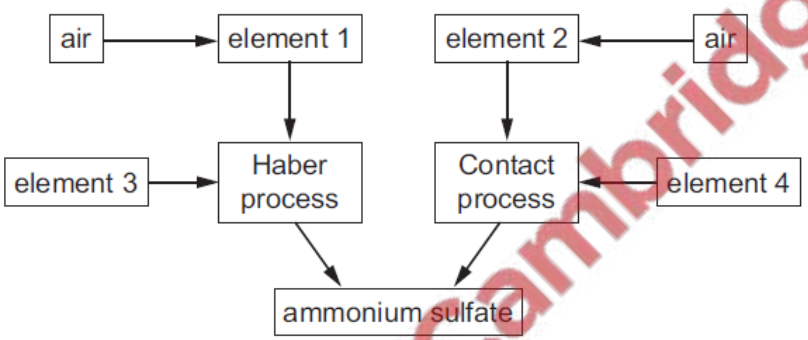
key

✓ = present

✗ = absent

11. June/2022/Paper_12/No.29

The flow chart describes the preparation of ammonium sulfate.



What are elements 1–4?

	1	2	3	4
A	nitrogen	oxygen	hydrogen	sulfur
B	nitrogen	oxygen	hydrogen	oxygen
C	oxygen	nitrogen	hydrogen	sulfur
D	oxygen	nitrogen	sulfur	hydrogen

12. June/2022/Paper_12/No.30

Which row correctly shows the possible uses of sulfur dioxide and sulfuric acid?

	sulfur dioxide	sulfuric acid
A	as a bleach	as battery acid
B	killing bacteria in food	as a bleach
C	making detergents	as battery acid
D	making fertilisers	making fertilisers

13. June/2022/Paper_21/No.1

Choose from the following compounds to answer the questions.

NH_4Cl

$BaSO_4$

KI

K_2SO_3

$Mg(NO_3)_2$

$NaOCOCH_3$

Na_2CO_3

Na_3PO_4

$ZnSO_4$

Each compound may be used once, more than once or not at all.

State which compound:

(a) reacts with dilute nitric acid to form a gas that turns limewater milky

..... [1]

(b) reacts with warm aqueous sodium hydroxide to form a gas that turns damp red litmus paper blue

..... [1]

(c) reacts with dilute hydrochloric acid to give a gas that decolourises acidified potassium manganate(VII)

..... [1]

(d) is prepared using a precipitation reaction

..... [1]

(e) contains an anion with a charge of –3

..... [1]

(f) is used to test for an oxidising agent.

..... [1]

[Total: 6]