11 Qualitative Analysis

Set A Foundations

Name	Time 45 minutes	Total 18 marks	Score ____ / 18

Use a copy of the Periodic Table where you need one.

A From the lesson

7 MARKS

1 Which cation gives a white precipitate with aqueous sodium hydroxide that is insoluble in excess?

A aluminium, Al^{3+} **B** calcium, Ca^{2+} **C** zinc, Zn^{2+} **D** ammonium, NH_4^+

/1

Answer ☐ [1]

Source: Learners' Alley, Qualitative Analysis slides

2 A solution is acidified with dilute nitric acid, then aqueous silver nitrate is added. A yellow precipitate forms. Which ion is present?

A chloride, Cl^- **B** iodide, I^- **C** sulfate, SO_4^{2-} **D** carbonate, CO_3^{2-}

/1

Answer ☐ [1]

Source: Learners' Alley, Qualitative Analysis slides

3 A pungent gas turns damp blue litmus paper red, then bleaches it. What is the gas?

A ammonia **B** carbon dioxide **C** chlorine **D** sulfur dioxide

/1

Answer ☐ [1]

Source: Learners' Alley, Qualitative Analysis slides

4 Answer these questions about qualitative analysis.

(a) State the result when aqueous ammonia is added to a solution of iron(III) ions until in excess.

..... [1]

(b) Describe the test for sulfate ions.

.....

..... [1]

(c) Describe the test for hydrogen.

..... [1]

(d) Name the reagent used to tell aluminium ions from zinc ions.

/4

.....

[1]

Source: Learners' Alley, Qualitative Analysis slides

B Practice

11 MARKS

5 When sulfur is burned, sulfur dioxide is produced. How can the identity of sulfur dioxide be confirmed?

	test	observation
A	insert a glowing splint into the gas	the glowing splint rekindles
B	use a piece of damp blue litmus paper	blue litmus paper turns red and is then bleached
C	use a piece of damp red litmus paper	red litmus paper turns blue and is then bleached
D	use a piece of filter paper soaked with acidified potassium manganate(VII)	purple potassium manganate(VII) turns colourless

/1

Answer [1]

Source: 2023 GESS Sec 3 End-of-Year P1 Q34

6 Separate tests were performed on an unknown solution. The results are shown in the table. What is the unknown solution?

test	observation
add aqueous sodium hydroxide	green precipitate forms and is insoluble in excess sodium hydroxide
add nitric acid	no observable change
add aqueous sodium hydroxide, aluminium foil and warm	pungent gas evolved which turned moist red litmus paper blue

A ammonium nitrate **B** iron(II) carbonate **C** iron(II) nitrate **D** iron(III) sulfate

/1

Answer [1]

Source: 2023 GESS Sec 3 End-of-Year P1 Q35

7 An excess of aqueous sodium hydroxide is added to an aqueous solution of salt X and boiled. Ammonia gas is only given off after aluminium foil is added to the hot solution. What could X be?

A ammonium chloride
B ammonium iodide
C sodium chloride
D sodium nitrate

/1

Answer [1]

Source: 2024 CHS Sec 3 End-of-Year Section A Q27

8 There are two unlabelled test tubes. One contains aqueous ammonium nitrate and the other contains aqueous sodium nitrate. Which test could identify the solutions?

A add aqueous ammonia and warm
B add aqueous sodium hydroxide and warm
C add aqueous sodium hydroxide, aluminium foil and warm

D add dilute hydrochloric acid and warm

/1

Answer [1]

Source: 2020 SJI Year 3 End-of-Year P1 Q20

9 Three substances were added separately to aqueous potassium sulfate and to aqueous potassium carbonate.

1 aqueous ammonia
2 barium nitrate solution
3 dilute hydrochloric acid

Which substance(s) would give different observations with the two solutions?

A 1 only **B** 3 only **C** 1 and 2 **D** 2 and 3

/1

Answer [1]

Source: 2020 SJI Year 3 End-of-Year P1 Q19

10 A solution of compound Z reacts with sodium hydroxide solution to form a white precipitate that is insoluble in excess sodium hydroxide solution. Aluminium powder is then added. The mixture is heated and a gas that turns damp red litmus paper blue is given off. What could Z be?

A aluminium chloride **B** ammonium chloride **C** calcium nitrate **D** zinc nitrate

/1

Answer [1]

Source: 2024 CHIJ Prelim P1 Q18

11 Aqueous ammonia is commonly used to identify cations which are present in salt solutions.

(a) Describe how aqueous ammonia can be used to identify iron(II) ions.

.....

..... [1]

(b) Write an ionic equation, with state symbols, for the reaction in (a).

/3

..... [2]

Source: 2021 SJI Prelim P2 A2(b)

12 Describe what you see when:

(a) a few drops of aqueous ammonia are added to an aqueous solution containing copper(II) ions.

..... [1]

(b) excess aqueous ammonia is added to an aqueous solution containing copper(II) ions.

.....

/2

..... [1]

Source: 2025 TKGS Prelim P2 Q(c)