



CHEMISTRY ONLINE
— **TUITION** —

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CHEMISTRY

INORGANIC CHEMISTRY

Level & Board	AQA (A-LEVEL)
TOPIC:	Group 2 Metals
PAPER TYPE:	SOLUTION - 1
TOTAL QUESTIONS	10
TOTAL MARKS	24

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Group 2 Metals - 1

1.

Reagent: Barium chloride (BaCl_2)

Observation with KNO_3 (aq): No visible reaction or precipitate formation.

Observation with K_2SO_4 (aq): Formation of a white precipitate or white solid.

Conclusion: The formation of a white precipitate or white solid indicates the presence of sulfate ions, confirming the solution to be potassium sulfate (K_2SO_4).

(3)

2. A

(1)

3.

Reagent: Sodium hydroxide (NaOH)

Observation with MgCl_2 (aq): White precipitate forms in the solution.

Observation with AlCl_3 (aq): White gelatinous precipitate forms in the solution, and it may dissolve in excess NaOH to give a colorless solution.

(3)

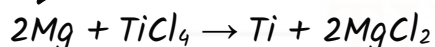
4. C

(1)

5.

(a)

Equation:



Role of magnesium:

Magnesium (2Mg) acts as a reducing agent by providing electrons to reduce titanium tetrachloride (TiCl_4).

The magnesium undergoes oxidation, changing from an oxidation state of 0 to +2.

(2)

(b)

Moles of water in 210 mg:

So water in 210 mg = 0.210 g

Moles of water in 0.210g = mass / mr

= 0.210 / 18

= 0.0117 mol

Equal to moles of magnesium hydroxide produced in stage one:

Mass of $Mg(OH)_2$ = 0.0117 x 58.3 = 0.680 g

Mass of magnesium oxide (MgO):

Mass of MgO = 3.2 - 0.68 = 2.52 g

 $\% \text{ of MgO} = \frac{2.52}{3.2} \times 100 = 78.7\%$

(4)

6. A

(1)

7.

(a)

Equation: $Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2$

Expected value for the pH: 8 - 12

The resulting solution is alkaline, and the pH is expected to be in the range of 8 to 12, influenced by the concentration of calcium hydroxide.

(2)

(b)

Solubility in water, of the Group 2 sulfates from magnesium to barium decreases. Because of increasing ionic size and decreasing lattice energy.

(2)

8.

The high melting point of calcium sulfate ($CaSO_4$) is due to the strong ionic bonds between the positively charged calcium ions (Ca^{2+}) and the negatively charged sulfate ions (SO_4^{2-}). This strong electrostatic attraction requires a significant amount of energy to break, resulting in a high melting point for the compound.

(2)

9. B

(1)

10. C

(1)

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- Completed Medicine (M.B.B.S) in 2007
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I am Sorry !!!!!

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