Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Inorganic 1

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Name of the Student:_____
Max. Marks : 17 Marks **Time : 17 Minutes**

Q1.

Zinc is similar to Group 2 metals and forms compounds containing Zn^{2+} ions.

Write an equation for the thermal decomposition of zinc carbonate to zinc oxide.

Calculate the percentage atom economy for the formation of zinc oxide from zinc carbonate in this reaction.

Equation _____

_____

Percentage atom economy _____

_____

_____

_____

(Total 3 marks)

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Q2.

A laboratory technician discovered four badly−labelled bottles, each containing one pure white solid. Each bottle contained a compound of a different Group 2 metal (magnesium, calcium, strontium and barium).

Some tests were carried out on the solids or, if the compound was soluble, on the aqueous solution. The results are given in the table.

Test	**Compound 1**	**Compound 2**	**Compound 3**	**Compound 4**
Added to water	Dissolves	Insoluble	Dissolves	Dissolves
Solution or solid added to HCl(aq)	Solution remains colourless	Gives off carbon dioxide gas and a colourless solution forms	Solution remains colourless	Solution remains colourless and heat released
Solution or solid added to NaOH(aq)	Solution gives a white precipitate	Solid remains insoluble	Solution gives a slight white precipitate	Solution has no visible change
Solution or solid added to H_2SO_4(aq)	Solution has no visible change	Gives off carbon dioxide gas and a white solid remains	Solution slowly forms a slight white precipitate	Solution forms a white precipitate

(a) One of the bottles has a very faint label that could be read as ‘Magnesium Sulfate’.

Use the information in the table to deduce which **one** of the four compounds is magnesium sulfate and explain your answer.

Compound _____

Explanation _____

_____

_____

_____

_____

(3)

(b) The bottle containing **Compound 2** has a ‘TOXIC’ hazard symbol.

Use the information in the table to identify **Compound 2**.

Explain both observations in the reaction with H_2SO_4(aq).

Identity of **Compound 2** _____

Explanation _____

_____

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_____

_____

_____

(3)

(c) Identify the compound that is strontium hydroxide.

Give an equation for the reaction of strontium hydroxide with sulfuric acid.

Compound _____

_____

Equation _____

_____

(2)

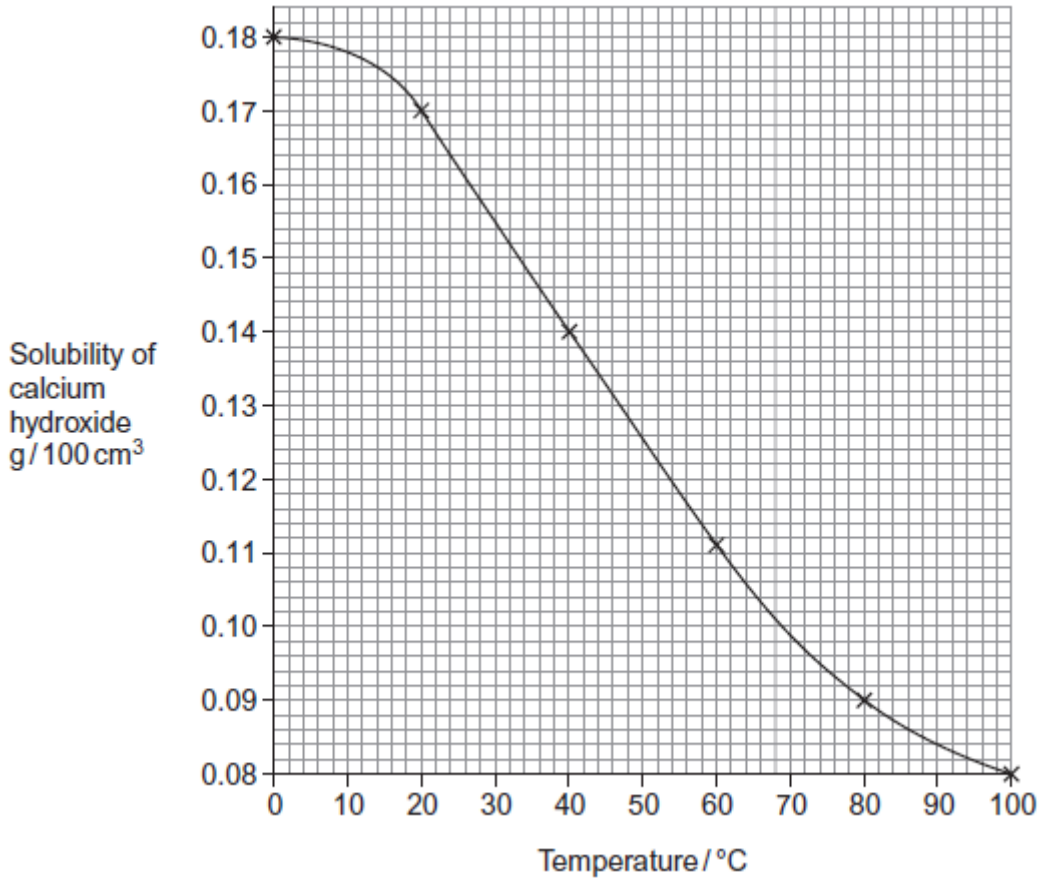
(Total 8 marks)

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Q3.

Calcium hydroxide is slightly soluble in water at room temperature. As the temperature rises, the solubility decreases. When the maximum amount of solid has dissolved at a particular temperature the solution is said to be **saturated**.

In an experiment, the solubility of calcium hydroxide was measured over a range of temperatures. The results are shown in the graph.



(a) Use data from the graph to calculate the concentration, in mol dm^{-3}, of a saturated solution of calcium hydroxide at 30 °C. Give your answer to 3 significant figures.

Show your working.

_____

_____

_____

_____

_____

_____

(3)

(b) You are given a sample of saturated calcium hydroxide solution. Outline the practical steps that you would take to determine the solubility of calcium hydroxide in this solution.

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(3)
(Total 6 marks)

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