**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ADM NO: \_\_\_\_\_\_\_\_\_\_\_\_CLASS: \_\_\_\_\_\_\_\_\_\_**

**DATE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ SIGN: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

MARKS HERE

**CHEMISTRY**

**FORM 3**

**TERM 3, 2023**

**INSTRUCTIONS: (ANSWER ALL QUESTIONS) TIME: (1 HOUR 30 MINUTES)**

1. . Study the information below and answer the questions that follow:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Formula of the chloride | NaCl | MgCl2 | AlCl2 | SiCl4 | PCl3 | SCl2 |  |
| M.P(0C) | 801 | 714 | - | -70 | -91 | -80 |  |
| Formula of the oxide | Na2O | MgO | Al2O3 | SiO2 | P4O10 | SO2 | Cl2O7 |
| M.P(0C) | 1190 | 3080 | 2050 | 1730 | 560 | -73 | -90 |

1. Aluminium chloride AlCl3, has an unexpected bond type and structure.

State the type of bond and the structure in AlCl3 (2marks)

1. Bond type ………………………………………………………………………………………………

1. Structure ……………………………………………………………………………………………....

1. What type of bonding would AlCl3 be expected to have why? (2 marks)

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1. Why is the melting point of AlCl3 not indicated in the table above? (1mark)

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1. A piece of blue litmus paper is placed in a solution of sodium chloride and a solution of aluminium chloride. Explain what would be observed in each case. (2 marks)
2. Sodium chloride solution

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1. Aluminium chloride solution

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1. Explain the large difference in the melting point of the compound of formula MgO and P4O10 (2 marks )

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1. State Gay Lussac’s law (1 mark)

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1. 10cm3 of methane (CH4) gas is exploded with 150cm3 of air containing 20% oxygen and 80% nitrogen. The products were allowed to cool to room temperature. What will be the total volume of the gases at the end of the reaction? (3 marks)

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1. Give the open structures of:-
	* 1. 3-chlorohex-1-yne (2 marks)
		2. CH3OH (2marks)
2. What is meant by Isomerism? (1 mark)

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1. Draw and name two Isomers of butane. (2 marks)
2. (a) (i) Name two allotropes of sulphur. (2 marks)

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 (ii) During extraction of sulphur hot compressed air is used. State its two functions. (2 marks)

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(iv). Write an equation for the reaction of sulphur (IV) oxide and oxygen gas (1 mark)

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 (b). The flow diagram below shows some of the process involved in production of sulphuric (vi)acid. Use it to answer the questions that follow.



1. Name substance A. (1 mark)

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1. Write an equation for the reaction that takes place in the absorption chamber. (1mark)

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1. Vanadium V oxide is commonly used catalyst in contact process. Name another catalyst which can be used for this process. (1 mark)

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1. Give two reasons why vanadium (v) Oxide is the commonly used catalyst. (2 marks)

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1. Explain the reason why sulphur (vi) oxide is not dissolved directly in water during manufacture of sulphuric (vi) acid. (1 mark)

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1. Give 2 uses four use of sulphuric (vi) acid. (2 marks)

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1. A mixture contains iron (III) chloride, zinc (II) oxide and potassium chloride. Describe how each of the substance can be obtained from the mixture. (2 marks)

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………………………………………………………………………………………………………………5. Starting with copper (II) oxide, describe how you can prepare copper (II) sulphate crystals. (2 marks)

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1. (a) State Graham’s law of diffusion (1 mark)

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 (b).60cm3 of oxygen gas diffused through a porous hole in 50 seconds. How long will it take 80cm3 of sulphur (IV) oxide to diffuse through the same hole under the same conditions?

 (S= 32.0. O=16.0) (3 marks)

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1. The following diagram below shows a series of steps followed in the manufacture of sodium carbonate.



1. Name substances A and B. (2mks)

 A

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 B

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b) Write equations for the reactions taking place in:

 i) The Solvay tower. (2mks)

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 ii) Chamber E. (1mk)

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c) i) Identify substance G. (1mk)

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ii) State one laboratory use of substance G.

 I. Laboratory use (1mark)

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d) Name two important industrial use of sodium carbonate. (2mks)

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