**NAME………………………………………………………….CLASS…………ADM………..**

**CHEMISTRY FORM 3**

**TERM 2 2022 OPENER EXAM FORM 3**

**TIME:**$2\frac{1}{2}$ **HOURS**

**Instructions:**

This paper consists of two sections,**EACH** section **50** marks.

**All** working **MUST** be clearly shown.

**FOR EXAMINERS USE ONLY**

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| **QUESTIONS**  | **SECTIONS** | **MAXIMUM**  | **CANDIDATE’S SCORE**  |
| 1 – 14  | A | 50 |  |
| 15 – 19 | B | 50 |  |
|  |  |  |  |
| **TOTAL SCORE**  |  | 100 |  |

**SECTION A**

1. 60 ml of ozone gas diffused through a porous partition in 5 min 10 sec. how many seconds would it take 80 ml of nitrogen (i) oxide to diffuse through the same partition under same condition. ( N=14, O=16) (3mks)
2. Below are 3 isotopes of element Neon. Study it and answer the questions that follows.

Ne- 20 90.9%

Ne – 21 0.3%

Ne – 22 8.8%

1. What are isotopes (1mk)
2. Calculate the relative atomic mass of Neon (3mks)
3. 0.28g of Aluminium reacted completely with Oxygen gas. Calculate the volume of oxygen used. [molar gas volume = 24$=dm^{3}$ Al =27 O = 16] (3mks)
4. Using dots (.) and cross(X) diagram, show the bonding in; [C =16 Cl= 17 K = 19 S = 16]
5. Potassium Sulphide (1$\frac{1}{2} mks)$
6. Carbon tetrachloride (1$\frac{1}{2}mks )$
7. During laboratory preparatioin of Oxygen, Manganese (iv) Oxide is added to reagent H.
8. Name reagent H. (1mk)
9. State the role of Manganese (iv) Oxide in this experiment (1mk)
10. Write the chemical equation for the reaction that took place (1mk)
11. Salt may be classified as soluble or insoluble salt.
12. Select from the following list a pair of compounds that can be used to prepare soluble and insoluble salts.

Nitric acid, lead nitrate, Potassium Nitrate, Barium Oxide, Sodium Chloride

1. Soluble salt (1mk)
2. Insoluble salt (1mk)
3. Describe how a solid sample of copper (ii) nitrate can be prepared in the lab starting with copper metal (3mk)
4. (a) State Charles law (1mk)

(b) A gas occupies 300ml at a pressure of 570 mmHg and temperature of -136 degrees Celsius. What would be its volume at stp. (3mks)

1. (a) State Gay Lusacs law. (1mk)
2. Under certain condition methane react with steam forming carbon (ii) Oxide and Hydrogen. Calculate the total volume of the of gas that would be form when a 100ml of steam react completely with methane (2mks)
3. Ammonia and nitric (v) acid are used to manufacture ammonium nitrate. Calculate the amount of nitric (v) acid required to manufacture 1000kg of ammonium nitrate using excess ammonia gas. [N = 14, H = 1, O = 16] (3mks)

1. (a) Calculate the number of sodium atomsa present in 40g of sodium metal

[“L” = 6.02 X $10^{23}$ Na = 23] (3mks)

 (b) Calculate the molarity of sodium hydroxide if 40g of sodium hydroxide was dissolved water to make 500ml of solution. (3mks)

1. Describe an experiment to show that group one element reacts with cold water forming an alkaline solution. (3mks)
2. Name three methods of gas collection. (3mks)
3. (i) Candle wax is mainly compound consisting of the elements. Name the two elements (2mks)
4. State one industrial use of hydrogen gas (1mk)
5. (a)Write the chemical formula of rust (1mk)
6. List 3 methods of prevent rusting (3mks)

**SECTION B**

1. (a) Name two apparatuses that can be used for determining accurate volume in a

laboratory **(2marks)**

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(b) One of the flames produced by Bunsen burner is the luminous flame

i) Explain why this flame is very bright **(1mark )**

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ii) State two disadvantages of the luminous flame **(2marks)**

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(c) Air is usually one of the substances that is considered as a mixture

(i) Identify the two most abundant component of air **(2marks)**

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(ii) Give two reasons why the air is considered as a mixture **(2marks)**

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(iii) One of the components of air is carbon (iv) oxide. Describe an experiment that can be used to prove the presence of carbon (iv) oxide in the air **(2marks)**

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1. The grid below forms part of the periodic table. Study it and answer the questions that follow. The letters do not represent the actual symbols of the elements

**P**

**Q**

**R**

**S**

**T**

**U**

**V**

**W**

**X**

**Y**

 **Z**

**M**

1. Write the general name given to the element P belong. **(1mark)**

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1. An element N has an atomic number of 15. Write down its electronic arrangement and hence fix it in its right position on the grid above. **(2marks)**

Electronic arrangement …………………………………………………………………………

1. Compare the size of the atom of R and that of its ion. Explain your answer. **(2marks)**

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1. Give the formula of the compound formed between **(1mark)**
2. P and W …………………………………………………………………………
3. T and Y …………………………………………………………………………..
4. Compare the melting points of element Q and S. Explain **(2marks)**

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1. State the unreactive element in the grid. Give a reason for your answer **(2marks)**

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1. Give two advantages that element S has over element Q in making electric cables**(2mks)**

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1. Draw (a) dot (.) and cross (x) diagram to represent the bonding in compound formed between T and Y**(2 marks)**

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1. The chart below represents the main steps in the large-scale manufacture of sodium carbonate.

 A

 Chamber X Ammoniated brine Solvay

 Tower

 A

 CaCl2

 Heat Chamber Y

 Solution C

 H2O (l)  Slaker Heat CO2

 B

 CO2

 Limestone Kiln

Sodium

 carbonate

1. Name substances A and B.

 A ………………………………………………………… **(1 mark )**

 B ………………………………………………………… **( 1 mark)**

 (b) Write down the chemical equation leading to formation of C. **(1 mark )**

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 (c ) A stream of cold water is made to circulate around chamber X. What does this

 suggest about the reaction taking place. **(1 mark )**

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 (d) Name the process that takes place in chamber Y. **(1 mark)**

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 (e) State any 2 by-products recycled in the process.  **(2 marks)**

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 (f) state one use of calcium chloride

 1mks

 (g) Mention any 2 uses of sodium carbonate. **( 2 mark )**

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1. Study the set up below.



a) Name salt K (1mk)

(b)Write the equation for the reaction for the formation of salt K (1mk)

(c)What property of salt A is exhibited as shown in the experiment.(1mk)

(d)What is the purpose of anhydrous calcium chloride? Explain (2mk)

(e)Name another metal that can be used to produce similar results (1mk)

1. The scheme below shows the preparation of a certain salt. Study it and answer the questions that follow



a) Give the name and the formula of the following (2mk)

|  |  |  |
| --- | --- | --- |
|  | Name | Formula |
| Solution A |  |  |
| Solution B  |  |  |

b) Give the equation for the;

i) Formation of B and gas C (2mk)

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ii) Formation of solution A and hydrogen gas (1mk)

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c) Describe a chemical test for gas C (2mk)

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d) Give two observations made when sodium metal is placed on water (2mk)

i………………………………………………………………………………………………………………

ii………………………………………………………………………………………………………………..

e) Distinguish between anhydrous salt and dry salt (1mk)

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