**CHEMISTRY OPENER FORM 3 NAME: ………………………………**

 **TERM 1 2023. CLASS: …………………**

 **TIME: 1HR 30MIN**

1. (a) State the Graham’s law. (1 mark)

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 (b) A 100 cm3 of Carbon (IV) oxide gas diffused through a porous partition in 30seconds.

 How long would it take 150 cm3 of Nitrogen (IV) oxide to diffuse through the same

 partition under the same conditions?) (C = 12.0, N = 14.0, O = 16.0) (2 marks)

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1. A gas occupies 0.4dm3 at 200c and 1.0 x 103Pascals what will be the temperature of the gas when the volume and pressure of the gas when the volume and pressure of the gas is

 0.1dm3 and 1.0 x 103Pascals respectively. (3mks)

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1. Study the table below and answer the question that follow. The letters do not represent

 the actual symbols of the element.

 Formula of ion Electron configuration

 W2+ 2

 V2- 2.8

 X3+ 2.8

 U2+ 2.8

 Y- 2.8.8

a) Select elements found in;

 i) the same group ……………………………………………………… (1mk)

 ii) period three …………………………………………………… (1mk)

b) What is the family name given the group members to which element Y belongs (1mk)

………………………………………………………………………………………………………

4. Study the table below and answer the questions that follow

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Substance | A | B | C | D | E | F |
| Melting Point (°C) | 801 | 113or 119 | -39 | 5 | -101 | 1356 |
| Boiling Point (°C) | 1410 | 445 | 457 | 54 | -36 | 2860 |
| Electrical solid | Poor | Poor | Good | Poor | Poor | Poor |
| Conducting Liquid | Good | Poor | Good | Poor | Poor | Poor |

Identify with reasons the substances that

1. Have a metallic structure ……………………………………………………….. (1mk)
2. Have a molecular structure ……………………………………………………… (1mk)
3. Suggest a reason why substance B has two melting points (1mk)

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5 A student lowered burning magnesium in a gas jar of carbon (IV) oxide as shown in the

 diagram.

Magnessium

ribbon

Gas jar

CO2

 (a) State and explain the observation made in the gas jar (2 Marks)

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 (b) Write the equation of the reaction that takes place in the gas jar (1 Mark)

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6. (a) Using a dot (•) and cross (x) to represent the outer most electrons, draw diagrams to

 show the bonding in magnesium sulphide. (Mg =12 S =16 ) (2 Marks)

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 (b) State the structure of the above compound. ( 1 Mark)

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 (c) Give two properties of substances with the above structure (2 Mark)

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7. Given sodium carbonate solid, lead (II) nitrate solid and water, explain how you can obtain

 a solid sample of Lead (II) carbonate. (3 Marks)

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8. The diagram below shows part of Solvay process.

K

J

L

Brine

with ammonia

Carbon (IV) Oxide

NH4Cl(aq)

NaHCO3 (s)

Solid x

Solid Y

1. Name solid X ……………………………………………………………… (1 Mark)
2. State the process taking place in chamber L (1 Mark)

…………………………………………………………………………………………………State two uses of sodium carbonate (1 Mark)

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9 (a) Define electrolysis. (1mk)

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(b) During the electrolysis of molten aluminium oxide, write the equations at the;

 Anode - …………………………………………………………………………. (1mk)

 Cathode - …………………………………………………………………………. (1mk)

…………………………………………………………………………………………

10. In an experiment to determine the percentage purity of Sodium carbonate produced in the Solvay process , 2.15g of the sample reacted with exactly 40.0cm3 of 0.5M Sulphuric(VI)acid. Determine the percentage purity of sodium carbonate in the sample. (3marks)

11. Below is a structure of an element X. Use it to answer the questions that follow.

+

+

+

+

+

+

a) Name the chemical family to which element X belongs. Give a reason. (2mks)

………………………………………………………………………………………………………

b Define covalent bond. (1mk)

………………………………………………………………………………………………………………………………………………………………………………………………………………12. A colourless liquid was suspected to be water. State two ways to confirm.

1. Purity of the water. (1mk)

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1. That the liquid was water. (2mks)

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13. The grid below is part of the periodic table. The elements are not represented by their actual symbols. Use the information to answer the questions that follow



(i) Which is the most reactive

(I) Non — metal? (2mks).

………………………………………………………………………………………………………

 Explain

………………………………………………………………………………………………………………………………………………………………………………………………………………

(II) Metal? (2mks)

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 Explain

………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Name the family to which elements **T** and **Q** belongs.(1mk)

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1. Write the formula of the compound formed when **W** reacts with **S**. (1mk)

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1. Explain why element **N** doesn’t form compounds with other elements. (2mks)

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1. Compare the atomic radii of **T** and **Q.** Explain.(2mks)

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 (v) Compare the atomic radii of T and S. Explain. (2mks)

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