Candidate's Name: .....

Signature: .....

545/2
CHEMISRTRY
Paper 2
2022
2 hours

MATIGO MOCK EXAMINATIONS 2022
Uganda Certificate of Education

CHEMISTRY

Paper 2

2 hours

INSTRUCTIONS TO CANDIDATES:

Section **A** *consists of 10 structured questions .Answer* **all** *questions in this section.*

Answers to these questions **must** *be written in the spaces provided.*

Section **B** *consists of 4 semi- structured questions. Answer any* **two** *questions from this section. Answers to the questions must be written in the answer booklet(s) provided.*

In both sections all working must be clearly shown

(Fe= 56; Na = 23; O= 16; K = 39; CL = 35.5)

1 mole of gas occupies 24dm^3 at room temperature.

1 mole of gas occupies 22.4 dm^3 at s.t.p

For Examiners Use Only														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	**Total**

SECTION A: (50 MARKS)

Answer **all** *questions in this section.*

1. a) State what is observed in each case when the following mixtures are heated in a dry hard test tube.

i) Sodium carbonate and Zinc carbonate. *(1 mark)*

.....

.....

ii) Iodine and Sodium hydrogen carbonate *(1 ½ marks)*

.....

.....

b) Write equation (s) of the reaction (s) that took place in (a)(i) *(1 ½ marks)*

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.....

c) State

i) the practical application of heating the mixture in (a) (ii) *(½mark)*

.....

.....

ii) what would be observed when the residue in (a) (i) is warmed in dilute nitric acid while stirring. *(1 mark)*

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.....

2. A symbol ${}^{35}_{17}Y$ is an element in the periodic table and naturally exists as a diatomic in gaseous state.

a) State

i) the group in the periodic table to which **Y** belongs. *(½mark)*

.....

.....

ii) what does the figure "35" stand for in the atom of **Y**? *(1 mark)*

.....

.....

b) A piece of iron wire was heated in the molecules of **Y** until no further change.

i) State what was observed. *(1 ½ marks)*

.....

.....

ii) Write the formula of compound that was formed in (b) (i) *(½mark)*

.....

c) Another atom of **Y** has a mass number of "37" and atomic number of 17.

i) Write the full symbol of this atom of **Y**. *(½mark)*

.....

.....

ii) State what $^{35}_{17}\boldsymbol{Y}$ and the atom you have given in (c) (i) are called. *(½mark)*

.....

.....

3. In one of the laboratory experiments, some drops of water were added to substance **W**. This resulted into formation of 1.5dm^3 of oxygen gas and an alkaline solution at room temperature.

a) Name substance **W**. *(½mark)*

.....

.....

b) Write an equation of the reaction that took place between water and substance **W** *(1 ½ marks)*

.....

.....

c) Calculate the maximum mass of substance **W** that was used in this experiment. *(2 marks)*

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.....

d) State what would be observed if the alkaline solution was shaken with aluminium hydroxide powder. *(1 mark)*

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.....

4. Potassium and Zinc can all react with water under different conditions to form gas, **X**

a) Identify gas **X**. *(½ mark)*

.....

.....

b) State the condition(s) at which gas **X** is displaced from water by;

i) Potassium *(½mark)*

.....

ii) Zinc *(1 mark)*

.....

c) Write equation of reaction leading to the formation of gas **X** from water and;

i) Potassium *(1 ½ marks)*

.....

.....

ii) Zinc *(1 ½ marks)*

.....

.....

d) Give one other metal that can displace gas **X** from water under the similar conditions , as Zinc. *(½ mark)*

.....

.....

5. An organic compound **Q** of molecular formula $\mathbf{C_2H_x}$ can react with bromine. It can also react to form apolymer.

a) What is apolymer. (½ mark)

.....

.....

b) Deduce the value of **x** *(½ mark)*

.....

.....

c) Write the equation of reaction between compound **Q** and bromine. *(1 mark)*

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.....

d) Write the formula of the polymer obtained when compound **Q** reacts and name the polymer. *(1 mark)*

.....

.....

e) Compound **Q** can be prepared in the laboratory to form alcohol **R**

i) Name alcohol **R** *(½ mark)*

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.....

ii) Write equation of reaction leading to the formation of **Q** from alcohol **R** *(1 mark)*

.....

.....

6. a) Define the term **Oxidation** *(1 mark)*

.....

.....

b) In the laboratory preparation of chlorine, the major reactants undergo both oxidation and reduction.

i) Give one set of reactants that can undergo both oxidation and reduction during the laboratory preparation of chlorine. *(1 mark)*

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.....

ii) Write an equation of the reaction between the reactants you have given in (b) (i) above. *(1 ½ marks)*

.....

.....

iii) Which of the reactants you have given is the oxidizing agent? *(½ mark)*

.....

.....

c) Excess chlorine was reacted with burning sodium to give solid **P**.

i) Identify solid **P** *(½ mark)*

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.....

ii) Which of chlorine and sodium is an oxidizing agent? *(½ mark)*

.....

.....

7. When excess sodium hydroxide solution was added to a solution containing Copper (ii) chloride and Zinc chloride, a precipitate was formed. The mixture was then filtered.

a) Name the precipitate that was formed *(½ mark)*

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b) Write an ionic equation of the reaction that led to the formation of the precipitate. *(1 ½ marks)*

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.....

c) Briefly explain the reactions that led to the formation of the substance in the filtrate. (Equation not required) *(2 marks)*

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.....

d) State the reagent that can be used to confirm the anion in the mixture above. *(½ mark)*

.....

.....

8. Haematite is one of the ores used in the extraction of metal **Y**

a) Name;

i) metal **Y** *(½ mark)*

.....

.....

ii) one other ore from which metal **Y** can be extracted. *(½ mark)*

.....

.....

b) Write the final equation of the reaction leading to the formation of haematite from purified haematite. *(1 ½ marks)*

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c) Given that 8.0g of hematite produced 2.24 g of pure metal **Y**. Calculate the percentage of hematite that reacted to produce the pure metal. *(2 ½ marks)*

.....

.....

9. When ammonium chloride is heated in a dry test tube , it liberates hydrogen chloride and gas **Z**.

a) i) Identify gas **Z** *(½ mark)*

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.....

ii) Write equation of the reaction that takes places *(1 ½ marks)*

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.....

b) State how gas, **Z** can be tested in the laboratory. *(1 mark)*

.....

.....

c) Gas **Z** was bubbled until in excess into an aqueous solution of lead (ii) nitrate and the mixture shaken.

i) State what was observed. *(½ mark)*

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.....

ii) Write an ionic equation of the reaction that took place. *(1 ½ marks)*

.....

.....

10. When margarine (solid fat) was boiled with sodium hydroxide for some time, compound **T** was formed.

a) Name

i) Compound **T** formed *(½ mark)*

.....

.....

ii) The process involved in the formation of compound **T** *(½mark)*

.....

.....

b) State how a solid form of compound **T** can be obtained from the reaction mixture. *(1 ½ marks)*

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.....

c) A solution of compound **T** was added to aqueous solution of magnesium sulphate slowly while stirring until in excess.

i) State what was observed. *(1 mark)*

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.....

ii) Write an ionic equation of the reaction that took place. *(1 ½ marks)*

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SECTION B: (30 MARKS)

Answer any **two** *questions from this section*

Additional question(s) answered will **not** *be marked.*

11. a) What do you understand by the term electrolysis? *(1 mark)*

b) Dilute copper (ii) sulphate solution was electrolyzed using graphite electrodes.

i) Give two factors that determined the discharge of ions at the electrodes. *(1 mark)*

ii) State and explain what happened at the anode. *(5½ marks)*

iii) Write equation for the reaction at the cathode. *(1 mark)*

c) State and explain what happens to the litmus paper if it is put into the resultant solution at the end of the electrolysis reaction in (b) *(2 marks)*

d) Name the substance that would be formed at the anode if a solution of copper (II) chloride was electrolysed;

i) Using copper electrodes *(1 mark)*

ii) In concentrated form using graphite electrodes. Explain your answer with equations of reactions. *(3 marks)*

e) Give the industrial application of the reaction in (d) (i) *(½ mark)*

12. In one of the laboratory experiments some gases were separately bubbled into gas jars containing pieces of moist blue cloth. The blue cloth turned to white for some gases.

a) i) Name two gases that were able to turn the blue cloth to white. *(1 mark)*

ii) What property of the gases was being investigated in the experiment? *(½ mark)*

b) State which of the two gases you have named in (a) (i) turned the blue cloth to white by;

i) Oxidation *(½ mark)*

ii) Reduction *(½ mark)*

c) Explain briefly how the gas you have stated in (b) i) turned the blue cloth to white by oxidation. *(3 marks)*

d) With the aid of a well labeled diagram, describe how the gas that turned the blue cloth to white by reduction is prepared in the laboratory *(6 marks)*

e) State briefly how each of the gases you have named in (a) (i) can be obtained on the large scale. Write equations for the reactions involved *(3 marks)*

f) Give one use of the gas you have prepared in (d) *(½ mark)*

13. When steam was reacted with iron fillings, one of the reactants behaved as a reducing agent.

a) i) what is a reducing agent? *(1 mark)*

ii) Which of the two reactants is the reducing agent? *(½ mark)*

iii) State the condition(s) for the reaction *(½ mark)*

iv) Write equation for the reaction that took place. *(1 ½ marks)*

v) Name any one other metal that can react with steam under similar conditions. *(½ mark)*

b) Given that 1120cm^3 of gas was produced at stp. Calculate the mass of iron that reacted with steam. *(2 marks)*

c) The gas produced from the reaction between iron fillings and steam is very useful in the manufacture of a certain alkaline gas **D**.

i) Name gas **D** *(½ mark)*

ii) State the condition(s) for the industrial reaction during the manufacture of gas **D**. *(1 ½ marks)*

d) Describe how a dry sample of gas **D** can be prepared in the laboratory.(no diagram is required) *(5½marks)*

14. Under certain conditions 7.5g of potassium chloride crystals was reacted completely with substance **R** to give hydrogen chloride gas at room temperature.

a) i) Name substance **R** *(½ mark)*

ii) State the conditions for the reaction *(1 mark)*

iii) Write equation for the reaction that took place. *(1 ½ marks)*

b) Describe how a dry sample of hydrogen chloride gas can be obtained from the reaction above (No diagram is required) *(5 marks)*

e) State what would be observed when hydrogen chloride gas was;

i) Bubbled into aqueous solution of Silver nitrate. Explain your observation *(3 marks)*

ii) Reacted with magnesium ribbon in the presence of water. Write equation for the reaction that took place. *(2 ½ marks)*

d) Calculate the volume of hydrogen chloride gas evolved in this reaction. *(1 ½ marks)*

END