Candidate Number……..

THE PRESIDENT'S OFFICE – RALG

TAHOSSA ROMBO DISTRICT EXAMINATION SYNDICATE

FORM FOUR MOCK EXAMINATION

032/1 **CHEMISTRY 1**

TIME: 3:00 Hours **August, 2024**

INSTRUCTIONS

1. This paper consists of sections A, B and C with a total of **eleven (11)** questions.
2. Answer **all** questions in sections A and B and **two (2**) questions from section C.
3. Section A carries **sixteen (16)** marks, section B carries **fifty-four (54)** marks and section C carries **thirty (30)** marks.
4. Cellular phones and any unauthorized materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer sheet.
6. The following constants may be used:
   Atomic masses: H=1, C=12, O=16, N=14, Na=23, Ca=40, Cl=35.5, Mg=24, Ag=108
   Avogadro's number= $6.02\ X\ 10^{23}$ GMV at S.T.P =$22.4dm^3$
   1Faraday=96,500 coulombs 1Litre=$1dm^3$=$1000cm^3$

FOR ASSESSOR'S ONLY		
QUESTION NUMBER	**SCORE**	**MARKER'S INITIALS**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
TOTAL		
CHEKER'S INITIALS		

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SECTION A (16 Marks)

Answer **all** questions in this section

1. For each of the items (i)-(x), choose the correct answer from among the given alternatives and write its letter beside the item number in the answer sheet provided.

   i. What type of substances does a Spatula used for scooping?
      A. Liquids and gases
      B. Solids and liquids
      C. Powdery and gases
      D. Solids and powdery
      E. Powdery and liquids

   ii. Anjela mixed cooking oil with liquid M that seemed to change white anhydrous copper (II) sulphate to blue. What method of separation may be the best for this mixture?
      A. Magnetic separation because liquid M can be attracted by a magnet
      B. Fractional distillation because the two substances differ in their boiling points
      C. Layer separation because the two substances differ in their densities
      D. Decantation because cooking oil will settle at the bottom
      E. Picking because liquid M is enough to be picked by hand

   iii. Form three students were provided different statements basing on solubility of salts. Which of the following statement is TRUE about solubility?
      A. All chlorides are soluble in water except sodium chloride
      B. All sulphates are soluble in water except barium sulphate
      C. All nitrates are insoluble in water except silver nitrate
      D. All sodium, lead and ammonium salts are soluble in water
      E. All sodium, potassium and ammonium salts are soluble in water

   iv. Form three students from TWENZETU SECONDARY SCHOOL were required to present a chemical reaction shortly in such a way that is simple; no quantities, no states of matter and no conditions. Which of the following they will choose?
      A. Word equation
      B. Molecular equation
      C. Ionic equation
      D. Reaction story
      E. Combination equation

   v. Zinc granules on treating with acid X to form zinc sulphate salt along with evolution of gas Y which explodes with a pop sound when brought near a burning candle. Identify acid X and gas Y evolved;
      A. X-hydrochloric acid and Y-oxygen gas
      B. X-sulphuric acid and Y-hydrogen gas
      C. X-nitric acid and Y-nitrogen dioxide gas
      D. X-sulphuric acid and Y-oxygen gas
      E. X-sulphuric acid and Y-carbon dioxide gas

   vi. Some fruits like mango, lemon and oranges have a sour taste due to the presence of;
      A. Malic acid
      B. Lactic acid
      C. Oxalic acid
      D. Citric acid
      E. Acetic acid

vii. Which of the following substances represent a group of acid oxides?
   A. Carbon dioxide, carbon monoxide and Sulphur dioxide.
   B. Sulphur trioxide, Nitrogen dioxide and Nitrogen monoxide
   C. Carbon dioxide, Sulphur dioxide and dinitrogen oxide
   D. Sulphur trioxide, carbon dioxide and Nitrogen dioxide
   E. Carbon monoxide, nitrogen oxide and sulphur dioxide

viii. If 0.9g of calcium metal is burnt in air, the mass in grams of the powder formed will be,
   A. 1.14 B. 1.18 C. 1.12 D. 1.08 E. 1.26

ix. Radicals have their respectively oxidation states. The following set of radicals have oxidation state of either -1 or -2, EXCEPT
   A. Hydroxide, carbonate, nitrate, phosphate, chlorate and sulphite
   B. Hydroxide, sulphate, carbonate, nitrate, nitrite, chlorate and sulphate
   C. Hydroxide, carbonate, nitrate, chlorate and hydrogencarbonate
   D. Hydroxide, carbonate, nitrite, chlorate, sulphate and nitrate
   E. Hydroxide, nitrite, hydrogencarbonate and oxalate

x. C_2H_4Cl can be represented in different structures which are called;
   A. Homologous series
   B. Isomers
   C. Structural formula
   D. Identical structures
   E. Condensed structures

2. Match the definition in **LIST A** with the respective term in **LIST B** by writing the letter of the correct response besides the item number in the answer sheet provided.

LIST A	LIST B
i. Growing one type of crop repeatedly on the same piece of land	A. Deforestation
ii. Feeding animals on the same piece of land repeatedly	B. Afforestation
iii. Keeping too many animals on a piece of land than it can support	C. Reforestation
iv. Cutting down of trees without replacement	D. Soil erosion
v. Replanting of trees in an area where there was once a forest which was destroyed or cleared	E. Monocropping
	F. Intercropping
vi. Planting of trees in an area where there was never a forest or plantation	G. Overgrazing
	H. Overstocking

SECTION B (54 Marks)

Answer **all** questions in this section

3. (a) Give four (4) examples of chemistry laboratory apparati made up by ceramic materials.
   (b) Dilute silver nitrate solution was decomposed by the passage of electric current through it. What mass of silver and what volume of oxygen (Measured at s.t.p) would be liberated in electrolysis by 9650 coulombs of Electricity?

4. (a) You have been given two salts which are; copper (II) sulphate and copper (II) nitrate then asked to decompose them by using heat. Use a balanced chemical equation to show the effect of heat on each salt provided.

(b) A certain compound with a vapour density of 14 was analyzed and found to compose 0.6g of carbon and 0.1g of hydrogen. Workout on the molecular formula of the compound and classify the compound to its homologous series.

5. (a) Briefly explain the concept of chemical equation.
   (b) In each of the following chemical phenomenon, write a net ionic equation;
   i. Magnesium sulphate solution reacted with aqueous sodium carbonate to form a white precipitate of magnesium carbonate and a colourless solution of sodium sulphate.
   ii. Aqueous sodium hydroxide reacted with blue solution of copper (II) nitrate to form blue precipitate of copper (II) hydroxide and sodium nitrate solution.
   iii. John took dilute hydrochloric acid with pH of 2.1 then titrated it against aqueous potassium hydroxide with pH of 12; at the end, the solution in the conical flask had a pH of 7.
   iv. Amina observed a colourless gas produced from the test tube when she mixed a colourless solution of hydrogen carbonate of sodium and a dilute hydrochloric acid.

6. The following equation shows the reaction between hydrogen and iodine gases to form hydrogen iodide gas. $\boldsymbol{H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)}, \Delta H < 0 KJ/mol}$
   a) By using Le-Chatelier's principle, explain what would happen to the position of equilibrium if;
      i. Temperature is increased
      ii. Pressure is lowered
      iii. More hydrogen gas is pumped into the system
   b) Draw an energy level diagram representing the provided equation above.

7. In one titration experiment 25cm^3 of hydrated sodium carbonate $\mathbf{Na_2CO_3.XH_2O}$ were titrated against 20cm^3 of 0.25M hydrochloric acid. The solution of sodium carbonate was made by dissolving 7.15g of the compound in 250cm^3 of distilled water.

   Use the above data to answer the following questions
   a) Write down a balanced equation to represent the acid base reaction
   b) (i) Find the morality of the anhydrated sodium carbonate
      (ii)Calculate the value of X in the hydrated sodium carbonate

8. (a) Briefly explain what will happen when;
   i. Concentrated sulphuric acid is exposed to the atmosphere
   ii. A bottle containing silver nitrate is often left open
   iii. The mouth of two test tubes one containing hydrogen chloride gas and another ammonia gas brought together.

   (b) With the aid of chemical equations where necessary, explain the following phenomenon;
   i. The reaction between lead (II) nitrate and dilute hydrochloric acid stops immediately after it started
   ii. Zinc reacts with dilute hydrochloric acid but copper has no effect on dilute hydrochloric acid
   iii. A burning magnesium metal introduced in a gas jar containing carbon dioxide gas keeps on burning.

SECTION C (30 Marks)

Answer only **two (2)** questions from this section

9. (a) How can you identify water is polluted? Give two ways

   (b)We have coal at Mbinga in Ruvuma region. Authorities in the government have allowed the use of coal for domestic and industrial purpose. What warning can you raise concerning the likely effects? Give five points

10. By using a well-labeled diagram and all balanced chemical equations taking place in the Blast furnace, explain how iron can be extracted from its ore.

11. Three moles of sulphur dioxide gas combined with four moles of oxygen gas to form sulphur trioxide gas in the Contact process.
    (a) Which reactant is present in smaller amount?
    (b) Calculate the mass in grams of the reactant left in the container
    (c) How many moles of sulphur trioxide are produced?
    (d) How many litres of sulphur trioxide are produced at STP?