PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

MTWARA MIKINDANI MUNICIPAL COUNCIL

FORM THREE TERMINAL EXAMINATION

032/1 **CHEMISTRY 1**

Time: 3 Hours **May: 2024**

INSTRUCTIONS

a) This paper consists of sections A, B and C with a total of **eleven (11)** questions.
b) Answer **all** questions in sections A and B and **two (2)** questions from section C.
c) Section A carries **sixteen (16)** marks, section B **fifty four (54)** marks and section Ccarries **thirty (30)** marks.
d) Non – programmable calculators may be used
e) Cellular phones and any unauthorized materials are **not** allowed in theexamination room.
f) Write your **Examination Number** on every page of your answer booklet(s).
g) Where necessary, the following constants may be used:
Atomic masses: H = 1, O = 16, C = 12, Cu = 63.5, S = 32, Cl = 35.5,Ca = 40, Na = 23, N = 14, Fe = 56, Ag = 108, Br = 80, Zn =65
Avogadro's constant = 6.02×10^{23}
G.M.V at S.T.P = 22.4 dm^3
1 Faraday = 96,500 coulombs
Standard pressure = 760mmHg
Standard temperature = 273K
Density of water = 1000kg/m^3 1 litre = 1dm^3 = 1000cm^3
Specific heat capacity of water = 4.18 KJ/kgK

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 writeits letter beside the item number in the answer booklet(s) provided.
   i. Which of the following materials can cause fire outbreak?
   A. Oxygen, carbon-dioxide and fuel
   B. Oxygen, heat and fuel
   C. Oxygen, heat and carbon-dioxide
   D. Oxygen, foam and fuel
   E. Oxygen, heat and foam
   ii. What type of fire occurs in vapour air mixture over the surface of flammable liquids?
   A. Class A
   B. Class C
   C. Class B
   D. Class D
   E. Class E
   iii. Which of the following processes is a chemical change?
   A. Butter melts on warm toast
   B. Water evaporates from the surface
   C. Juice in a bottle freezes
   D. Food scrap turns in to compost
   E. A wet clothes dries
   iv. The simplest formula of a compound formed when combining 36g of magnesium and14g ofnitrogen is:
   A. MgN
   B. Mg_3N_2
   C. Mg_2N
   D. MgN_2
   E. Mg_4N_2
   v. What is the pH state of water at room temperature?
   A. Basic
   B. Neutral
   C. Acidic
   D. Sour
   E. Alkalinity
   vi. Which one of the following is not true about solubility of salts?
   A All chlorides are soluble in water except sodium chloride.
   B. All sulphates are soluble in water except barium sulphate.
   C. All nitrates are soluble in water.
   D. All sodium, potassium and ammonium salts are soluble in water.
   E. All carbonates are in soluble in water except those of K, Na and NH_4^+.
   vii. Due to its lightness, hydrogen is used in
   A. Rocket engines
   B. Making water
   C. Making margarines
   D. Weather balloons
   E. Water gas
   viii. Syrups are examples of which among of the following?
   A. Solutions
   B. Emulsion
   C. Homogenous mixture
   D. Suspensions
   E. Filtrates

ix. "Water is referred to as the universal solvent". What does this mean?
A. Water is neither acidic nor basic as compared to other liquids.
B. Water exists in three states of matter than any other liquid
C. .Water dissolves both organic and in organic solutes.
D. Water is used more domestically than any other liquids
E. Water dissolves many substances than any other known liquids.

x. Which of the following is the best method for treating and purifying water?
A. Chlorination and aeration
B. Chlorination and decantation
C. Chlorination and sedimentation
D Chlorination and distillation
E. Chlorination and filtration

2. Match the item in List A with the response in List B by writing the letter of the correct response besides the item number in the answer booklet(s) provided.

LIST A	LIST B
i. Regular periodic changes of properties of elements due to changes in atomic number. ii. Ability of an atom to attract shared electrons towards itself. iii. The energy required to remove an electron from an atom or ion. iv. The distance between the nucleus of an atom and the outermost shell. v. They react with metals to form salts. vi. Inert gases	A. Atomic radius B. Electronegativity C. Periodicity D. Halogens E. Group VI elements F. Attraction force G. Ionization energy H. Group VIII elements I. Atomic energy J. Reactivity

SECTION B (54 Marks)
Answer all questions in this section

3. (a) Victoria went in the Laboratory and wanted to confirm an unknown compound using cobalt chloride paper. The cobalt chloride paper changed from Blue to Pink upon the addition of small amount an unknown compound.
   i. Identify the name and Chemical formula of unknown compound
   ii. Name the other substance that can be used to confirm its positive observation.
   iii. State three chemical properties of an unknown compound.
   (b) An organic compound contains 5.3g carbon, 0.44g of hydrogen and 14.22g of oxygen determinethe empirical formula.
4. (a)When excess of Magnesium metal dissolve in limited volume of hydrochloric acid, $288cm^3$ of hydrogen gas was liberated at S.T.P. Calculate the mass of the metal that produced this volume of hydrogen gas.
   (b) Clara was given two gas jars, one containing gas "P" and another containing gas "Q" gas "P" is used to prepare water gas in the Laboratory and Gas "Q" is used in treating sewage plants
   i. Identify the two gases
   ii. With reason give the method used to collect gas "P" in the Laboratory.
5. (a) Form Three students encounter many events in process in daily lives that are good examples of chemical changes. Provide three examples of these changes.
   (b) List down four properties that clear justify whether muddy water is a mixture or a compound.
6. (a) With the aid of chemical equations, state the type of chemical reactions for the following substances reacting.
   i. Zinc and dilute Sulphuric acid.
   ii. Break down of potassium chlorate.
   iii. Silver nitrate and sodium chloride.

(b) Doreen went Laboratory so as to prepare the solution and she found a label on bottle of concentrated hydrochloric acid has the following specification. Molar weight = 36.5 g/mol, percentage purity range of 35-38% and density of 1.16 g/cm^3. Calculate the molarity of the stock solution and use it to prepare 6000cm^3 of 0.1M HCl solution.

7. (a)Mr. Tumbo tumbo is saddened with the reddish brown substances which occurred in his iron sheets. He wants to find the good way of protecting his iron sheets so as to present formation of reddish brown coat. As a form three students who taking chemistry, briefly explain any four (4) methods which Mr. Tumbotumbo can use to prevent his iron materials from damages.
   (b) Briefly explain any three (3) applications of scientific methods.
8. (a) Ester took egg shells and put them inside the beaker containing hydrochloric acid. Abruptly thereaction started to take place inside the beaker.
   i. Write a chemical equation for the reaction above.
   ii. Write the balanced ionic equation of the reaction taking place.
   (b) If 2g of the substance composed in an egg shell are added to the excess hydrochloric acid:
   i. What volume of carbon dioxide would be given out at s.t.p?
   ii. What mass of carbon dioxide will also be produced?

SECTION C (30 Marks)

Answer two (2) questions in this section

9. A 2.12g of sample of an unknown monovalent metal carbonate (M_2CO_3) was dissolved in water to make 250cm^3 of a solution. The following results were obtained in the experiment when 25cm^3 of themonovalent metal carbonate was reacted with 0.250M hydrochloric acid solution by using a methyl orange indicator.

Burette reading	**PILOT**	**EXP 1**	**EXP 2**	**EXP 3**
Final reading (cm^3)	17.00	16.10	32.00	48.20
Initial reading (cm^3)	0.00	0.00	16.00	32.00
Volume used (cm^3)				

   (a) Copy and complete the value of volume of acid used
   (b) Calculate the average volume of hydrochloric acid used in the reaction
   (c) Write a balanced chemical equation for the reaction.
   (d) Calculate the molarity of monovalent metal carbonate (M_2CO_3)
   (e) Determine the relative molecular mass of metal carbonate
   (f) Determine the relative mass of metal "M"
   (g) Identify the element "M" in the compound M_2CO_3
10. Sister Mambomengi was invited at Muungano day to prepare the delicious food for the guest of honour. She cooked well the food on time but she forgets to add a compound "X" that used to increase flavor and good taste of the food. The guest when tasted the food realizes that the food missing compound "X" which it is so important for the food. As form three students, write an essay onthe uses of compound "X" in our daily life. Provide six points.
11. Most areas in Singida region have a problem of water hardness which affects people's daily lives activities. As an expert telling them not to be discouraged by educating them on both merits and demerits of it. Give three points to each