THE UNITED REPUBLIC OF TANZANIA
PRESIDENT" S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
KILIMANJARO SPRINGS SECONDARY SCHOOL
FORM TTHREE ANNUAL EXAMINATION
032/1   **CHEMISTRY 1**

<u>**Time: 3:00 Hours**</u>   **NOVEMBER 2024**

Instructions

1. This paper consists of sections A, B and C with a total of **eleven (11)** questions.
   Answer **all** questions in sections A and B and **two (2)** questions from section C.
2. Section A carries **(16)** marks, section B **(54)** marks and section C carries **(30)** marks.
   Except for drawings which must be drawn in pencil, all writings must be in **blue** or **black** ink.
3. Where necessary, the following constants may be used:

   Atomic masses: H=1, C=12, N=14, O=16, Na=23, Mg=24, Al=27, S=32, Cl=35.5, K=39, Cu=64.

   Avogadro's number = 6.02×10^{23}

   GMV at s.t.p. = 22.4 dm^3

   1 Faraday = 96.500 coulombs

   Standard pressure = 760 mmHg

   Standard temperature = 273 K

   1 Litre = 1 dm^3 = 1000 cm^3

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 besides the item number in the answer booklet(s) provided.
(i) Group I elements burn in oxygen to form……………
A. hydroxides B. non-metal oxides C. metal oxides D. carbon dioxides E. metallic bond
(ii) Which of the following is not a physical way of separating mixtures?
A. paper chromatography B. filtration C. simple distillation D. melting E. evaporation
(iii) Which of the following solutions will turn pink when phenolphthalein indicator is added to it?
A. orange juice B. sulphuric acid C. caustic soda D. drinking water E. lime water
(iv) The total number of protons and neutrons in the nucleus of an atom is called
A. valency number B. atomic number C. molecular number D. mass number E. proton number
(v) What number of faradays of electricity are required to deposit 4g of calcium from molten calcium chloride?
A. 0.1 B. 0.2 C. 0.3 D. 0.4 E. 0.5

(vi) The formula for potassium bicarbonate is KHCO3. How many moles are equivalent to 25g of this compound?

A. 0.5 B. 0.25 C. 1 D. 50 E. 0.3

(vii) What type of fire is associated with electrical equipment?

A. class E B. class F C. class B D. class C E. class A

(viii) The reaction that can proceed on either direction by changing the condition that governs the reaction is called……….

A. endothermic reaction B. displacement reaction C. reversible reaction D. exothermic reaction E. neutralization reaction

(ix) 280 cm of a gas weighs 0.4g at STP. Calculate the molecular mass of the gass.

A. 22 B. 32 C. 42 D. 2 E. 40

(x) The compounds with both acidic and basic characteristics are best described ad

A. alloys B. alkaline C. amphoteric D. non-acidic E. metalloids

2. Match the items in List A with their responses 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) Electrode	A. Positively charged electrode
(ii) Cathode	B. Relationship between the electric charge and the mass of substance dissolved or deposited at the electrodes
(iii) Anode	C. Negatively charged electrode
(iv) Cation	D. Allows electric current to enter and leave the electrolyte
(v) Anion	E. Negatively charged ion
(vi) First faradays law of electrolysis	F. Positively charged ion
	G. Calculated charge

SECTION B (54 Marks)

Answer **all** questions in this section

3. (a) (i) Define the term flame

   (ii) Tabulate any three difference between luminous and from non-luminous flame.

   (b) Explain why a chemistry laboratory should have;

   (i) A rough floor

   (ii) Ventilation system

   (iii) Water supply system

   (iv) A wide space

   (v) Doors that open to the outside

4. (a) Describe the following chemistry terminologies

   (i) Mixture

   (ii) Compound

   (iii) Solution

   (iv) Suspension

   (b) Distinguish a mixture from a compound. Five points

5. You have been invited in the seminar to instruct form two students at KANDAMBILI SEC. SCHOOL on how to prepare a gas that burns with a **POP SOUND**. As an expert;

    (i) Show these students all necessary chemicals for the process

    (ii) Draw a well labelled diagram for the preparation of the gas

    (iii) Explain four uses of the gas daily life activities

6. (a) Differentiate empirical formula from molecular formula

   (b) The empirical formula of compound Q is CH_2. If the vapour density of compound Q is 21, what will be its molecular formula?

   (c) Draw a large and neat diagram of a periodic table and label the following blocks of elements,

    (i) Alkali metals

    (ii) Alkali earth metals

    (iii) Metalloids

    (iv) Non-metals

    (v) Noble gases

7. (a) Differentiate the oxidation state from valency power

(b) Determine the oxidation state of the underlined elements in the following compounds

    (i) $Cu\underline{S}O_4$

    (ii) $Ca\underline{C}O_3$

    (iii) $HN\underline{O}_3$

    (iv) $Na_2\underline{S}_2O_3$

(c) (i) Define the term chemical equation

   (ii) State any two characteristics of any chemical equation

   (iii) Explain three types of chemical equations

8. (a) (i) What is salt?

    (ii) Explain any four applications of salt in daily life activities

   (b) (i) What is hard water?

    (ii) Outline four compounds that cause hardness of water

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SECTION C (30 Marks)

Answer **two (2)** questions in this section

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9. (a) When compound A and compound B react, the products are salt and water only.

   (i) Name the type of reaction

   (ii) Define the reaction

   (iii) Explain any five applications of the reaction in daily life processes

  (b) State three (3) sources of errors during titration process in the laboratory.

  (c) A 2.12g sample of unknown monovalent metal carbonate (M_2CO_3) was dissolved in water to make $250cm^3$ of solution. $25cm^3$ of M_2CO_3 was reacted with 0.2500M hydrochloric acid solution by using methyl orange indicator. The results were as follows:

Burette reading	PILOT	1	2	3
Final reading cm^3	17.00	16.10		48.10
Initial reading cm^3	0.00	0.00	16.10	32.00
Volume used cm^3			15.90	

(i) Copy the table and complete the missing values.

(ii) Calculate the average volume of hydrochloric acid used in the reaction.

(iii) Write the balanced chemical equation for the reaction.

(iv) Calculate the number of moles of hydrochloric acid used and those of metal carbonate solution used in the reaction.

(v) Determine the relative molecular mass of metal carbonate.

(vi) Identify the unknown element "M" in the compound M_2CO_3

10. (a) (i) What do you understand by the term chemical reaction?

    (ii) Explain five types of chemical reactions

  (b) (i) Define the term electrolysis

    (ii) Describe any four applications of electrolysis

  (c) Calculate the total number of faradays required to deposit 0.12 moles of calcium during electrolysis, when calcium chloride is used as an electrolyte

11. (a) (i) Differentiate endothermic reaction from exothermic reaction

    (ii) Explain any three factors affecting the rate of a chemical reaction

  (b) (i) What do you understand by the term extraction of metals?

    (ii) Mention five stages involved in extraction of metals

  (c) State the role of the following materials during extraction of iron

    (i) Coke

    (ii) Haematite ore

    (iii) Calcium carbonate $CaCO_3$

  (d) State two uses of metal hydrogen carbonates in daily life processes