PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

LINDI MUNICIPAL COUNCIL

FORM FOUR UMEKTA EXAMINATION

032/1 CHEMISTRY 1

TIME: 3 HOURS JULY 2023

INSTRUCTIONS

1) This paper consists of sections A, B and C with a total of eleven (11) questions.

2) Answer all questions in section 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) Celuler phones and any unauthorized materials are **NOT allowed** in the examination room

5) Where neccesary the following constants may be used

Atomic Masses: H = 1, Al = 27, O = 16, Na = 23, C = 12, Ag = 108, S = 32, Ca = 40, Cl = 35.5

1 faraday = 96500 coulomb

GMV at S. T. P = 22.4 dm^3/mol

1 litre = $1dm^3$ = $1000cm^3$

SECTION A (16 Marks)

Answer all questions in this section

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

(i) A student added a few drops of barium chloride solution to sodium sulphate solution, he obtained a white precipitate instantly. Which of the following type of chemical reaction has been carried out by the student?

A. Combination
B. Double displacement
C. Displacement
D. Decomposition
E. Redox

(ii) A chemistry teacher from Kibondo secondary school heated a colourless solid compound, then brown fumes of a gas were evolved. The colourless solid is most likely to be;

A. Ferrous sulphate
B. Silver chloride
C. Lead nitrate
D. Magnesium sulphate
E. Sodium peroxide

(iii) A form three student was asked to test an unknown colourless solution with an indicator. When he added a few drops of phenolphthalein indicator, the solution turned pink. Which one of the following chemicals should be added in excess so as to obtain colourless solution again?

A. Hydrochloric acid solution
B. Sodium hydroxide solution
C. Ammonia solution
D. Sodium chloride solution
E. Lime water solution

(iv) Form four students from Ororimo secondary school performed a project. They took a soil sample from different places and found that the PH value of five soil solution A, B, C, D and E were 10, 2, and 7 respectively, how would you infer from the above soil to have slightly acidic?

A. Soil solution A
B. Soil solution C
C. Soil solution B
D. Soil solution E
E. Soil solution D

(v) Mr. Punje from his stationary burned the used papers until smoke, ash, flame and soot were formed. What type of change took place?

A. Physical change
B. Chemical change
C. Climatic change
D. Physiological change
E. Biological change

(vi)The students of form one performed an experiment but their results didn't support hypothesis. How can you advise these students?

A. The experiments should be changed
B. The result should be left out
C. A new problem should be identified
D. To find more ideas for further testing
E. To formulate new hypothesis

(vii) Fatma and Farhla were debeting about the process that are involved during simple distillation. what process will you recommend to them?

A. Filtration and decantation
B. Condensation and decantation
C. Evaporation and filtration
D. Evaporation and condensation
E. Sublimation and deposition

(viii) Joseph, a form one student from Chikonji secondary school was asked to carry out a chemical reaction by placing solution of Sulphur dioxide into iron (iii) sulphate. Which of the following may be observed?

A. A precipitate yellow solution
B. A pale green solution
C. A brown solution
D. A deep black solution
E. A brick red solution

(ix) A jeweler from Bitale who makes and sells jewels, one day he said that "Three faradays of electricity were required to deposit one mole of Metallic Element M from aqueous solution of its salt". As a chemist what is a chemical formula of its chloride if element M has no variable valency.

A. M3Cl
B. M3Cl2
C. MCl3
D. M2Cl3
E. MCl

(x) District commissioner (DC) of Temeke visited at Mbagala market, he advised people to use renewable source of energy like wind and prohibited to use nonrenewable source of energy like charcoal. As a chemistry student why DC recommended to use such kind of energy source?

A. It does not produce harmful gases that pollute environment
B. There are no chemical reactions involved in harnessing wind power
C. It cannot be seen
D. It has high content of non-combustible materials
E. The scarcity of the energy sources

2. Match the item in list A with a response in list B by writing the letter of correct response beside the item number in the answer sheet provided.

LIST A	LIST B
(i) A statement of how the results are related to the hypothesis. (ii) A series of investigations. (iii) A statement that identifies an event, fact or situation. (iv) A tentative explanation. (v) A step in which the researcher explains the results. (vi) A step in which the pattern or pattern are considered and explained why they occur in that way.	A. Conclusion B. Data analysis C. Data collection D. Experimentation E. Hypothesis F. Observation G. Problem H. identification

SECTION B (54 Marks)

Answer **all** questions in this section

3. (a) Mwalimu Uchebe by mistake forgot to label the two gas jars containing hydrogen gas and oxygen gas. Suggest an experiment to identify the substances correctly.

   b) The laboratory technician planned to conduct an experiment for the preparation of gas Y. The following sets of apparatus were used: Flatbottomed flask, thistle funnel, delivery tube, beehive shelf and gas jars. Also pieces of zinc metal and dilute hydrochloric acid were used.

   i Identify gas X

   ii What apparatus is missing in the set provided

   (c) Write a balanced chemical equation for the reaction between marble chips and hydrochloric acid

4. (a) Two dogs with the same strength held the same size of bones in their mouths looking at each other, After time the dogs started to fight and none of them wanted to lose the bones, finally the dogs stopped to fight and began sharing the bones.

   i. Suppose the bones were electrons and the dogs were atoms. What is the type of bond can be formed?

   ii. Outline four characteristics of bond (i) above

   (b) A form three student from certain school had been asked by his chemistry teacher to write the chemical formula of calcium bromide, sodium iodide, barium sulphate and silicon dioxide. The result was as follows

Calcium bromide	Br_2Ca
Sodium iodide	NaFe
Barium sulphate	$BaSO_4$
Silicon dioxide	SiO_2

   Explain whether the above chemical formulas are correct named and give the correct name from incorrect one.

5. Mwanamkasi, a laboratory technician from Lindi Secondary school, established an equilibrium between dinitrogen tetra oxide and nitrogen dioxide in a glass syringe under heat condition as shown in the equation below

$$N_2O_4 \leftrightarrow 2NO_2$$

i. Is the reaction above endothermic or exothermic? Explain your answer.
ii. State and explain the observation made when a glass syringe containing the equilibrium mixture is immersed in ice cold water
iii. If the piston of the syringe is pushed, state the effect on the position of the equilibrium
iv. Briefly explain three factors which may affect the reaction above.

6. In one titration experiment performed by form three students, $25cm^3$ of hydrated sodium carbonate $Na_2CO_3.XH_2O$ 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.

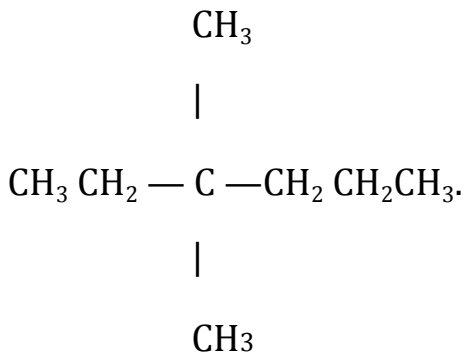
a)Write down a balanced equation to represent the acid base reaction.

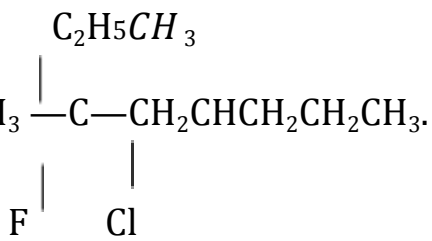
b) i) Find the molarity of the hydrated sodium carbonate

ii) Calculate the value of X in the hydrated sodium carbonate

7. a) Write the IUPAC name for the following structural formula

i. C_5H_{12}

ii.


iii.


b) How long a current of 5A should be passed through a solution of silver chloride in order to deposit 3.24 g of silver metal at the cathode? Given that, the electrochemical

equivalent of silver = 1.118×10^{-3} gc $^{-1}$.

8. (a) Malilo was suffering from Malaria therefore he was not able to attend the chemistry period when a Chemistry teacher was teaching the subtopic of Empirical formula and Molecular formula. As a student who were present during chemistry lesson assist him to differentiate between the two terminologies taught.

   b) You are provided with a compound composed of 22.2% Zinc, 11.6% Sulphur, 22.3% Oxygen and the rest percentage is water of crystallization. Calculate the molecular formula of the compound if its molecular mass is 283.

SECTION C (30 Marks)

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

9. (a) With the aid of diagram, describe the extraction of sodium from its ore and write all reaction equation.

(b) Suggest four (4) ways which can be used to control environmental impact that are caused by extraction of metals through mining.

10. (a) Write an essay on soil fertility by using the following guideline; (i) Meaning of soil fertility

    (ii) Methods used to maintain soil fertility (4 methods)

    (iii) How does soil loose its fertility (4 points)

(b) Mr Aliko is an agriculture Officer at Kibondo. He visited certain village to educate farmers on the appropriate ways of farming and also insisted them to use organic manures to inorganic manures. Do you think why he said so? Give five points.

11. (a) Despite of its corrosiveness, sulphuric acid is very important in industry, is manufactured in large scale through contact process, with aid of balanced chemical equation explain stages in industrial manufacturing of sulphuric acid by contact process

    (b) With 3 reasons explain why sulphuric acid is important.