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THE UNITED REPUBLIC OF TANZANIA
ORGANIZATION OF HEADS OF NON-GOVERNMENT SECONDARY
SCHOOLS-TANZANIA (OHONGSS-T)
MWANZA REGION
FORM FOUR MOCK EXAMINATION-MAY, 2024



032/1

CHEMISTRY 1

Time: 3 Hours

May, 2024

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) question from section C.
3. Section A carries sixteen (16) marks, section B fifty-four (54) marks and section C thirty (30) marks.
4. Non-programmable calculators may be used.
5. Communication devices and any unauthorized materials are not allowed in the examination room.
6. Write your Examination Number on every page of your answer booklet(s)
7. The following constants may be used.
Atomic masses: H = 1, C = 12, O = 16, K =39.

This paper consists of 6 printed pages

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 booklet provided.

(i) When a table salt is dissolved in water, a salt solution is formed. Which method is appropriate in separating this solution?

- A. Paper chromatography
- B. Evaporation
- C. Filtration
- D. Fractional distillation
- E. Sublimation

(ii) Sodium and oxygen atoms react as shown in the following word equation:
Sodium + oxygen \longrightarrow Sodium oxide.

Which one of the reactions given below represents a balanced equation for the above reaction?

- A. $\text{Na} + \text{O}_2 \longrightarrow \text{Na}_2\text{O}$
- B. $2\text{Na} + 2\text{O}_2 \longrightarrow 4\text{Na}_2\text{O}$
- C. $4\text{Na} + \text{O}_2 \longrightarrow 2\text{NaO}$
- D. $2\text{Na} + \text{O}_2 \longrightarrow \text{Na}_2\text{O}$
- E. $2\text{Na} + 2\text{O}_2 \longrightarrow 2\text{NaO}$

(iii) Which of the following pairs contains fuels which originate from fossils?

- A. Coal and charcoal
- B. Firewood and petrol
- C. Petrol and charcoal
- D. Petrol and coal
- E. Coal and firewood.

(iv) The formula for potassium bicarbonate is KHCO_3 . How many moles are equivalent to 25g of this compound?

- A. 0.25
- B. 50
- C. 1
- D. 0.75
- E. 0.5

(v) Which among the following is not a property of a luminous flame?

- A. Burns with a roaring noise
- B. Produces less heat
- C. Is sooty
- D. Is bright yellow in colour
- E. Has unlimited access to oxygen.

- (vi) What does the gas collected after heating a solid sample of an unknown salt indicate about the salt?
- A. Type of cation
 - B. Volatility
 - C. Confirmatory test
 - D. Type of anion
 - E. Solubility of a salt.
- (vii) It is known that; most salts have comparatively high melting points. Which comment is true about the statement?
- A. They have high specific heat contents
 - B. They have low pressure
 - C. They have crystalline structure
 - D. They are deliquescents
 - E. They are inert in nature
- (viii) Consider the reaction: $\text{Zn}_{(s)} + 2\text{HCl}_{(aq)} \longrightarrow \text{ZnCl}_{2(aq)} + \text{H}_{2(g)}$
- Which of the following factors can be used to increase the rate of production of zinc chloride?
- A. Increasing the surface area of zinc
 - B. Decreasing the concentration of hydrochloric acid
 - C. Increasing the concentration of zinc
 - D. Increasing the volume of hydrogen
 - E. Decreasing the pressure of zinc
- (ix) Water pollution is addressed as a serious problem, especially in developing countries including Tanzania. Which of the following statements explains the effect of increase in temperature in water sources?
- A. Heat decreases dissolved oxygen in the water
 - B. Heat lowers the purity of water
 - C. Heat releases unpleasant odours from water
 - D. Heat promotes microbes that prey on fish
 - E. Heat promotes dissolved oxygen in water
- (x) In which stage of the scientific method a chemist compares the results and then gives the explanation of the problem?
- A. Formulation of hypothesis
 - B. Data analysis and interpretation
 - C. Drawing conclusion
 - D. Data collection and recording
 - E. Experimentation and observation

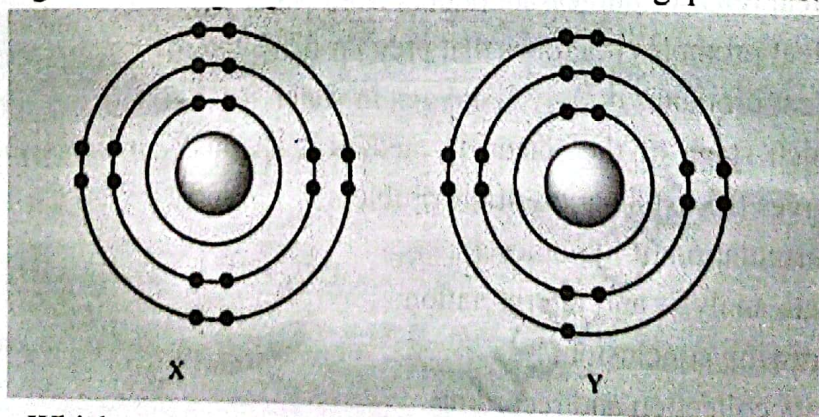
2. Match the uses of the non-metallic gases in **List A** with the corresponding gases in **List B** by writing the letter of the correct response beside the item number in the answer booklet provided.

List A	List B
(i) It is used in the manufacture of fizzy drinks.	A. Ammonia gas
(ii) Its solution controls P^H in some chemical processes.	B. Hydrogen sulphide gas
(iii) It is used in manufacture of nitrogenous fertilizers.	C. Carbon monoxide gas
(iv) It is used as a reducing agent in the blast furnace.	D. Sulphur dioxide gas
(v) It is used as a bleaching agent.	E. Carbon dioxide gas
(vi) It is used in the manufacture of sulphuric acid through the contact process.	F. Hydrogen chloride gas
	G. Chlorine gas
	H. Dinitrogen oxide gas

SECTION B: (54 MARKS)

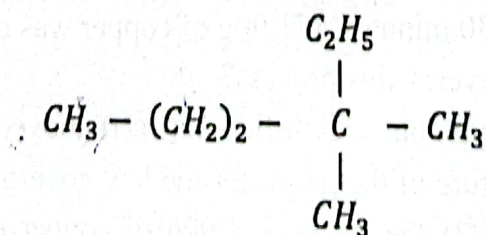
Answer **all** questions in this section.

3. (a) Describe **three (3)** methods that are used in extracting metals from metal ores and give one example of a metal which is extracted by using each of the methods.
- (b) Give one reason to support each of the following statements:
- Chemicals which are not correctly labelled should not be used in the laboratory.
 - A laboratory should be equipped with working fire extinguishers.
 - A laboratory should have large windows.
4. (a) The following diagrams show the structures of atoms of elements X and Y. Giving one reason in each case, answer the following questions:



- Which one is stable?
- Which of the two elements can conduct electricity?
- Which element is chemically more reactive?
- Identify elements X and Y.

- (b) How can you apply the knowledge of separating mixtures in everyday life?
Give **four (4)** points.
5. (a) A form one student reads a statement from a certain book that "if the clothes worn by your friends catch fire, cover them with a fire blanket"
- Classify the fire caused by clothes
 - Why a fire blanket is to be used in that case?
 - Suggest **two (2)** best alternatives in case the fire blanket is not accessible easily.
- (b) A student went to a doctor complaining of an upset stomach. The doctor explained to the student that she was suffering from excess stomach acid, and recommended that she takes an antacid tablet.
- Why did the doctor prescribe the antacid tablet to the student?
 - Write a balanced equation for the reaction that took place in the student's stomach after taking the tablet.
 - Describe the reaction that took place in the student's stomach.
 - Apart from relieving excess stomach acid, state other two uses of antacids.
6. (a) Hard water contains some dissolved substances which cause it to react with soap leading to the formation of scum.
- Which substances cause water hardness?
 - What does the term scum mean?
 - What are the **two (2)** disadvantages of hard water in our daily life?
- (b) According to the IUPAC system, the name of the compound with the chemical formula PCl_3 is phosphorus trichloride. Suggest **three (3)** steps which are used to name binary covalent compounds.
7. (a) Use the given structure of the hydrocarbon to answer the questions that follow:



- Give the name of the longest continuous carbon chain.
 - Write the names of the substituents present in the molecule.
 - Identify the locants of the substituents.
 - Write the systematic name of the compound.
- (b) How the following apparatuses are used during acid-base titration?
- | | |
|----------------------------------|--------------------------|
| (i) Filter funnel | (i) Conical flask |
| (iii) Retort stand and its clamp | (iv) White tile or paper |

8. (a) An experiment to investigate the effects of heat on carbonate salts was conducted in a school laboratory where zinc carbonate, ammonium carbonate and Lead (II) carbonate were heated strongly.
- Explain the differences observed when heating zinc carbonate and Lead (II) carbonate when cold and hot.
 - What is common between the two compounds in (a) (i) above?
 - Write the equation representing the action of heat on ammonium carbonate.
- (b) Give the uses of nitrogen gas that corresponds with the following properties:
- Inert nature
 - Low boiling point.

SECTION C: (30 MARKS)

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

9. During the practical exercise to identify the properties of gases, hydrogen and oxygen were prepared and collected in separate unlabeled jars.
- Give a pair of compounds which are preferred in the preparation of the two gases.
 - How can you identify the gases using the given unlabeled gas jars?
 - Basing on the solubility and density of the gases, determine the method in which the gases are prepared.
 - Give **three (3)** similarities between the gases.
 - What happens to moist blue and red litmus papers placed in the two jars containing gases?
 - Identify **three (3)** uses of oxygen and two uses of hydrogen.
10. How can a farmer ensure that the farm has optimal levels of both macronutrients and micronutrients? Give **six (6)** points.
11. A current of 3.2 A was passed through a solution of copper (II) sulphate using platinum electrodes for 30 minutes. If 1.90g of copper was deposited at the cathode:
- Which law governs this process?
 - State the law you have identified in (a) (i) above.
 - Sketch the nature of the graph for the law governing this process.
 - Which **three (3)** factors does 1.90g of copper deposited at the cathode depend on?
 - Using the half-ionic equations, show the products at the electrodes.
 - Which factors was used to decide and write the products at the electrodes in (b) (i)?
 - Use the details given to compute the electrochemical equivalent of copper.
 - Draw the diagram to represent the whole process which took place.