



**PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
KIBAHA TOWN COUNCIL
FORM THREE PRE-ANNUAL EXAMINATIONS**



032/1

CHEMISTRY 1

Time: 3 Hours

02/10/2024

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, B. and **two (2)** question 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 booklet(s).
6. The following constants may be used

GMV at STP	=	22.4dm ³
1 faraday	=	96,500 Coulombs
1 litre = 1dm ³	=	1000cm ³

SECTION A (16 Marks)

Answer **all** questions in this section.

1. For each of the following 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) Which of these statements is true about Isotopes of an element?
 - A. The number of protons is the same, but the number of neutrons is different.
 - B. The number of protons and neutrons is the same, but the number of electrons is different.
 - C. The number of neutrons is the same, but the number of proton is different.
 - D. The number of neutrons and electrons are the same.
 - E. The number of protons is the same, but electrons are added to the nucleus.
 - (ii) Which of the following transforms a mechanical energy to an electric energy?
 - A. Hydroelectric power plant
 - B. Solar panel
 - C. An electric cooker
 - D. Electric motor
 - E. A motorcycle wheel
 - (iii) Which oxides among the following are gaseous at room temperature?
 - A. Copper oxide and Iron oxide
 - B. Carbon dioxide and Copper oxide
 - C. Carbon dioxide and Sulphur dioxide
 - D. Sulphur dioxide and Copper oxide
 - E. iron oxide and carbon dioxide

- (iv) Steam and methane can react and produce hydrogen according to the following equation $\text{CH}_4(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 3\text{H}_2(\text{g})$. The volume of methane needed to produce 150cm^3 of hydrogen at the same conditions will be
- A. 50 cm^3
 B. 25 cm^3
 C. 100 cm^3
 D. 75 cm^3
 E. 150 cm^3
- (v) Which of the following statement is not true about hydrogen gas
- A. Is a reducing agent
 B. burns in air to form steam
 C. Is a neutral gas, almost insoluble in water
 D. Diffuses more rapidly than carbon dioxide
 E. Is prepared by the action of dilute nitric acid on Zinc metal.
- (vi) Which of the following substances where its dissolution in water causes permanent hardness of water
- A. Sodium carbonate
 B. Magnesium carbonate
 C. Calcium sulphate
 D. Sodium chloride
 E. Calcium carbonate
- (vii) What will happen as water is being added to an acid
- A. The acid becomes more acidic and its PH goes down
 B. The acid becomes neutral and its pH becomes 7
 C. The acid becomes less acidic and its PH goes down
 D. The acid becomes more acidic and its PH goes up
 E. The acid becomes less acidic and its PH goes up
- (viii) A Bunsen burner will produce a yellow flame when
- A. The air hole is fully closed
 B. The gas tap is fully opened
 C. Sufficient gas is supplied to the Bunsen burner
 D. The gas tap is partially opened
 E. The air hole is fully opened.
- (ix) Which of the following sets of laboratory apparatus are used to measure volume of water
- A. Thistle funnel, separating funnel and beaker
 B. Burette, pipette and measuring cylinder
 C. Crucible, kipp's apparatus and volumetric flask
 D. Volumetric flask, distillation flask and test tube
 E. Test tube, beaker and gas jar
- (x) Form three students in a certain school were doing a scientific research about malaria disease in the Coast Region. Which among the following scientific procedures was used to accept or reject the hypothesis made?
- A. Data interpretation
 B. Experimentation
 C. Conclusion
 D. Hypothesis formulation
 E. Problem identification

2. Match the chemical composition of fire extinguisher in List A with the corresponding extinguisher in List B by writing the letter of the correct response beside the item number in the answer booklet/sheet provided

LIST A	LIST B
(i) The extinguisher composed bromochlorodifluoro - methane	A. Dry chemical extinguisher
(ii) The extinguisher composed potassium acetate	B. Fire blanket extinguisher
(iii) The extinguisher composed of monoammonium phosphate with a nitrogen carrier	C. APW extinguisher
(iv) The extinguisher composed of fine sodium bicarbonate powder pressurized by nitrogen	D. Carbon dioxide extinguisher
(v) The extinguisher composed of protein and fluoro-protein	E. Halon extinguisher
(vi) The extinguisher composed of tape water pressurized by air	F. ABC extinguisher
	G. Sand bucket extinguisher
	H. Wet chemical extinguisher.
	I. Foam extinguisher

SECTION B (54 Marks)

Answer **all** questions in this section

3. (a) The following table contain some names of laboratory apparatus

Tripod stand	Combustion tube
Measuring cylinder	Retort stand and clamp
Pipette	Wire gauze
Petri dish	Burette
Conical flask	Bunsen Burner

Using the names given in the table, identify five apparatus that are used in volumetric analysis and suggest their function.

- (b) Name an indicator you may choose for each of the following neutralization reactions
- Acetic acid against ammonia solution
 - Hydrochloric acid against sodium hydroxide
 - Acetic acid against potassium hydroxide
 - Sulphuric acid against aqueous ammonia

4. (a) What does the following terms mean

- Rate of chemical reaction
- Dynamic equilibrium
- Reversible reaction

- (b) For each of the following equilibrium, explain and give reason how the following stress affect the equilibrium point

- $\text{N}_{2(g)} + \text{O}_{2(g)} \rightleftharpoons 2\text{NO}_{(g)}$ Increase in pressure
- $\text{SO}_3 + \text{heat} \rightleftharpoons 2\text{SO}_{2(g)}$ Increase in temperature
- $\text{H}_2 + \text{I}_{2(g)} \rightleftharpoons 2\text{HI}_{(g)} + \text{heat}$. Hydrogen Iodide gas id pumped into the system

5. (a) Form three students visited DAWASA and observed how water is treated and purified. Give the difference between these two activities of water treatment and purification done by DAWASA.

- (b) Sequentially briefly explain six processes through which water obtained from various sources goes through before it can be safe for consumption in urban area.

6. (a) Using three example in each, briefly explain any three industrial application of electrolysis.
- (b) What volume of Oxygen gas measured at STP will be produced during electrolysis by a current of 5A supplied for 30 minutes?
7. (a) By giving reason identify the following types of chemical reaction
- $\text{CaCO}_3 \longrightarrow \text{CaO}_{2(s)} + \text{CO}_{2(g)}$
 - $\text{CaO}_{(s)} + \text{H}_2\text{O}_{(l)} \longrightarrow \text{Ca(OH)}_{2(aq)}$
 - $\text{Zn}_{(s)} + \text{CuSO}_{4(aq)} \longrightarrow \text{ZnSO}_{4(aq)} + \text{Cu}_{(s)}$
 - $\text{Zn(NO}_3)_2(aq) + 2\text{NaOH}_{(aq)} \longrightarrow \text{Zn(OH)}_{2(s)} + 2\text{NaNO}_{3(aq)}$
- (b) Why is the use of the balanced chemical equations so important in the chemical manufacturing industries?
8. (a) Briefly explain observation in the following samples of hard water.
- Sample A: When boils, it forms white precipitate.
 - Sample B: After boiling, the water forms a scum with soap.
 - Sample C: When sodium carbonate was added, it becomes completely soft.
- (b) Mr. John and Ally were arguing on usefulness of hard water in our daily life. As a form three student educate them on the importance of hard water. (Give four (4) points)

SECTION C (30 Marks)

Answer **two (2)** equations from this section.

9. Fuels are essential for domestic and industrial heating. Describe fuels under the following guidelines
- Meaning of fuels
 - Classification of fuels
 - The most two common fuels used in Tanzania and how they are obtained
 - Environmental effects of using such fuels
10. When dilute nitric acid added to a green solid P, a blue solution X is formed and a gas R that forms a white precipitate with lime water. Heating the blue solution of hydrated salt X, it initially loses its water of crystallization, and then decomposes to form a black solid S, brown fumes of gas Y and a gas Z that relights a glowing splint.
- Identify the solid P, X and gases Y, Z and R
 - Write an equation for the reaction between solid P and dilute nitric acid
 - Write an equation for the formation of the solid S
11. Iron is extracted from various ores by reduction in the blast furnace.
- Why the furnace is called a blast furnace?
 - Identify the chief ore from which the iron metal is extracted.
 - Describe the role of the blast furnace in the extraction process.
 - What roles are played by tuyeres in the furnace?
 - Write the equation for the reduction of the ore into Iron
 - Explain the purpose of adding limestone and coke in the blast furnace.