

THE PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
UKEREWE DISTRICT COUNCIL



FORM FOUR MOCK EXAMINATION

032/1

CHEMISTRY 1

TIME 3:00 Hours

Year: 2025

INSTRUCTIONS

1. This paper consists of section **A, B** and **C** with total number of eleven **(11)** questions.
2. Answer **all** questions in section A and B and any **two (2)** questions in the section C
3. Section A carries **sixteen (16)** marks, section B carries **fifty-four(54)** marks and section C carries **thirty (30)** marks
4. All writing must be in **black** or **blue** pen except for diagrams which must be in **pencil**.
5. Non programmable calculators may be used
6. Cellular phones and other unauthorized materials are not allowed in the examination room
7. The following constants may be used;
 - $1^{\circ}\text{F} = 9/5^{\circ}\text{C}$
 - $\text{Ar (Zn)} = 65.38, \text{O} = 16, \text{Ag} = 108, \text{N} = 14$
 - $\text{GMV} = 22.4\text{dm}^3$

SECTION A (16 Marks)
Answer **ALL** questions in this section

1. Choose the correct answer from the given alternatives and write its letter besides the item number in the answer sheet provided.

(i) The reason why white anhydrous copper (II) sulphate turns blue when exposed in atmosphere is that if:

- A. Absorbs water vapor
- B. Reacts with carbon dioxide
- C. Becomes dry
- D. Reacts with oxygen
- E. Release water to the atmosphere

(ii) The extraction of iron in the blast furnace gives slag as one of the products. This slag consists of;

- A. Molten calcium oxide
- B. Molten iron
- C. Molten calcium silicate
- D. Molten iron oxide
- E. Molten calcium carbonate

(iii) When a metallic element burns in air the compound formed is likely to be

- A. Basic oxide
- B. A salt
- C. A common oxide
- D. Acidic oxide
- E. A gas

(iv) The oxidation state of chlorine in sodium chlorate (NaClO_3) is

- A. -1
- B. +2
- C. +5
- D. +3
- E. -3

(v) One among the following is the application of chemistry in agriculture

- A. Yeast
- B. PVC
- C. Tooth paste
- D. Pesticides
- E. Alcohols

(vi) The formula below represents some chemical substances which formula represents substances that do not contribute global warming?

- A. H_2
- B. CO_2
- C. CH_4
- D. CF_3Cl
- E. N_2O

(vii) If 0.5g of hydrogen gas is exploded in air, the mass of water formed has

- A. 0.75g
- B. 18g
- C. 1.8g
- D. 40g
- E. 4.5g

(viii) Substance x liberates chlorine gas from acidified potassium chloride. What is the behavior described by x

- A. Catalysis
- B. An oxidation
- C. Reduction
- D. Basicity
- E. Acidity

- (ix) It is possible to collect oxygen by downward displacement of water because oxygen is
- Denser than water
 - Soluble in water
 - Slightly soluble in water
 - Floats in water
 - Insoluble in water
- (x) In electrolysis the equivalent of an element is the mass of the element that is liberated by;
- 1 coulomb of electricity
 - 96500C of electricity
 - 2 coulombs of electricity
 - 9650 coulombs of electricity
 - Electricity process

2. Match the item in **LIST A** with the corresponding in **LIST B** by writing a letter of the corresponding answer beside the item number in the answer booklet provided.

LIST A	LIST B
i) Biogas	A. Industrial gas which is the mixture of hydrogen and carbonize.
ii) Natural gas	B. Non-renewable gases fuel
iii) Producer gas	C. Industrial gas fuel which is the mixture of nitrogen gas and carbon monoxide.
iv) Water gas	D. Gases fuel derived from decomposition of biological waste
v) They react only when catalyst such as Iron is present	E. Renewable source of energy
	F. Water gas and ammonia
	G. Ammonia and butane

SECTION B (54 Marks)
Answer **ALL** questions from this section

3. a) During a science club discussion at Mwenge secondary school, students were tasked to clarify common chemistry concepts. You are asked to assist by explaining the following by using relevant examples.
- i) A base and alkali
 - ii) An atom and isotope
- b) An organic compound Q consist of 2.2% of carbon, 13% of hydrogen Q is 23. Calculate the molecular formula of the compound
- c) Calculate the oxidation number of nitrogen in potassium nitrate.
4. a) A chemical manufacturing facility uses water in various industrial process. Elaborate on the significance of implementing water treatment and purification system within industrial settings considering both environmental impact and the quality of water used in production.
- b) During the coagulation stage of water treatment, what is the primary purpose of adding chemicals like aluminum sulphite?
5. a) When aqueous solution nitrate is electrolyzed with inert electrode the product are hydrogen (2 vol) at the cathode and oxygen (1 vol) at the anode. Also the cathodic liquid becomes alkaline and the anodic liquid acidic. Explain these results and write the ionic equation in illustration.
- b) The same quantity of electricity was passed through three voltameters liberating 300cm^3 of oxygen in the first, silver in the second and copper in the third. Calculate the mass of silver and copper deposited at the same time.

6. a) Neutralization is applied in various useful situations with the aid of a balanced chemical equation where necessary, describe any four usefulness of neutralization.

b) 2.91g of a monobasic acid HX, were dissolved in water and made up to 250cm³ with water.

This solution was titrated with 0.108M sodium hydroxide solution. 25cm³ of the solution of sodium hydroxide solution required 22.5cm³ of the HX solution for complete neutralization. The equation for the reaction is $\text{HX (aq)} + \text{NaOH (aq)} \longrightarrow \text{NaX} + \text{H}_2\text{O (l)}$. Calculate the concentration in

- g/dm³
- Mol/dm³
- Calculate the molar mass of HX

7. a) Metals are extracted from their ores. Using two important metals in the table below identify the substances apart from their chief ores which are added during the extraction process and finally suggest their functions

Name of the metal to be extracted	Substance (s) added during extraction	Function (s) of the substance
Sodium		
Iron		

b) A student in chemistry laboratory at Mzena secondary school mixed aqueous solutions of silver nitrate and calcium chloride.

- Using appropriate state symbols, help the student write a balanced molecular equation for the reaction observed.
- In your opinion, explain three advantages of using the balanced chemical equation over a word equation in interpreting the reaction

8. a) Explain each of the following observations
- Why methyl propane has a lower boiling point than butane although both have the same molecular mass
 - Why ignition sources such as smoking are not allowed at petrol stations
- b) The equation below represents the industrial preparation of ethane from a higher alkane
- $$\text{C}_{13}\text{H}_{28}(\text{l}) \xrightarrow[70 \text{ atm}]{750^\circ \text{C}} \text{CH}_4(\text{g}) + \text{C}_3\text{H}_8(\text{g}) + \text{C}_3\text{H}_{18}(\text{l})$$
- What name is given to this reaction?
 - Suggest the uses of the products formed in the reaction and the reactant

SECTION C (30 Marks)

Answer **ONLY TWO** questions in this section.

9. Chlorine can be prepared by heating a mixture of manganese (IV) oxide, sodium chloride and concentrated sulphuric acid.
- Write molecular equation for this reaction
 - Explain the following statements
 - Chlorine gas is collected by upward displacement of air
 - The role of manganese (IV) oxide in preparation of chlorine
 - The reaction is done in a fume chamber
 - In five detailed points, explain how chlorine gas is utilized across different sectors, highlight its significance in each.
10. Crops yield depend on a number of factors, one among these factors is the nutrients contents of the fertilizers used. In five points, explain the best of fertilizer application which ensure availability of plants nutrients.
11. You are environmental officer in Mwanza, a region located near Lake Victoria. You have been invited to educate community members on the consequences of dumping waste into the lake.