

**THE UNITED REPUBLIC OF TANZANIA  
PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL  
GOVERNMENT**

**HOME PACKAGE FORM IV EXAMINATIONS APRIL 2020  
CHEMISTRY 1**

032/1

TIME:3 Hours

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**INSTRUCTIONS**

1. This paper consist of sections A, B and C
2. Answer ALL questions
3. Calculators and cellular phones are not allowed in the examination room.
4. The following constants may be used:-

Atomic Masses: H=1,Cu=64,S=32,O=16,C=12,Cl=35.5,  
Na=23,Ca=40,K=39.

1F= 96500 Coulombs and 1Litre=1dm<sup>3</sup>=1000cm<sup>3</sup>

**FOR EXAMINER'S USE ONLY**

QUESTION	SCORE	INITIALS OF EXAMINER
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
<b>TOTAL</b>		
<b>CHECKER'S INITIAL</b>		
<b>COMPUTER ENTERER</b>		

## SECTION A (20 Marks)

**Answer ALL questions in this section**

1. For each of the items (i - x) choose the correct answer from the given alternatives and write its letter, under the item number in the table provided.
  - i. The valency of an element with an atomic number of 8 is:
    - A. 0
    - B. 1
    - C. 2
    - D. 3
    - E. 4
  - ii. A Chemist should acquire the following skills except:
    - A. Problem identification
    - B. Experimentation
    - C. Observation
    - D. Data analysis
    - E. Surgery
  - iii. The chemical properties of an element usually depends on:
    - A. The arrangement of protons in an atom.
    - B. The arrangement of neutrons in an atom
    - C. The arrangement of electrons in an atom.
    - D. The arrangement of nucleons in an atom.
    - E. The arrangement of protons and neutrons in the nucleus.
  - iv. The process of chlorination in water treatment aims at:
    - A. Killing microorganisms in water.
    - B. Syrup making
    - C. Removing bad odours
    - D. Making water to have a pleasant taste and smell
    - E. Reducing the ions in water
  - v. ....is the only alkaline gas.
    - A. Hydrogen chloride
    - B. Nitrogen dioxide
    - C. Chlorine
    - D. Sulphur-dioxide
    - E. Ammonia

- vi. Technicians prefer to use blue flame in welding because:
- A. It is bright and non-sooty
  - B. It is light non sooty
  - C. It is very hot and large
  - D. It very hot and non-sooty
  - E. It is not expensive.
- vii. A gas burned in air forms carbon dioxide and water only. From this experiment, the gas is likely to be:
- A. Hydrogen
  - B. Carbon-dioxide
  - C. Ethane
  - D. Nitrogen
  - E. Ozone
- viii. When chlorine gas is passed through a green solution of iron II chloride, the solution changes to yellowish brown because
- A.  $\text{Fe}^{2+}$  were oxidized to  $\text{Fe}^{3+}$
  - B.  $\text{Fe}^{3+}$  were reduced to  $\text{Fe}^{2+}$
  - C.  $\text{Fe}^{2+}$  were reduced to  $\text{Fe}^{3+}$
  - D.  $\text{Fe}^{3+}$  were oxidized to  $\text{Fe}^{2+}$
  - E.  $\text{Fe}^{3+}$  were neither reduced nor oxidized
- ix. A steady current of 4 amperes was passed through an aqueous solution of copper II Sulphate for 1800 seconds. The mass of copper deposited was:
- A. 63.5g
  - B. 31.75g
  - C. 1.18g
  - D. 2.38g
  - E. 11.8g
- x. Which group of organic compounds is prepared by the dehydration of corresponding alcohol
- A. Alkynes
  - B. Carboxylic acids
  - C. Alkanes
  - D. Esters
  - E. Alkenes

2. Match the items in list **A** with the responses in list **B** by writing the letter of the correct response beside the item number in the table provided.

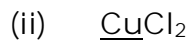
LIST A	LIST B
i. Molecular formular	A. Determines the chemical properties of a certain class of organic compounds.
ii. Hydrogenation of alkenes	B. Group of atoms present in a compound and are charged.
iii. Used in hastening the ripening of fruits	C. Normal butane and 2-methylpropane.
iv. Esterification.	D. Ethene
v. Butanoic acid	E. Ethyne
vi. Prepared by the reaction between water and calcium carbide	F. Converting them to alkanes.
vii. Isomers of $C_4H_{10}$	G. Making of soap from oil or fat.
viii. Functional group	H. Ester formation
ix. Saponification	I. Reaction between acid and base to form ester and water only
x. Carbon tetrachloride.	J. $C_3H_7COOH$
	K. $K:C_4H_9COOH$
	L. Halo alkane
	M. Methane
	N. Shows the actual number and type of atom present in a molecule of a compound.
	O. Show the composition of each element by mass

### SECTION B (54 Marks)

**Answer ALL questions from this section**

3. (a) Give the meaning of the following terms:-
- A non-metal
  - Reduction
- (b) (i) Explain why chlorine gas is collected by downward delivery method.
- (ii) Describe how sulphur dioxide is changed into sulphur trioxide in contact process. Give the reaction condition and equation
4. (a) Write the chemical formula of the following compounds
- Ammonium chloride
  - Potassium sulphate

- (b) (i) Explain why sodium metal is NOT extracted by the reduction of its ore using carbon.
- (ii) What are the factors affecting the selective discharge of ions at the electrodes during electrolysis?
5. (a) State two (02) uses of each of the following:
- Ethanoic acid.
  - Carbon-dioxide gas
- (b) Indicate whether a chemical or physical change is involved in the following process.
- Souring of milk
  - Heating of ice
6. (a) Copper nitrate undergoes thermal decomposition as shown in the equation below
- $$\text{Cu}(\text{NO}_3)_2(\text{aq}) \longrightarrow \text{Cu}(\text{s}) + \text{NO}_2(\text{g}) + \text{O}_2(\text{g})$$
- Balance the equation
  - What type of chemical reaction is represented by the equation?
- (b) An element **M** has an atomic number of **19** and mass number of **39**.
- Determine protons, neutrons and electrons number
  - Represent M in nuclide notation hence identify element M and write its electronic configuration.
7. (a) Name the following compounds:
- An amphoteric oxide which is yellow when hot and white when cold.
  - A white precipitate which is formed when aqueous silver nitrate is added to aqueous sodium chloride.
- (b) Differentiate (with one example) between
- A strong acid and a weak acid
  - An acid salt and a normal salt
8. (a) Calculate the percentage by composition of the underlined elements in the following compounds:



(b) Name the gas produced when:

(i) Potassium chlorate decomposes

(ii) Zinc granules react with dilute hydrochloric acid.

9. (a) Explain why:

(i) Hydrogen chloride gas cannot be collected over water

(ii) Hydrogen gas is used in filling weather balloons.

(b) What is the environmental effect of using charcoal as a source of fuel? (2 effects)

10. (a) Define the following terms

(i) Molar solution

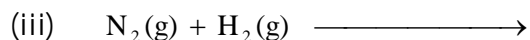
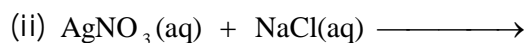
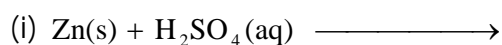
(ii) A standard solution

(b)  $25\text{cm}^3$  of  $0.1\text{M Na}_2\text{CO}_3$  neutralizes a solution containing  $2.5\text{g}$  sulphuric acid in  $250\text{ cm}^3$  of solution. Calculate

(i) The molarity of sulphuric acid solution

(ii) The volume of acid used.

11. (a) Complete the following equations



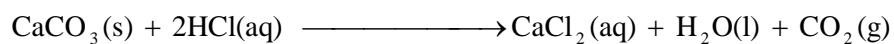
(b) (i) State Le Chatelier's principle

(ii) Write down three factors affecting dynamic equilibrium reactions.

### SECTION C (26 Marks)

**Answer all questions in this section.**

12. (a) What is terrestrial pollution?  
(b) Explain five (5) causes of terrestrial pollution  
(c) Mention three (3) hazards of terrestrial pollution  
(d) List 4 methods of preventing terrestrial pollution.
13. (a) The reaction between calcium carbonate and dilute hydrochloric acid can be represented by the following equation



- (i) Name the factors which would affect the rate of the reaction  
(ii) Explain how each of the factors would affect the rate of chemical reaction.
- (b) Calculate the mass of calcium chloride produced when 20g of calcium carbonate reacts with excess of hydrochloric acid.