

UNITED REPUBLIC OF TANZANIA

PRESIDENT'S OFFICE REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

# THE CITY COUNCIL OF DODOMA



## FORM IV PRE-MOCK EXAMINATION 2021

032/1

CHEMISTRY 1

TIME: 3:00 HOURS

MARCH, 2021

### Instructions

1. This paper consists of sections A, B, and C with a total of **fourteen (14)** questions
2. Answer **all** questions in sections A and B and **one (1)** question from section C
3. Sections A and C carry **fifteen (15)** marks each and section B carries **seventy (70)** 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.

Atomic masses: **H = 1, C = 12, N = 14, O = 16, Na = 23, S = 32, Ca = 40, Cl = 35.5, Cu = 64, Zn = 65**

Avogadro's number =  **$6.02 \times 10^{23}$**

GMV at s.t.p =  **$22.4 \text{ dm}^3$**

1 Faraday = **96,500** coulombs

Standard pressure = **760** mmHg

Standard temperature = **273** K

1 Litre =  **$1 \text{ dm}^3 = 1000 \text{ cm}^3$**

### SECTION A (15 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) The solution with pH of 5 is
    - A. A strong base
    - B. A neutral
    - C. A weak acid
    - D. A strong acid
    - E. A weak base
  - (ii) Alcohols react with carboxylic acids to form a group of organic compounds called
    - A. Alkynes
    - B. Haloalkanes
    - C. Esters
    - D. Alkenes
    - E. Alkanes

- (iii) Which of the following is not a component of the first aid kit?
- A. Goggles
  - B. A pair of scissors
  - C. Dropper
  - D. Gloves
  - E. Razor blade
- (iv) A rapid chemical reaction that releases energy in form of light and heat is called
- A. Combustion
  - B. Decomposition
  - C. Displacement
  - D. Neutralization
  - E. Precipitation
- (v) The molarity of a solution containing 26.5g of anhydrous sodium carbonate in 5 dm<sup>3</sup> of the solution is.....M
- A. 0.05
  - B. 0.25
  - C. 1.25
  - D. 5.3
  - E. 0.025
- (vi) Why oxygen differs from other gases?
- A. It neither burns nor support combustion
  - B. It supports combustion but does not burn
  - C. It burns but does not support combustion
  - D. It burns and supports combustion
  - E. It explodes and support combustion
- (vii) The oxidation state of chlorine in sodium chlorate ( NaClO<sub>3</sub>) is:
- A. -1
  - B. +2
  - C. +5
  - D. +3
  - E. -3
- (viii) Elements lose or gain electrons to form:
- A. Isotopes
  - B. Radicals
  - C. Molecules
  - D. Ions
  - E. Allotropes
- (ix) Insoluble salts like barium sulphate, generally can be obtained in the laboratory by:
- A. Evaporation of its concentrated solution
  - B. Crystallization
  - C. Precipitation
  - D. Decomposition
  - E. Displacement reaction
- (x) In a blast furnace carbon monoxide is prepared by passing carbon dioxide over a red hot coke. Carbon dioxide is:
- A. An accelerator
  - B. An oxidizing agent
  - C. A reducing agent

- D. A catalyst
- E. Oxidized

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 answer booklet provided.

List A	List B
(i) Isomerism	A. Soil pollution, nutrient pollution
(ii) Bonding in molecules of nitrogen	B. Compounds with the same molecular formula but different structural formulae
(iii) Ammonia in water	C. Presentation of reactants and product
(iv) Chemical equation	D. Pungent choking smell
(v) Eutrophication	E. Triple bonds
	F. Bleaching
	G. Ionization

### SECTION B (70 Marks)

Answer **all** questions in this section

3. (a) Giving an example for each, give four uses of matter in daily life  
 (b) Why are chemical symbols useful in Chemistry? Give three reasons. **(7 marks)**
4. (a) Distinguish between temporary hardness and permanent hardness of water  
 (b) By use of equations, show how each of the type of hardness in (a) above can be eliminated. **(7 marks)**
5. (a) Define the following terms  
 (i) Acid  
 (ii) Base  
 (iii) Salt  
 (b) State any four importance of neutralization in daily life. **(7 marks)**
6. (a) Briefly explain three importance of chemical equation  
 (b) Give a balanced chemical equation between the reaction of sodium carbonate and hydrochloric acid. **(7 marks)**
7. (a) Calculate the concentration in  $\text{g/dm}^3$  of vinegar ( $\text{CH}_3\text{COOH}$ ) if  $25.0 \text{ cm}^3$  of  $0.1 \text{ M}$  sodium hydroxide reacts with  $12.5 \text{ cm}^3$  of vinegar.  
 (b) By giving a reason, suggest the suitable indicator for the reaction in (a) above. **(7 marks)**
8. (a) Explain the meaning of molar volume of a gas  
 (b) If  $0.5\text{g}$  of hydrogen gas is exploded in air, what is the mass of water formed? **(7 marks)**
9. (a) Ammonia gas is manufactured by nitrogen gas with hydrogen gas in the presence of a catalyst. Write a balanced chemical equation for the reaction and explain the role played by the catalyst in this reaction.

(b) When hydrogen sulphide gas is passed through sulphur dioxide a yellow deposit of sulphur is produced immediately. Write the chemical equation for this observation. **(7 marks)**

10. (a) Give the meaning of the following terms

(i) Cracking

(ii) Isomerism

(b) Write the structures of the following

(i) 2,2-dichloro-3-methylpentane

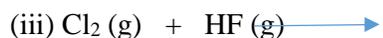
(ii) 4-ethyl-2,6-dimethylheptane. **(7 marks)**

11. (a) Element X has 20 electrons and mass number of 40. Work out the number of each type of nucleons present.

(b) Calculate the empirical formula and molecular of the compound having a relative molecular mass of 76 containing 15.8% of carbon and 84.2% of sulphur. **(7 marks)**

12. (a) Arrange the following elements in the order of increase in electronegativity: F, Br, I, N, C and Cl

(b) Predict the products in the following reactions and give reason if any:



**(7 marks)**

### SECTION C (15 Marks)

Answer **one (1)** question in this section

13. Explain how soil fertility can be lost by erosion, water logging, leaching (flooding) and burning. **(15 marks)**

14. What are protective and remedial measures of water pollution? **(15 marks)**