

Candidate's Index Number



THE UNITED REPUBLIC OF TANZANIA
THE PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL
GOVERNMENT
TANGANYIKA DISTRICT COUNCIL
FORM FOUR MOCK EXAMINATIONS



CHEMISTRY 1

032/1

Time: 3:00 Hours

April, 2023

INSTRUCTIONS

1. This paper consists of three sections A, B and C with a total of eleven (11) questions.
2. Answer all questions from Section A and B and two (2) questions from section C.
3. All writing should be in blue/black ink except for diagrams which must be in pencil.
4. Cellular phones and other unauthorized materials are not allowed in the examination room.
5. Write your index number on every page of your answer booklet(s) provided
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, Ag= 108

Avogadro's number = 6.02×10^{23}

GMV at s.t.p = 22.4 dm^3

1 Faraday = 96500 coulombs

Standard pressure = 760 mm Hg

Standard temperature = 273K

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

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QUESTION NUMBER	SCORE	EXAMINER'S INITIALS
01		
02		
03		
04		
05		
06		
07		
08		
09		
10		
11		
TOTAL		
CHECKER'S INITIALS		

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) A good fuel is the one which has
A. high speed of continuous energy supply
B. high energy value supply
C. low carbon dioxide supply
D. high carbon dioxide production
E. high content of non-combustible material
- (ii) Which of the following is an agricultural chemical product made by the application of chemistry?
A. Drugs B. Pesticides C. Clothes D. Yeasts E. Cement
- (iii) Which one is the molecular formula for prop – 1-yne?
A. C_3H_6 B. $CH_3 CCH$ C. C_3H_4 D. $HCH_2 CCH$ E. $CH_3 CH CH_2$
- (iv) Which name is given to the uniform mixture of metals?
A. Compounds B. Alloys C. Ores D. Salts E. Mixtures
- (v) The reason why white anhydrous copper (II) sulphate turns blue when exposed in atmosphere is that it
A. Absorbs water vapour
B. Reacts with oxygen
C. Reacts with carbon dioxide
D. Becomes dry
E. Release water to the atmosphere
- (vi) A simple proof that some chemical reactions take place in our bodies is that
A. We eat a balanced diet
B. Doctors tell us so at the hospital
C. We occasionally fall sick
D. The food we eat or the drinks we take are quite different from the waste products from our bodies
E. There is no proof
- (vii) An aqueous solution turns red litmus solution blue. Excess addition of which of the following solution would reverse the change?
A. Baking powder B. Lime C. Aqueous ammonia D. Vinegar E. Quick lime
- (viii) What happens when dilute sulphuric acid is poured on copper plate?
A. Zinc sulphate formed
B. Zinc chloride formed
C. Copper sulphate formed

- D. Copper chloride formed
E. None of the above
- (ix) An organic compound of structural formula R – COOH belongs to the homologous series of.
A. Alkenes B. Esters C. Alcohols D. Alkanes E. Acids
- (x) Chlorine ion, Cl⁻ differs from chlorine atom because it has
A. More protons
B. Less protons
C. More electrons
D. Less electrons
E. More neutrons
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(s) provided.

List A	List B
(i) A gas with pungent choking smell and sharp taste of acid.	A. Carbon dioxide
(ii) An alkaline gas.	B. Nitrogen
(iii) A greenish-yellow gas.	C. Diamond
(iv) The hardest allotrope of carbon.	D. Hydrogen chloride
(v) A gas which turns lime water milky.	E. Sulphur
(vi) Graphite, Diamond and Amorphous.	F. Graphite
	G. Chlorine
	H. Ammonia gas
	I. Allotropes of carbon
	J. Allotropes of sulphur

SECTION B (54 Marks)

Answer all questions in this section

3. (a) (i) State two conditions required for iron to rust.
(ii) List three methods which are used to prevent rusting of iron.
(b) State two properties that make aluminium useful in overhead cables.
4. (a) The table below shows two brands of bottled water for drinking and the concentration of different mineral ions in each brand. Study the table and answer the questions below it:
- | Composition in mg/litre | Mineral | Na ⁺ | Ca ⁺ | Mg ²⁺ | Cl ⁻ | NO ₃ ⁻ | SO ₄ ²⁻ | Fe ²⁺ | F ⁻ |
|-------------------------|---------|-----------------|-----------------|------------------|-----------------|------------------------------|-------------------------------|------------------|----------------|
| | Uhai | 40.0 | 3.05 | 4.15 | 14.18 | 0.48 | 10.0 | 0 | 1.76 |
| | Dasani | 22.32 | 2.69 | 0.11 | 6.50 | 1.0 | 8.0 | 0 | 0.45 |
- (i) Which brand of water is more hard? Explain.
(ii) State the benefit of having calcium ions in water.
(iii) Tap water is usually treated before being used. State what is added to perform that function.
- (b) Hydrogen and phosphorous are non-metallic elements.
(i) Which one between the two atoms is more electropositive?

(ii) Show your work clearly, write the chemical formula and the name of the compound formed when the two atoms combine.

5. (a) Give the meaning of the following terms:
 (i) Mole
 (ii) Molar mass
 (b) 112 dm³ of oxygen gas was collected at S.T.P when a sample of lead nitrate was completely decomposed by heat. Calculate the volume of nitrogen dioxide produced.
6. (a) (i) What is the aim of having fume chamber in the chemistry laboratory?
 (ii) Why laboratory doors are open outward?
 (b) State the use of the following components of First Aid Kit:

Component	Use
(i) Cotton wool	
(ii) Petroleum jelly	
(iii) Pain killers	
(iv) Bandages	
(v) Razor blade	

7. (a) State Le Chatellier's Principle
 (b) In the industrial preparation of sulphur trioxide, equilibrium is established between sulphur dioxide and oxygen gas as follows:

$$2\text{SO}_{2(g)} + \text{O}_{2(g)} \rightleftharpoons 2\text{SO}_{3(g)} \quad \Delta H = -94.9 \text{ KJ/mol}$$
 (i) How would you adjust temperature and pressure to maximize the proportion of the product at equilibrium?
 (ii) Why is it unfavourable to work with very high pressure and very low temperature in the contact process?
 (iii) What catalyst is used to speed up the rate of formation of sulphur trioxide before attaining the equilibrium?
8. (a) State Faraday's Laws of Electrolysis.
 (b) Dilute silver nitrate solution was decomposed by passage of electric current through it. What mass of silver and what volume of oxygen (measured at s.t.p) would be liberated in electrolysis by 9650 coulombs of electricity?

SECTION C (30 Marks)

Answer any **two** (02) questions in this section

9. By giving six (06) points, explain how to maintain soil fertility of a particular area.
10. (a) Give the meaning of the following terms:
 (i) Functional group
 (ii) Homologous series
 (iii) Isomerism
 (b) Write down the molecular structure and the IUPAC names of the isomer whose molecular formula is C₄H₁₀.

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(c) By naming the reagents, stating the conditions whenever possible using a balance equation, describe how ethene could be converted into:

- (i) Ethane
- (ii) Chloroethane
- (iii) 1,2-dibromoethane
- (iv) Ethanol

11. Explain six (06) methods of preventing water pollution.

