

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



**FORM FOUR JOINT MOCK EXAMINATION
(TANGA, IRINGA, SINGIDA, MOROGORO, DODOMA,
TABORA, LINDI AND MTWARA)**

032/1

CHEMISTRY 1

(For Both School and Private Candidates)

Time: 3 Hours

Year: 2025

INSTRUCTIONS

1. This paper consists of sections A, B, and C with a total of **eleven (11)** questions.
2. Answer **all** questions in sections A and B and **two (2)** questions from section C.
3. Sections A carries **sixteen (16)** marks, section B **fifty-four (54)** marks, and section C **thirty (30)** marks.
4. Non-programmable calculators may be used.
5. Communication devices and any unauthorised materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).
7. The following constants may be used:
 - Atomic masses:
H = 1, C = 12, O = 16, N = 14, S = 32, Mg = 24, Ca = 40, Na = 23, K = 39
 - Avogadro's number = 6.02×10^{23}
 - GMV at S.T.P = 22.4 dm^3
 - 1 Faraday = 96500 coulombs
 - 1 Litre = $1 \text{ dm}^3 = 1000 \text{ cm}^3$

This paper consists of 6 printed pages

SECTION A: (16 MARKS)

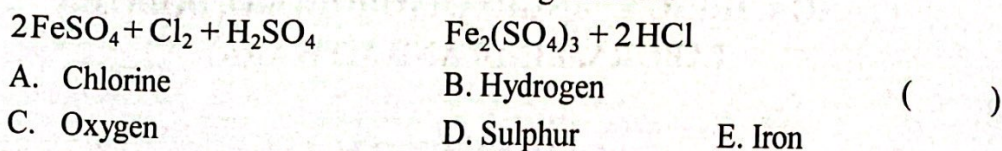
Answer ALL questions in this section.

1. For each of the items (i) – (x), choose the correct answer from the given alternatives and write its letter beside the item number in the answer sheet provide.

(i) Which of the following is **not** a component of the first aid kit?

- | | | |
|----------------|-----------------------|---------|
| A. Goggles | B. A pair of scissors | () |
| C. Knife | D. Gloves | |
| E. Razor blade | | |

(ii) Which element is oxidized in the following reaction?



(iii) A form four student boiled a mixture of sunflower oil and concentrated solution of sodium hydroxide for the mixture. What was the aim of this experiment?

- | | | |
|-----------------------------------|---------------------------------|---------|
| A. To prepare an alcohol | B. To prepare a solid soap | |
| C. To prepare sodium metal | D. To prepare a carboxylic acid | () |
| E. To prepare an organic compound | | |

(iv) To investigate the solubility of sodium chloride, a technician dissolved different amount of sodium chloride in a specific volume of water while altering the temperature of water. What does temperature represent in this experiment?

- | | | |
|-------------------------|--------------------------|---------|
| A. Dependent variable | B. Intermediate variable | () |
| C. Independent variable | D. Controlled variable | |
| E. Fixed variable | | |

(v) What is the amount of charge when a current of 2 amperes flows through a certain point in an electrolyte for 0.5 second?

- | | | |
|-----------------|-----------------|---------|
| A. 2 coulombs | B. 1 coulomb | () |
| C. 2.5 coulombs | D. 1.5 coulombs | |
| E. 10 coulombs | | |

(vi) Addition of halogens to carbon – carbon double bond is referred to as;

- | | | |
|--------------------------|----------------------------|---------|
| A. Alkyl halide | B. Hydrogenation of alkene | () |
| C. Elimination of alkene | D. Substitution of alkene | |
| E. Bromo alkanol | | |

(vii) The reaction between iodine and hydrogen is represented by the following equation $\text{I}_2(\text{g}) + \text{H}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$ $\Delta H = -x \text{ kJ/mol}$

- | | | |
|---------------------|----------------------------|---------|
| A. An exothermic | B. A displacement | () |
| C. A neutralization | D. A thermal decomposition | |
| E. An endothermic | | |

(viii) If K and Y are isotopes of the same element, then K and Y have the same.

- | | | |
|------------------------|-----------------------|---------|
| A. Mass number | B. Atomic weight | |
| C. Atomic number | D. Number of neutrons | () |
| E. Number of electrons | | |

6. (i) Mwanjaa was unable to identify the following chemical equation given by her teacher. As a form four chemistry expert help her to identify the type of reaction in each of the following chemical equations and explain your answer.
- $\text{CaCO}_3(\text{s}) \longrightarrow \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$
 - $\text{CaO}(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow \text{Ca}(\text{OH})_2(\text{aq})$
 - $\text{Zn}(\text{s}) + \text{CuSO}_4(\text{aq}) \longrightarrow \text{ZnSO}_4(\text{aq}) + \text{Cu}(\text{s})$
 - $\text{Zn}(\text{NO}_3)_2(\text{aq}) + 2\text{NaOH}(\text{aq}) \longrightarrow \text{Zn}(\text{OH})_2(\text{s}) + 2\text{NaNO}_3(\text{aq})$
- (ii) Briefly explain the following observations about a sample of hard water.
- When boiled, it forms white precipitate.
 - After boiling, the water forms a scum with soap.
 - Sodium carbonate makes the water completely soft.
7. You have been given the following hydrocarbons; $\text{P} = \text{HCCCH}_2\text{CH}_3$, $\text{Q} = \text{CH}_3(\text{CH}_2)_2\text{CH}_3$ and $\text{Z} = \text{H}_2\text{CCHCH}_2\text{CH}_3$.
- Which family does each of the compounds belong?
 - Identify the compound that will decolourise bromine water in the:
 - Dark, and in the presence of UV light
 - Presence of UV light only
 - Dark only
8. Ammonia gas is manufactured in industry by the Haber process. The reaction for this process is represented by the equation below.
- $$\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g}) \quad \Delta H = -92\text{KJ/mol}$$
- Explain in which side the reaction will shift when:
 - More nitrogen is added to the equilibrium reaction
 - Hydrogen gas is removed from the reaction
 - Temperature of the reaction is lowered
 - The pressure of the reaction is increased
 - State three factors that can increase the production of ammonia according to the given reaction.
 - With reference to the energy change, describe the types of the reaction that involves in production of ammonia.

SECTION C: (30 MARKS)

Answer **TWO (2)** questions in this section.

9. Since chemistry is a science that involves experiment and practical works, chemists have to acquire scientific skills in order to be successful in obtaining facts and verifying them. Describe any five skills required by the chemists.

10. By giving six points, explain how to maintain soil fertility of a particular area.
11. Nowadays global warming is a crucial issue due to the addition of greenhouse gases in the atmosphere.
- (i) Identify four greenhouse gases.
 - (ii) How do the greenhouse gases contribute to global warming? (Three points)
 - (iii) What are the measures to be taken to overcome this problem globally? (Three points)