

**THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION**

032/1

CHEMISTRY 1

(For Both School and Private Candidates)

Time: 3 Hours

Year: 2024

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, N = 14, O = 16, Cl = 35.5, Ca = 40



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 in the answer booklet provided.
- (i) Which ideas were introduced by Dalton?
- (i) Atoms cannot be created or destroyed.
 - (ii) Atoms of the same element may have different chemical properties.
 - (iii) Atoms of different elements may have the same chemical properties.
 - (iv) When atoms combine they do so in simple whole numbers to form compounds.
- A (ii) and (iv) B (i) and (iii) C (ii) and (iii)
D (i) and (iv) E (i) and (ii)
- (ii) A Form Four student boiled a mixture of sunflower oil and concentrated solution of sodium hydroxide for a certain period of time. After cooling, sodium chloride salt was added to 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
- (iii) In Periodic Table, hypothetical elements X and Y are found in group VI and II respectively. What is the correct formula for the compound formed between the two elements?
- A XY B YX C X_6Y_2
D Y_2X_6 E X_3Y
- (iv) How is Mendeleev's Periodic Table differs from the modern Periodic Table?
- A Mendeleev's Periodic table does not include noble gases while Modern Periodic table includes them.
 - B Mendeleev's Periodic table does not include non-metals while Modern Periodic table includes them.
 - C Mendeleev's Periodic table does not include halogens while Modern Periodic table includes them.
 - D Mendeleev's Periodic table has only 7 groups while Modern Periodic table has 8 groups.
 - E Mendeleev's Periodic table organise elements by increasing atomic number while the Modern Periodic table organise elements by atomic mass.

- (v) 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 represents in this experiment?
- A dependent variable B intermediate variable
C independent variable D controlled variable
E fixed variable
- (vi) Which property is used to confirm the presence of pure water?
- A It turns white anhydrous copper (II) sulphate blue
B It dissolves all other substances
C It freezes at 0 °C
D It is neutral to litmus paper
E It turns blue cobalt (II) chloride paper pink
- (vii) In which type of oxides does Aluminum oxide belong?
- A Metal oxides B Insoluble oxides
C Soluble oxides D Amphoteric oxides
E Basic oxides
- (viii) 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 coulombs
C 2.5 coulombs D 1.5 coulombs
E 10 coulombs
- (ix) How can you prevent a hoe from getting rust?
- A By painting and oiling them.
B By exposing them to air.
C By keeping them in moisture.
D By cleaning them with water after use.
E By leaving them in the garden after use.
- (x) When 2.45 g of zinc granules are dropped in 50 cm³ of acid 'Y', zinc sulphate is formed along with evolution of gas 'M' which burns with pop sound when kept close to a burning candle. Which one of the following pairs represent the acid Y and gas M?
- A Sulphuric acid and Carbon dioxide gas.
B Sulphuric acid and Hydrogen gas.
C Hydrochloric acid and Oxygen gas.
D Hydrochloric acid and Hydrogen gas.
E Sulphuric acid and Oxygen gas.

2. Match the effects of environmental pollution in **List A** with the respective causes in **List B** by writing the letter of the correct response besides the item number in the answer booklet provided.

List A	List B
(i) Ozone layer depletion	A Biological Oxygen Demand
(ii) Green House effect	B Biomass sludge
(iii) Eutrophication	C Sulphur dioxide
(iv) Terrestrial pollution	D Chlorine atom
(v) Acidic rain	E Liquid effluents
(vi) Water pollution	F Calcium Ammonium Nitrate
	G Methane
	H Ultra Violet Radiation

SECTION B (54 Marks)

Answer **all** questions in this section.

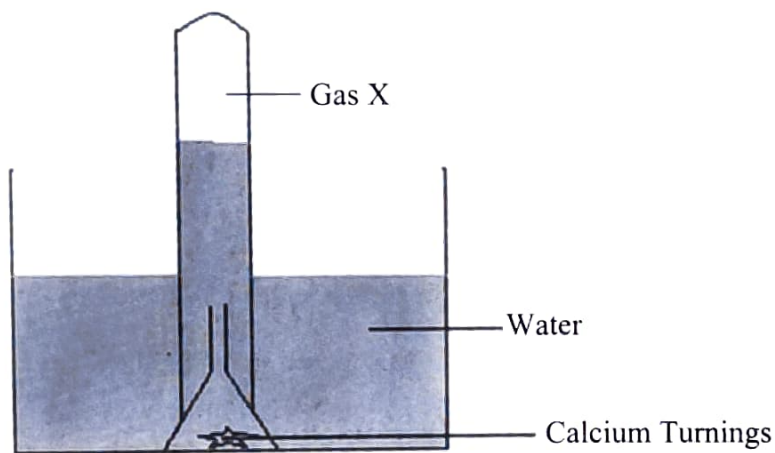
3. (a) The products formed when most non-metals burn in oxygen can react with water to form solutions which turn blue litmus paper red. With the aid of chemical equations, show the validity of this statement using carbon as non-metal.
- (b) (i) Give three properties of oxygen gas.
(ii) Give three uses of oxygen gas based on the properties mentioned in (b) (i).
4. (a) Why is Bunsen burner a preferable source of heat in the chemistry laboratory? Give four points.
- (b) Suggest five sources of heat that can be used in a chemistry laboratory apart from Bunsen burner.
5. (a) Which processes can be used to separate or extract each of the following substances?
(i) Mixture of iodine and sand
(ii) Mixture of cooking oil and water
(iii) Mixture of sodium chloride and water
(iv) Oil from seed
(v) Mixture of ethanol and water
(vi) Mixture of sand and water
- (b) Briefly explain application of chromatography process in daily life. Give six points.

6. (a) What are the sources of organic acids? Give five points.
- (b) Identify two products which can be formed in each of the following processes:
- Reaction of sodium with ethanol.
 - Partial fermentation of sucrose in presence of yeast cells.
7. (a) Why is it important to replace fossil fuels as an energy source?
- (b) Briefly explain four alternative sources of energy that can be developed to replace the fossil fuels.
8. (a) How is the concept of mole useful in Chemistry? Give four points.
- (b) What mass of impure ammonium chloride (90%) would be needed to react completely with 14.8 g of calcium hydroxide?

SECTION C (30 Marks)

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

9. (a) The following diagram was used to study the reaction of calcium and water.



Gas X produced was passed through black copper(II) oxide which changed colour to brown. With the aid of a chemical equation, interpret this observation.

- (b) Hydrogen atom can react by either gaining or losing electron. In both cases, energy is involved. With the aid of the chemical equation(s) and energy level diagram, interpret this observation.
10. How is organic manure important to soil quality? Briefly explain by giving five points.

11. Give the explanation on the hydrogen chloride gas based on the following:
- (a) the raw material for production of the gas.
 - (b) two chemical tests for hydrogen gas.
 - (c) four physical properties of hydrogen chloride.
 - (d) five uses of hydrogen chloride gas.