THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

FORM TWO NATIONAL ASSESSMENT

032 **CHEMISTRY**

Time: 2:30 Hour **SOLUTIONS** **Year: 2025**

Instructions

1. This paper consists of sections A, B and C with a total of **ten (10)** questions.
2. Answer **all** questions in spaces provided.
3. Section A and C carry **fifteen (15)** marks each and section B carries **seventy (70)** marks.
4. All writing must be in **blue** or **black** ink, **except** diagrams which must be in pencil.
5. Communication devices and any unauthorised materials are **not** allowed in the examination room.
6. Write your **Assessment Number** at the top right corner of every page.

SECTION A (15 Marks)

1. For each of the items (i) – (x) choose the correct answer from among the given alternatives and write its letter in the box provided.

(i) The knowledge of chemistry is useful in many fields of study except

A forestry.

B agriculture.

C laundry.

D political science.

Answer: D

Reason: Chemistry is applied in forestry, agriculture, and laundry through fertilizers, pesticides, soaps, and detergents. Political science deals with governance and politics, not chemical processes.

(ii) A Form Two student used a measuring cylinder to prepare oxygen by decomposing hydrogen peroxide. What is the function of the cylinder in this experiment?

A To measure volume

B To measure weight

C To measure width

D To measure volume length

Answer: A

Reason: A measuring cylinder is used to measure the volume of liquids accurately during experiments.

(iii) Which pairs represents suitable alternative heat sources when the Bunsen burner is not available in the laboratory?

A Kerosene stove and firewood

B Torch and spirit burner

C Firewood and gas stove

D Gas stove and spirit burner

Answer: D

Reason: Both a gas stove and a spirit burner provide controlled heat suitable for laboratory experiments.

(iv) In an experiment to determine the solubility of common salt the amount of water was kept constant. What type of variable does water represent in this experiment?

A Dependent variable

B Independent variable

C Controlled variable

D Uncontrolled variable

Answer: C

Reason: The amount of water is kept constant to ensure fair testing, so it is a controlled variable.

(v) When solid ammonium chloride is heated strongly it changes to gaseous molecules. Select the type of change related to this process.

A Melting

B Sublimation

C Condensation

D Freezing

Answer: B

Reason: Sublimation is the change of a solid directly into gas without passing through the liquid state.

(vi) Why do ships often have blocks of magnesium attached to their hull?

A To improve appearance of the hull

B To make the hull more stronger

C To give sacrificial protection to the hull

D To make the hull float easily

Answer: C

Reason: Magnesium corrodes in place of iron, protecting the ship's hull through sacrificial protection.

(vii) Why is wind said to be the promising source of energy for the future?

A It does not produce harmful gases

B It is easily stored

C It is harnessed without chemical reaction

D It is a renewable source of energy

Answer: D

Reason: Wind energy is renewable and will not be exhausted, making it suitable for future use.

(viii) Which element corresponds to the electronic structure 2:8:8?

A Argon

B Neon

C Lithium

D Helium

Answer: A

Reason: Argon has 18 electrons arranged as 2,8,8.

(ix) Why elements such as boron, silicon, germanium and antimony are referred to as metalloids?

A They display non-metallic characteristics

B They form alloys and conduct electricity

C They display metallic characteristics

D They display both metallic and non-metallic characteristics

Answer: D

Reason: Metalloids show properties of both metals and non-metals.

(x) How many electrons are gained by sulphur in forming sulphate ion?

A 3

B 6

C 5

D 2

Answer: B

Reason: Sulphur gains six electrons to form the sulphate ion SO_4^{2-}.

2. Match the descriptions in List A with the correct techniques for separating mixtures in List B.

List A	**List B**
(i) Extraction of 5 g of table salt dissolved in 10 L of salt solution.	A Funnel separation
(ii) Separation of cooking oil from a mixture of water and cooking oil.	B Solvent extraction
(iii) Collecting 50 mL of pure water from 300 L copper(II) sulphate solution.	C Evaporation
(iv) Extracting flower pigment from hibiscus flower using 2.5 mL of ethanol.	D Fractional distillation

(v) Separating serum from suspension of human blood.	E Centrifugation
	F Simple distillation
	G Paper chromatography

Answers

(i)	(ii)	(iii)	(iv)	(v)
C	A	F	B	E

3. (a) Five apparatuses used to prepare hydrogen gas

(i) Conical flask, it holds the reactants.
(ii) Thistle funnel, it allows controlled addition of acid.
(iii) Delivery tube, it directs hydrogen gas to the collection vessel.
(iv) Water trough, it is used to collect gas over water.
(v) Gas jar, it collects hydrogen gas.

(b) Preparation of oxygen gas using hydrogen peroxide

Oxygen gas is prepared by decomposing hydrogen peroxide using manganese (IV) oxide as a catalyst.

Hydrogen peroxide is poured into a conical flask containing the catalyst.

The reaction releases oxygen gas.

The gas passes through a delivery tube. Oxygen is collected over water because it is slightly soluble in water.

4. Five laboratory safety measures

(i) Wear protective clothing such as lab coats and goggles to prevent injuries.
(ii) Do not eat or drink in the laboratory to avoid chemical poisoning.
(iii) Handle chemicals carefully and read labels before use.
(iv) Turn off gas and electrical appliances after experiments.
(v) Report all accidents and spills immediately to the teacher.

5. (a) Applications of combustion in daily life

(i) Used in cooking food using gas, charcoal, or firewood.
(ii) Used in transportation through burning fuel in engines.
(iii) Used in generating electricity in power plants.
(iv) Used in heating homes and industrial processes.

(b) Use of a portable fire extinguisher

(i) Pull the safety pin to unlock the extinguisher.
(ii) Aim the nozzle at the base of the fire.
(iii) Squeeze the handle to release the extinguishing agent.
(iv) Sweep the nozzle from side to side until the fire is out.

6. (a) Four findings by Rutherford

(i) Most of the atom is empty space.
(ii) The nucleus is very small and dense.
(iii) The nucleus contains positive charge.
(iv) Electrons move around the nucleus.

(b) Sub-atomic particles

Sub-atomic Particle	Location	Charge
Proton	Nucleus	Positive
Neutron	Nucleus	Neutral
Electron	Outside nucleus	Negative

7. (a) Three elements stored in oil

(i) Sodium
(ii) Potassium
(iii) Lithium

(b) Reason for not exposing them to air

They react violently with air and moisture. This reaction can cause fire or explosion.

(c) Alkaline earth metals, five points

(i) They are found in Group II of the periodic table.
(ii) They have two electrons in the outermost shell.
(iii) They form basic oxides.
(iv) They are reactive but less than alkali metals.
(v) They form ionic compounds.

8. (a) Two chemical properties of water

(i) Water reacts with metals like sodium to form hydroxides and hydrogen gas.
(ii) Water decomposes into hydrogen and oxygen during electrolysis.

(b) Hydrological cycle

Water evaporates from rivers, lakes, and oceans due to heat. The water vapour rises and cools to form clouds through condensation. When clouds become heavy, precipitation occurs as rain. The water returns to rivers and oceans, completing the cycle.

9. (a) Electronic configuration status

S/N	Chemical species	Status
(i)	Ne	Stable
(ii)	N	Unstable
(iii)	Na^+	Stable
(iv)	Cl^-	Stable
(v)	Mg	Unstable

(b) Oxidation numbers

(i) Oxidation number of a free element is 0
(ii) Oxidation number of hydrogen in LiH is -1
(iii) Oxidation state of oxygen in H_2O is -2
(iv) Oxidation state of oxygen in H_2O_2 is -1
(v) Number of atoms in three molecules of water = 9 atoms

SECTION C (15 Marks)

10.(a) Why water gas is widely used as an industrial fuel

Water gas produces high heat energy. It burns cleanly with little smoke. It is cheaper to produce. It is suitable for industrial heating.

(b) Why the government of Tanzania discourages charcoal and firewood use

(i) They cause deforestation and environmental degradation.

(ii) They contribute to air pollution and health problems.

(c) Classification of fuels based on origin

SN	Fuel	Category
(i)	Petrol	Fossil fuel
(ii)	Wood	Biomass fuel
(iii)	Alcohols	Biofuel
(iv)	Kerosene	Fossil fuel
(v)	Coal	Fossil fuel
(vi)	Diesel	Fossil fuel
(vii)	Petroleum	Fossil fuel
(viii)	Hydrogen	Synthetic fuel
(ix)	Water gas	Gaseous fuel
(x)	Coal gas	Gaseous fuel
(xi)	Natural gas	Fossil fuel
(xii)	Producer gas	Gaseous fuel