Student's Assessment Number.....

THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
FORM TWO NATIONAL ASSESSMENT

032 **CHEMISTRY**

Time: 2:30 Hours **Year: 2021**

Instructions

1. This paper consists of sections A and B with a total of **ten (10)** questions.
2. Answer **all** questions in the spaces provided.
3. Section A carries **twenty (20)** marks and section B carries **eighty (80)** marks.
4. All writing must be in black or blue ink **except** diagrams which must be in pencil.
5. Cellular phones and any unauthorized materials are **not** allowed in the assessment room.
6. Write your **Assessment Number** at the top right corner of every page.
7. The following atomic masses may be used: H = 1, O = 16, S = 32, Ca = 40, Na = 23.

FOR ASSESSORS' USE ONLY		
QUESTION NUMBER	SCORE	ASSESSOR'S INITIALS
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		
CHECKER'S INITIALS		

2 119032 100010

rtna2021

SECTION A (20 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 in the box provided.

(i) Which particles contribute the net charge inside the nucleus of an atom?

A Protons B Neutrons
C Electrons D Nucleons

(ii) Which of the following is **not** a man-made product of applying chemistry?

A Fertilizer B Milk
C Sugar D Vaccines

(iii) How is the amount of air entering in the Bunsen burner controlled?

A By adjusting the opening of the barrel.
B By adjusting the opening of the collar.
C By adjusting the opening of the jet.
D By adjusting the opening of the base.

(iv) How do the chemists refer to a mixture of milk and water?

A Emulsion B Suspension
C Miscible solution D Immiscible solution

(v) Why is it necessary to boil drinking water?

A To remove oxygen. B To remove impurities.
C To make it tasteless. D To kill micro-organisms.

(vi) Which of the following indicates a pair of isotopes?

A $^{40}_{20}X$ and $^{40}_{18}X$. B $^{39}_{19}X$ and $^{40}_{20}X$.
C $^{12}_{6}X$ and $^{12}_{6}X$. D $^{35}_{17}X$ and $^{37}_{17}X$.

(vii) Which of the following are the products of the reaction of sodium metal with water?

A Sodium oxide and hydrogen gas.
B Sodium hydroxide and water.
C Sodium oxide and water vapour.
D Sodium hydroxide and hydrogen gas.

(viii) How does the covalent bond form?

A By combining opposite charged atoms.
B By loss of electrons between ions.
C By sharing of valence electrons.
D By force of attraction of atoms.

(ix) How can one prevent rusting in fragile instruments like cameras?

A By using silica gel.
B By using ethanol.
C By galvanization.
D By using oil.

(x) What is the maximum number of electrons in the innermost shell of an atom?

A 3 B 8
C 2 D 1

2. (a) Match the mixtures in **List A** with the methods of separation in **List B** by writing the letter of the correct response below the corresponding item number in the table provided.

List A	List B
(i) Ammonium chloride crystals in sand	A Decantation
(ii) Muddy water	B Chromatography
(iii) Oil in sunflower	C Evaporation
(iv) Sodium chloride in water	D Fractional distillation
(v) Spirit in water	E Layer separation
	F Sublimation
	G Solvent extraction

Answers

List A	(i)	(ii)	(iii)	(iv)	(v)
List B					

(b) Answer the following items by filling in the blank spaces provided.

(i) Apart from air and fuel, what is the other component required for a flame to be produced? _____

(ii) How do we refer to the factors which can be adjusted in an experiment to get the desired results? _____

(iii) In what system through which water is continually moving above and below the Earth? _____

(iv) What process is involved in order to obtain coke and coal gas from bituminous coal in absence of air? _____

(v) Which element in period 2 can share four electrons in order to acquire stability? _____

SECTION B (80 Marks)

Answer **all** questions in this section.

3. Answer the following questions with reference to the first 20 elements of the Periodic Table.

(a) Give the chemical symbol of the element having:

(i) the smallest atomic size.

.....

.....

(ii) the largest atomic size.

.....

.....

(b) Identify the elements which are:

(i) metals having 3 shells of electrons each.

.....

.....

(ii) metals having 1 electron in the valence shell.

.....

.....

(iii) noble gases.

.....

.....

4. (a) Give the IUPAC names of the following radicals:

(i) ClO_3^-.....

(ii) PO_4^{3-}.....

(b) Calculate the oxidation state of the underlined element in each of the following compounds:

(i) $NH_4\underline{Cl}$

.....

.....

.....

.....

.....

.....

(ii) $Al_2\underline{O_3}$

.....

.....

.....

.....

.....

.....

(iii) $Na_2\underline{S}O_4$

.....

.....

.....

.....

.....

.....

(iv) $H_2\underline{O_2}$.

.....

.....

.....

.....

.....

.....

5. (a) Assign each of the properties to either luminous or non-luminous flame by putting a tick (✓) on the respective column in the following table.

Property of Flame	Luminous Flame	Non-luminous Flame
(i) Gives plenty of smoke and soot.		
(ii) Blue in colour and almost invisible.		
(iii) Yellow zone is larger than blue zone.		
(iv) Formed when the air holes are completely closed.		
(v) Blue zone is larger than yellow zone.		
(vi) Produces the hottest flame.		

(b) Assume that you are doing an experiment in the laboratory at 07.30 pm and suddenly the lights go off. Give two reasons to justify the fact that you would consider luminous flame rather than non-luminous flame as an alternative source for lighting.

(i) .....

.....

(ii) .....

.....

(c) Identify two properties of the flame produced by the Bunsen burner (air holes full opened) that can not be found in the flame produced by the spirit burner.

(i) .....

.....

.....

(ii) .....

.....

.....

6. (a) Draw a diagram and give one use for each of the following apparatuses:

Diagram	Name and Use
(i)	Name: Volumetric flask Use: ....
(ii)	Name: Simple funnel Use: ....
(iii)	Name: Liebig condenser Use: ....
(iv)	Name: Thermometer Use: ....

Diagram	Name and Use
(v)	Name: Retort stand Use: ....

7. (a) Distinguish the following substances:

(i) Saturated from unsaturated solution.

.....
.....
.....
.....
.....
.....
.....

(ii) Miscible from immiscible liquids.

.....
.....
.....
.....
.....
.....
.....

(iii) Homogenous from heterogeneous mixture.

.....
.....
.....
.....

.....

.....

.....

(b) How can you separate each of the following mixtures?

(i) Pure water and muddy water

.....

.....

.....

.....

.....

.....

.....

(ii) Kerosene and water

.....

.....

.....

.....

.....

.....

.....

8. Oxygen gas is one of the important gases in the atmosphere. It combines with different elements to form oxides. It can be made in the laboratory and industries.

(a) Which reagents can be used to prepare oxygen gas in the laboratory apart from hydrogen peroxide?

(i) .....

(ii) .....

(b) Give the name of the product formed by reacting oxygen gas with each of the following:

(i) Carbon .....

.....

(ii) Phosphorus .....

.....

(iii) Suphur .....

(c) Give five uses of oxygen gas.

(i) .....

.....

.....

(ii) .....

.....

.....

(iii) .....

.....

.....

(iv) .....

.....

.....

(v) .....

.....

.....

9. (a) Differentiate molecular formula from empirical formula.

.....

.....

.....

.....

.....

.....

.....

.....

.....

(b) (i) A pure oxide of lead (Pb) contains 13.4% of oxygen. Calculate the empirical formula of the compound.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(ii) Show how a compound can be formed between magnesium ion and chloride ions.

.....

.....

.....

.....

.....

.....

10. Describe the main five approaches which chemists carry out during scientific research.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....