Candidate's Examination Number _____

SMZ

ZANZIBAR EXAMINATIONS COUNCIL

FORM THREE ENTRANCE EXAMINATION

043 CHEMISTRY

TIME: 2:30 HOURS TUESDAY 28TH NOVEMBER, 2017 a.m

INSTRUCTIONS TO CANDIDATES

1. This paper consists of THREE (3) sections A, B and C.
2. Answer ALL questions in section A and B, and any TWO (2) questions in section C. Question NINE (9) is compulsory.
3. Write your Examination Number on each page.
4. Write your answers in the space provided.
5. Use blue or black pen in writing. The diagrams must be in a pencil.
6. Cellular phones are not allowed in the examination room.
7. The following constants may be helpful
   Na = 23, Cl = 35.5, K = 39, O = 16

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	MARKS	SIGNATURE
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
TOTAL		

This paper consists of 14 printed pages

Candidate's Examination Number _____

SECTION A: (30 Marks)

Answer all questions in this section

1. Choose the best answer and write its letter in the box below.

i) The following apparatus are used to measure the volume of the liquid except

A: Beaker B: Jar
C: Pipette D: Measuring cylinder

ii) It is used for cleaning wound in order to kill germs

A: Antiseptic B: Safety pin
C: Pain killers D: Liniment

iii) Safety in the laboratory is maintained by putting

A: Apparatus in the cupboards
B: Chemicals on a bench
C: Containers of chemicals on a shelf
D: Chemical warning signs on chemical containers

iv) The last step in scientific procedure is

A: Interpret the data B: Formulate the hypothesis
C: Draw a conclusion D: Collect data and analyze

v) One of the following is not a chemical change

A: Burning B: Rusting C: Decaying D: Freezing

vi) A group which consists of non- metals only

A: Lithium, Potassium, Aluminium
B: Carbon, Sodium, Fluorine
C: Sulphur, Oxygen, Chlorine
D: Boron, Beryllium, Calcium

vii) It changes anhydrous copper (II) sulphate to blue colour

A: Iron Sulphide B: Sodium Chloride
C: Water D: Sand with salt

viii) The electronic configuration of Nitrogen is

A: 2: 2: 3 B: 2:5 C: 2:3:2 D: 2:2:2:1

ix) The oxidation number of sulphur in the SO_4^{2-} radical is

A: - 2 B: -6 C: +6 D: + 2

x) The set of alkali metals

A: Berryllium, Lithium, Aluminium

B: Lithium, Sodium, Potassium

C: Sodium, Calcium, Potassium

D: Lithium, Sodium, Calcium

ANSWERS

i	ii	iii	iv	v	vi	vii	viii	ix	x

2. Match the items in **LIST A** with the response in **LIST B.** Write the letter of the correct answer in the table below.

LIST A	**LIST B**
i. A dangerous substance that can cause death ii. It is put on the tripod stand to spread flame during heating iii. It is aimed to help a sick or an injured one before medical treatment iv. Changing from solid to gas directly v. A baby in the incubator and fish in water both breath vi. It is neither acidic nor basic and no effect on the litmus paper vii. The smallest particle of an element viii. Baking Soda ix. It separates immiscible liquids x. Prevention of rusting	A. Tongs B. First aid C. Sterile gauze D. Explosive E. Sublimation F. Toxic G. Oxygen H. Atom I. Wire gauze J. Separating funnel K. Hydrogen gas L. Molecule M. Sodium bicarbonate N. Galvanization O. Evaporation

ANSWERS

i	ii	iii	iv	v	vi	vii	viii	ix	x

3. Fill in the blank spaces. Use one word for each space.

   a) In a periodic table the elements which are arranged in a vertical column are called _____ and the horizontal rows are called_____.

   b) Metals which form coloured compounds and often act as a catalyst are known as _____elements and those in which the energy levels are filled are called_____.

   c) In luminous flame, if the supply of_____ is not enough it produces a black substance known as _____.

   d) A mixture which has uniform composition, appearance, properties is a_____ mixture while that which has different composition, appearance and properties is _____ mixture.

   e) Water is a _____ liquid and a _____solvent.

SECTION B: (50 Marks)
Answer ALL questions in this section

4. a) Write the names of the following radicals.

   i. HSO_4^- _____

   ii. HCO_3^- _____

   iii. NO_3^- _____

   iv. O^{2-} _____

   b) Use the above radicals (4a), combine them with the element Calcium to form the compounds and then name the compounds formed.

   i. _____

   _____

   ii. _____

   _____

   iii. _____

   _____

iv. _____

_____

c) Calculate the oxidation number of the following underlined atoms.

i) $\underline{S}O_3^{2-}$

_____

_____

_____

_____

_____

ii) $\underline{N}O_2^-$

_____

_____

_____

_____

_____

iii) $K\underline{N}O_3$

_____

_____

_____

_____

iv) $H_2\underline{S}O_4$

_____

_____

_____

_____

5. a) Compare the characteristics of electrovalent and covalent bond.

_____

_____

_____

_____

_____

_____

_____

_____

_____

b) Using • and x symbols to represent electrons. Sketch the diagrams to formulate the combination of the following.

i) Sodium and Fluorine

ii) Two Chlorine atoms

c) Specify the electrovalent and covalent bond formed above.

_____

_____

_____

_____

_____

_____

6. a) Write the meaning of the following terms.

i) Periodicity

_____

_____

_____

ii) Electronegativity

_____

_____

_____

iii) Ionization Energy

_____

_____

_____

b) Write the symbol , electronic configuration and valency of each of the following elements.

Element	Symbol	Electronic Configuration	Valency
Magnesium			
Potassium			
Fluorine			
Berrylium			
Sodium			
Chlorine			

7. a) List three (3) sub-atomic particles of an atom.

i) _____

ii) _____

iii) _____

b) "Atoms cannot be created or destroyed". Write the modification of this statement from the modern theory of atom.

_____

_____

_____

c) Carbon has the isotopes ${}^{12}_{6}C$, ${}^{13}_{6}C$ and ${}^{14}_{6}C$. Complete the table by inserting the sub-atomic particles from the number of isotopes shown.

Isotopes	Sub-atomic particles		
${}^{12}_{6}C$			
${}^{13}_{6}C$			
${}^{14}_{6}C$			

8. a) Identify the function of the following items as they are in the first aid kit.

   i) Painkillers _____

   _____

   ii) Safety pin _____

   _____

   iii) Cotton wool _____

   _____

   b) Name and sketch the warning signs of the substance which:

   i) Reacts easily with oxygen.

   ii) Catches fire easily.

   d) With the aids of the diagrams distinguish between a tripod stand and a retort stand.

Candidate's Examination Number _____

SECTION C: (20 Marks)

Answer ANY TWO (2) questions in this section

Question 9 is **COMPULSORY,** answer either (9a) or (9b).

9. a) I. Imagine you want to perform an experiment in the laboratory, name. the apparatus to be used for the following work

i) Adding liquids drop by drop _____

ii) Measure the temperature of the liquid _____

iii) Grind solid substances into a fine powder _____

iv) Collect a gas during its preparation _____

v) Hold a hot test – tube _____

II. Demonstrate the experiment used to separate the muddy water by following the guidelines below.

Aim of the experiment

_____

_____

_____

_____

Materials_____

_____

Diagram

9. b) You are required to demonstrate one of the chemical properties of Oxygen. You are provided with four gas jars of oxygen and four pieces of elements named (A, B, C and D), they are Sodium, Magnesium, Carbon and Sulphur.

Procedure:

The elements are placed in deflagrating spoon and inserted in the gas jars of oxygen one after the other

Observation

Element A + Oxygen ⟶ it burns with a bright white flame leaving a white powder.

Element B+ Oxygen ⟶ it burns vigorously with a yellow flame leaving a pale yellow solid.

Element C+ Oxygen⟶ it melts and burns with a blue flame giving a misty (white gas)

Element D+ Oxygen ⟶ it burns slowly with yellowish white flame giving a colourless gas.

i) Identify the elements A ,B,C and D

_____

_____

_____

_____

_____

ii) Name the products formed after the elements A, B, C and D burned in oxygen.

_____

_____

_____

_____

_____

iii) Classify the elements A,B,C and D into metals and non metals.

_____

_____

_____

_____

_____

10. a) Describe the process of combustion.

_____

_____

_____

b) Mention any two (2) areas where combustion is used and its applications.

Area	**Application**

c) Choose any two (2) classes of fire; state the burning materials and the appropriate extinguisher.

Class	Burning material	Appropriate extinguisher

11. a) Define the term fuel.

_____

_____

_____

_____

b) Explain briefly four (4) characteristics of a good fuel.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

c) Arrange the following into renewable and non-renewable sources.
(oil, gas, coal, solar, wind energy, nuclear, energy, fossil fuels)

Renewable sources	Non-renewable sources

==========