**Candidate's** Examination Number _____

SMZ

ZANZIBAR EXAMINATIONS COUNCIL

FORM THREE ENTRANCE EXAMINATION

043 CHEMISTRY

TIME: 2:30 HOURS MONDAY 3RD DECEMBER 2018 a.m

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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 drawn in pencil.
6. Cellular phones are not allowed in the examination room.
7. The following constants may be helpful
   N =14, H=1, O=16, Cu= 64, S=32, Mg =24, Cl =35.5, C = 12

| **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 15 printed pages

**Candidate's** Examination Number _____

SECTION A: (30 Marks)

Answer ALL questions

1 Choose the letter of the best answer and write it in the table below.

i. Converts mechanical energy into electrical energy

A: Electric iron B: Speaker

C: Hydroelectric power plant D: Machine

ii. The force of attraction that holds atoms together to form molecule

A: Chemical bond B: Energy C: Power D: Valency

iii. Chemical process that occurs in iron

A: Plating B: Burning C: Removal D: Rusting

iv. The use of oxygen

A: Used in refrigeration B: Killing living organism

C: Sustenance of living organism D: Used as a fuel

v. The lightest and most abundant element in the universe

A: Hydrogen B: Calcium C: Oxygen D: Iron

vi. The process of removing of contaminants from treated water to produce pure water

A: Water treatment B: Uses of water

C: Boiling D: Water purification

vii. Arrangement of electrons in different energy level

A: Shell B: Electronic configuration

C: Electronic changing D: Nuclide notation

viii. The oxidation number of Cr in $Cr_2O_7^{2-}$

A: -6 B: +6 C: 0 D: -4

ix. The chemical formula of aluminum sulphate

A: $AlSO_4$ B: $Al_2SO_4$ C: $Al_2(SO_4)_3$ D: $Al_2(SO)_4$

x. Which of the following sets of symbols represents isotopes?

A: $X_8^{16}$, $X_8^{17}$, $X_8^{18}$ B: $Y_7^{16}$, $Y_8^{17}$, $Y_9^{18}$

C: $X_7^{16}$, $X_8^{16}$, $X_9^{16}$ D: $X_7^{16}$, $Y_8^{17}$, $Z_9^{18}$

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. Are used to improve the quality and quantity of crops grown.<br>ii. Special room or building that is designed and used for scientific experiment.<br>Usually used to accurately measure and dispense liquid.<br>iv. It is among the causes of accident in the laboratory.<br>v. The injury that causes a change in the colour of the skin.<br>vi. It produces a black substance known as soot.<br>vii. Protons and neutrons.<br>viii. A group of atoms with unpaired electrons.<br>ix. The ability or capacity of doing work.<br>x. The regular periodic changes of elements due to their atomic number | A: Bruises<br>B: Luminous flame<br>C: Radicals<br>D: Periodicity<br>E: Burette<br>F: Energy<br>G: Nucleons<br>H: Laboratory<br>I: Fertilizers<br>J: Beaker<br>K: Power<br>L: Wrong use of equipment<br>M: Choking<br>N: Non luminous flame |

ANSWERS

| LIST A | i | ii | iii | iv | v | vi | vii | viii | ix | x |
|---|---|---|---|---|---|---|---|---|---|---|
| LIST B | | | | | | | | | | |

3. Fill in the blanks, one word for each space.

   i. Heat is the _____ of being _____.

   ii. Weed killers are chemical _____ that are used to destroy unwanted _____ which are harmful to crops.

   iii. Chemical _____ signs are _____ symbols found on chemical containers especially those used in the laboratory.

   iv. In immiscible liquids the dense liquid settles at the _____ while the least dense remain at the _____ of the separating funnel.

   v. Fire is the state or process of _____ in which ignited material combine with _____ and give off light, heat and flame.

## SECTION B: (50 Marks)

Answer ALL questions in this section.

4. a) What is a chemical formula?

_____

_____

_____

_____

_____

_____

b) Differentiate between molecular formula and empirical formula.

_____

_____

_____

_____

_____

_____

c) A certain compound contains 1.59% hydrogen, 22.22% nitrogen and 76.19% oxygen. Calculate its

i) Empirical formula

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

ii) Molecular formula, if its relative molecular mass is 63.

_____

_____

_____

_____

_____

_____

iii) Name the compound

_____

_____

5. a) i) What is biogas?

_____

_____

_____

_____

ii) List down any two (2) materials that can produce biogas in our local environment.

_____

_____

iii) Why is the biogas is mostly encouraged to use as fuel compare to other types of fuel.

_____

_____

_____

b) i) What is renewable energy?

_____

_____

ii) Mention any two (2) examples of renewable energy.

_____

_____

_____

iii) Write two (2) areas where renewable energy can be used.

_____

_____

6 a) i) What is scientific procedure?

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_____

ii) List down all steps of scientific procedure.

_____

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_____

_____

iii) Mention any two (2) areas of application of scientific procedures.

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_____

7 a) Define the following terms

i) Unsaturated solution

_____

_____

_____

_____

ii) Solute

_____

_____

_____

_____

iii) Emulsion

_____

_____

_____

_____

b) Give any two (2) differences between mixture and compound.

| Mixture | Compound |
|---|---|
| i) | i) |
| ii) | ii) |

c) i) Outline any two (2) significance of chemical symbol.

_____

_____

_____

_____

_____

_____

ii) Write the symbols of Sodium, Potassium and Beryllium.

_____

_____

_____

_____

_____

_____

8. a) i) How an ion is formed?

_____

_____

_____

_____

ii. By using ● and x, Show how potassium chloride is formed.

b. List down three (3) properties of electrovalent compound.

_____

_____

_____

_____

_____

_____

c. Calculate the oxidation number (state) of underlined elements

i) $K\underline{Cl}O_3$

_____

_____

_____

ii) $\underline{C}O_3^{2-}$

_____

_____

_____

SECTION C: (20 Marks)
Answer any two (2) questions from this section.
Question 9 is compulsory; answer either (9a) or (9b)

9. a i) Study the table which shows reaction of some metals with oxygen, then fill the blanks

| Metal | How it burns | Colour of flame | Name of product formed |
|---|---|---|---|
| Potassium | | White powder | |
| Calcium | | White solid | |
| Zinc | Slowly with a dull red flame | | |

ii) Outline two (2) physical properties of oxygen.

_____

_____

_____

_____

iii) List down any two (2) industrials uses of oxygen

_____

_____

_____

_____

_____

9. b) i) Explain briefly the three (3) states of matter.

_____

_____

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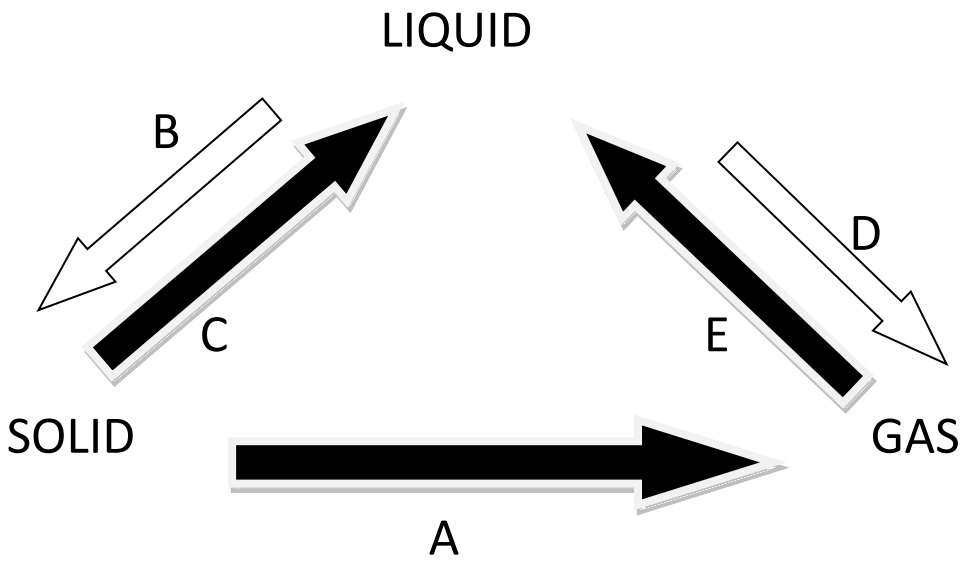
_____

_____

ii) Study the summary diagram of the change of matter from one state to another and then answer the questions that follows:




Identify the name of change indicated by letters

A _____

B _____

C _____

D _____

E _____

iii) Define the change represented by letter A

_____

_____

_____

iv) Mention one example of substance that can undergo the change represented by letter A

_____

_____

10 a. i. Define periodic table.

_____

_____

_____

_____

ii. State modern Periodic law.

_____

_____

_____

iii. Below are groups of elements, arrange them in their respective position in the periodic table as shown below

| I | II | III | IV | V | VI | VII | O |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

( Li, B, C, N, O, F, Ne, Mg, Al, Si, P, Cl)

11. a) Draw the warning sign which represent

i) Harmful substance

ii) Irritant substance

iii) Oxidant

b) i) Why it is important to put in a place safety measures in a laboratory?

_____

_____

ii) Why all persons working in a laboratory required to wear appropriate protective clothing?

_____

_____

c) What is the aim of using fume chamber in the laboratory?

_____

_____

_____

_____

FOR ROUGH WORK