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Republic of Somaliland
Somaliland National Examination Board

Form Four

Chemistry
EXAMINATION

June 2019

Time 2 hours

Plus 10 minutes for reading through the paper

INSTRUCTIONS TO CANDIDATES

This paper consists of 12 printed pages.

Count them now. Inform the invigilator if there is any missing.

PART ONE: 20 Multiple Choice Questions	**40 marks**
PART TWO: 6 structured questions	**60 marks**
Total	**100 marks**

- Answer **ALL** questions in part 1 and 2

Use this page for rough work. It will NOT be marked

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Multiple Choices **(20 Question x 2 Marks=40 Marks)**

1. An indicator is used during neutralization reaction in order to
   a. Detect the end point of the reaction
   b. Measure the amount of heat
   c. Measure the amount of reaction reactants
   d. Show whether the reaction is reversible

2. The formula mass of $Ca(OH)_2$ is
   a. 56
   b. 74
   c. 40
   d. 116
3. Below are some pollutant gases that causes air pollution except:-
   a. SO_2
   b. CO_2
   c. NO and NO_2
   d. O_2
4. A catalyst is used to :-
   a. Lower the energy of reactants
   b. Lower the energy of products
   c. Lower the rate of energy
   d. Lower the activation energy
5. The covalent bond is polar when atoms:-
   a. Have the same electronegativity
   b. Share Electrons equally
   c. Share same number of electrons
   d. Have different electro negativity

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6. The percentage of Oxygen in NaOH is
   a. 40%
   b. 43%
   c. 39%
   d. 45%
7. The enthalpy change of a reaction is the heat change at constant:-
   a. Temperature
   b. Volume
   c. Pressure
   d. Concentration
8. Which gas supports combustion?
   a. Nitrogen
   b. Oxygen
   c. Carbon dioxide
   d. Argon
9. Which two elements react together to form ionic compound?
   a. R and T
   b. T and X
   c. X and Z
   d. Z and R

Element	Electronic structure
R	2,4
T	2,8
X	2,8,1
Z	2,8,7

10. Which process is **NOT** exothermic?
    a. Burning fossil fuel
    b. Obtaining lime from limestone
    c. Radioactive decay of ^{235}U
    d. Reacting Hydrogen with Oxygen
11. Which bond is **NOT** in a molecule of Ethanoic acid?
    a. C-O
    b. C=O
    c. C=C
    d. O-H

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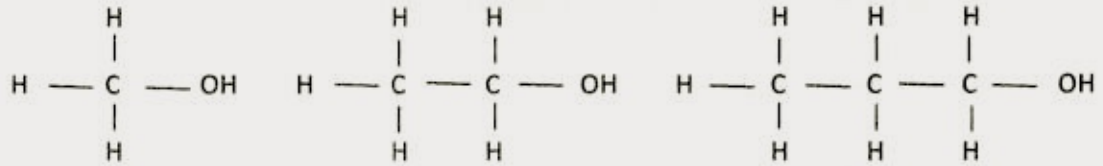
12. Which molecule contains two single covalent bonds?
    a. Cl_2
    b. CH_4
    c. H_2O
    d. HCl

13. Which Oxide dissolves in water to form a basic solution?
    a. Carbon dioxide
    b. Nitrogen dioxide
    c. Sodium oxide
    d. Sulphur oxide

14. Which gas is colorless and poisonous?
    a. Carbon Monoxide
    b. Chlorine
    c. Hydrogen
    d. Nitrogen

15. In which process Carbon dioxide is **NOT** formed?
    a. Burning of natural gas
    b. Fermentation
    c. Heating lime
    d. Respiration

16. The structure of three substances are shown below:



Why do all these substance belong to the same homologous series

    a. They are all compounds
    b. They are all saturated
    c. They all contain Oxygen
    d. They all contain same functional group

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17. Nitrogen has 5 valence electrons and it's a diatomic molecule. The bond between nitrogen molecule is:-
    a. Single covalent bond
    b. Double covalent bond
    c. Tribal covalent bond
    d. Tetra covalent bond

18. Which compound rapidly decolorizes aqueous bromine?
    a. Ethane
    b. Ethonoic acid
    c. Ethanol
    d. Ethene

19. There are two methods of obtaining ethanol

    Method1:- Addition of steam and ethane
    Method 2:- fermentation

    Which statement is **NOT** Correct?
    a. Method 1 produces Carbon dioxide
    b. Method 1 requires high temp and pressure
    c. Method 2 produces carbon dioxide
    d. Method 2 requires source of sugar

20. Atoms can form ions with a single positive charge by
    a. Gaining a proton
    b. Gaining an electron
    c. Losing proton
    d. Losing electron

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Part two: Structured Questions (6 Questions X 10 Marks = 60 Marks)

1. Water is a compound of hydrogen and Oxygen; it is the main constituents of all living Organisms.



a. How would you test if a liquid is water?

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b. Water from a reservoir is treated before use

i. Give a reason why water is treated before it is supplied?

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ii. Why chlorine is an important part of the treatment?

.....

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c. You are given a sample of hard and soft water:

i. Briefly explain how you should show which sample was hard and which sample was soft water?

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ii. Distinguish between temporary and permanent hard water?

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(10 Marks)

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2. The table below shows the PH of some common substances

NO	Substance	PH Value
1	A	10.5
2	B	6.4
3	C	2.6
4	D	10.0
5	E	14.0
6	F	1.0

Use the information from the table to answer question (i) to (iv)

a. Which of the above substances is:-

i. Hydrochloric acid?

.....

ii. Sodium hydroxide?

.....

iii. Lime water

.....

iv. Lemon juice

.....

b. State one example to prepare soluble a salt and one to prepare an insoluble salt?

.....

.....

c.

i. Name the acid and metal that you would use for making Magnesium chloride salt

.....

.....

ii. Write a balanced chemical equation for the above reaction?

.....

d. Calculate the hydrogen ion concentration of sulphuric acid whose PH value is 2?

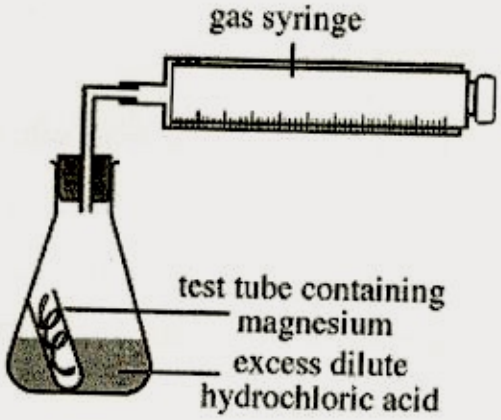
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(10 Marks)

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3. A student used the following apparatus to investigate the rate of reactions between Magnesium and hydrochloric acid



a. How you should measure the rate of the above reaction?

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b. Suggest why the amount of hydrogen gas production slows down towards the end of experiment

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c. What happens to the rate of reaction if you use large pieces of Magnesium?

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d. The rate of the above reaction can be changed by altering the temperature? Briefly explain why this happens

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(10 Marks)

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4. The equation below shows the reaction between iron and chlorine:-

$$2Fe_{(s)} + 3Cl_{2(g)} \longrightarrow 2FeCl_{3(s)}$$

According to the above equation:-

a. How many moles of chlorine are required to react with 4 moles of Iron?

.....

.....

b. How many moles of Iron chloride are formed when 4 moles of iron are used?

.....

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c. If 53.25 gram of chlorine gas is used, how many grams of iron chloride are formed? (RAM Fe=56, Cl=35.5)

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d. If 56 gram of iron is used how many grams of iron chloride are formed? (RAM Fe=56, Cl=35.5)

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(10 Marks)

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5. The molecular formula of **Butane is C_4H_{10}**

a.

i. Which family of organic compound does it belongs to?

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.....

ii. Is it saturated or unsaturated hydrocarbon?

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b. Write the structural formula of Butane?

c. Butane forms to Isomers

i. What is an Isomer?

.....
.....

ii. Draw the structural formula of butane Isomers

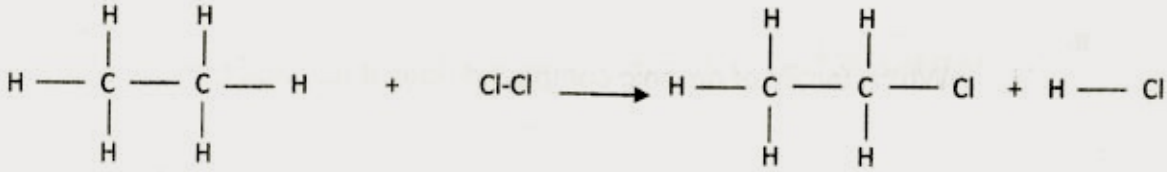
d. Give the names of above isomers?

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(10 Marks)

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6. Chlorine reacts with ethane to produce Chloroethane and Hydrogen gas



a. Define the following terms

i. Ethalpy change

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ii. Bond energy

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b. Distinguish between Exothermic and endothermic reactions.

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c. Using the bond energy shown below calculate the energy change for the above reaction

Bond	Bond energy in KJ/mol
C-Cl	+340
C – C	+350
C –H	+410
Cl – Cl	+240
H – Cl	+430

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d. Is the above reaction exothermic or endothermic?

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e. Using the axis below, show the enthalpy profile of the above reaction



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---End--

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