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MERRYLAND HIGH SCHOOL

S2 CHEMISTRY

END OF TERM III

@zinartjonah

$$\frac{56}{70} \times 100$$

Class	Stream
S. 2	<u>ChemF</u>

## A COMPETENCY BASED CHEMISTRY PAPER FOR CREATIVE LEARNERS

TIME: 2 HOURS

### INSTRUCTIONS

1. This paper consists of two sections A and B
2. Answer all questions in section A and only 2 Questions in section B
3. ANSWER EACH QUESTION ON A FRESH PAGE IN SECTION B.
4. NUMBER 8 OF SECTION B IS COMPULSORY

### SECTION A (50 marks)

1. We are surrounded by matter, a book is matter, a computer is matter, food is matter etc.

Sometimes matter maybe hard to identify. Forexample air is matter but because it is so thin compared to other matter like a book, we sometimes forget air is matter. With a reason, identify if the following are matter or not matter

i) Pancakes (1 mk)

It is Matter, because it occupies space  
because it has weight.

ii) Love (1 mk)

It is not matter, because it doesn't have weight  
because it occupies no space.

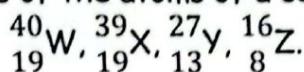
iii) The moon (1 mk)

~~It is matter, because it occupies space.  
because it has weight~~

iv) An idea of new invention (1 mk)

~~It is not matter, because it occupies no space.  
because it doesn't have weight~~

2. a). The full symbols of the atoms of a certain element are:-



(i) Suggest a reason for the difference in the atomic masses of the atoms of W and X. (1 mk)

~~Atoms W and X have different number of neutrons~~

(ii) state what the numbers 39 and 19 on element X stand for (2 mk)

~~39 represents mass number~~

~~19 represents atomic number.~~

(iii) state the number of electrons in element Z. (1 mk)

~~8 electrons~~

b) Element X belongs to Period 3 of the periodic table. The ion formed by element X is  $\text{X}^{3+}$ .

(a) State the,

i) atomic number of element X (1 mk)

~~13~~

ii) Electronic configuration of element X. (1 mk)

~~2: 8; 3~~

~~08~~

iii) group of the period table to which X belongs. (1 mk)

Group (III)

c). The atomic numbers of elements Q, R and T are 15, 20 and 17 respectively. Write the electronic configuration of each element.

(i) Q. (1 mk)

2 : 8 : 5

(ii) R. (1 mk)

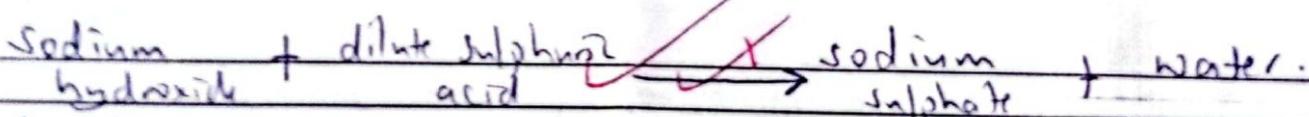
2 : 8 : 8 : 2

(iii) T. (1 mk)

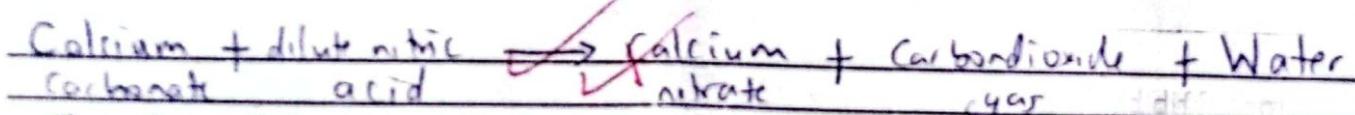
2 : 8 : 7

3. a) While in the lab, S2s mixed the following chemicals together and formed different salts. Unfortunately, they could not come up with the word equations for every reaction that they had carried out. Help your fellow S2s come up with the word equations for the reactions they carried out.

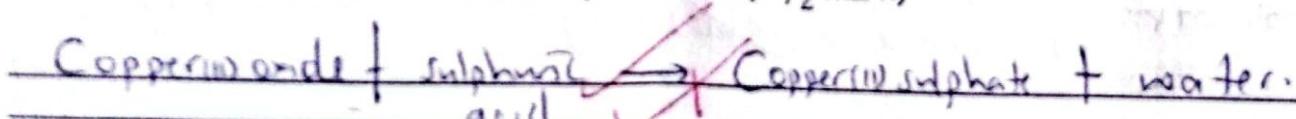
i) Sodium hydroxide and dilute sulphuric acid. (1 $\frac{1}{2}$  mark)



ii) Calcium carbonate and dilute nitric acid. (1 $\frac{1}{2}$  mark)



iii) Copper (II) oxide and dilute sulphuric acid (1 $\frac{1}{2}$  mark)



iv) Magnesium metal and dilute hydrochloric acid (1 $\frac{1}{2}$  mark)



b) In Uganda, drugs such as Eno, Aprazole, Magnesium are being used as faster relievers of burning pain.

10



Explain how Eno has been effective in reducing burning pains caused by ulcers. (3 mk)

~~Eno contains an alkaline substance that neutralises the acidity in the stomach that causes no pain thus reducing the burning pain.~~

c). Explain why the acidic lemon flavor added to Eno has no effect on the composition of Eno. (1 mk)

~~Lemon contains a weak acid that has no effect on Eno~~

4. a). Alkalies are slippery and bitter as some of their physical properties. Manufactured tooth pastes are slippery but not bitter. Explain: (3 mk)

i) why manufactured tooth pastes are not bitter yet they contain alkalies. (2 mk)

~~They are filled with flavouring agents and sweeteners~~ (2)

ii). The significance of the tooth paste not being bitter though (2 mk)

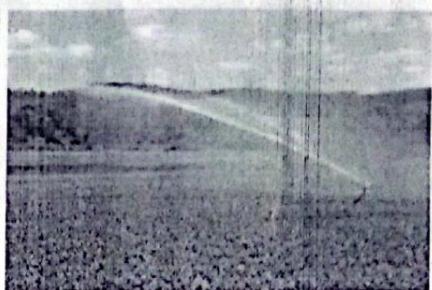
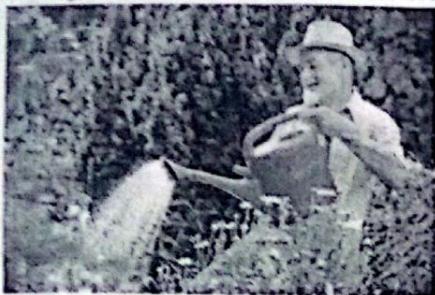
~~To be pleasant to use since bitter taste would make brushing teeth impossible.~~

~~To provide a refreshing and clean feel.~~

b) Explain why some salts like potassium nitrate are preferred to be used in manufacture of fire-works, gun powder and rocket repellants. (1 mk)

~~They are strong oxidising agents~~

5. a). How is water used in the pictures below. (3 mk)



Used in Irrigation. ②

Used in boat racing

2 pictures both showed  
Irrigation.

b) how are those uses of water important to our community. (3 mk)

Source of Leisure

Source of Income

accept any other  
two answers.

source of food of good quality.

e.t.c

c) How can water be tested in the lab, and write the negative test in case the liquid tested contains no water. (2 mk)

By using anhydrous copper(II) sulphate powder. It remains white if placed in a substance that has no water.

or → By using cobalt chloride paper. It remains blue

6. Ordinary air contains 0.03% of carbon dioxide and 21% oxygen. Air breathed out contains 4% carbon dioxide and about 16% oxygen the picture below shows how carbon dioxide is used

O<sub>2</sub>



a). How is carbon dioxide used in the picture above. (1 mk)

To extinguish fire.

b) Which property of carbon dioxide favors its use in the activity above? (1 mk)

It doesn't support burning.

c) How can oxygen be used in our daily life using the information in the above picture? (1 mk)

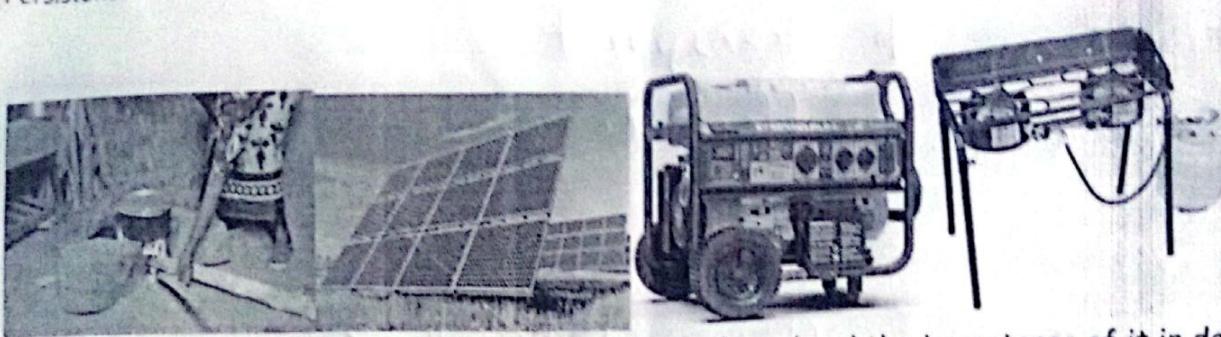
For cooking food.

d) Which property of oxygen favors its use in the activity you have mentioned above? (1 mk)

It supports burning.

7. a) Carbon based fuels are fuels whose combustion results in release of carbon into the earth's atmosphere. It is estimated that more than 80% of all man made carbon dioxide originates from fossil fuels that are burnt. The released carbon based fuels can be in form of carbon dioxide or carbon monoxide, Sulphur dioxide or Sulphur trioxide. The pictures below show items which we use.

64



For each picture, identify the name of the fuel used and the importance of it in daily life.  
(2 mk)

Fire wood.

Solar energy.

Petrol / Paraffin / diesel.

Gas / Methane.

b) Outline four examples of:

i) Carbon based fuels. (2 mk)

Petrol.

Diesel.

Paraffin.

Kerosene.

Bio gas

ii). Non carbon based fuels. (2 mk)

Hydro Electric power.

reject water

Solar energy.

reject sun

Air electricity / wind energy.

c) Mention two advantages of using

i) Carbon based fuels over non carbon based fuels (2 mk)

They produce a high energy density. max 2.

Cheap and accessible like firewood.

Despite being Non-renewable, they are available in plenty.

### *Persistence and Perseverance*

- Easy to transport
- cost effective.

ii). Non carbon based fuels over carbon based fuels. (2 mk)

They are Non-pollutants

They are renewable.

Less expensive

etc

SECTION B ( 20 MARKS)

1. ATTEMPT QUESTION 8 AND ANY OTHER QUESTION OF YOUR CHOICE
2. ANSWER EACH QUESTION ON A FRESH PAGE
3. NUMBER 8 OF SECTION B IS COMPULSORY

8. The table below shows the solubility of potassium nitrate at a range of different temperatures. Look carefully at the table and answer questions that follow.

Temperature °C	Solubility of salts in grams (g/100g of water)		
	Potassium nitrate	Sodium nitrate	Copper sulphate.
0	14	73	13
10	21	81	15
20	32	88	17
30	45	96	20
40	63	105	30
50	84	114	35
60	108	124	40
70	136	134	47
80	169	148	56

- a) Plot a graph to represent the information in the table. (6 marks)
- b) Describe the 'general' trend for the solubility of all the three salts. (2 marks)
- c) What is the solubility of sodium nitrate at 55 °C (1 marks)
- d) Which salt is more soluble at 80 °C, why(1 marks)

9. Soil pH is one of the major factors which affect crop growth. Most crops grow in soils which are slightly alkaline and others slightly acidic. Too much acidity or alkalinity of the soils affects crop growth leading to low crop yields. Too much acidity reduces availability of nutrients like phosphorus and also increases toxicity. Too much alkalinity affects drainage of the soil and reduces soil nutrients. (10 marks)



TASK. Using the knowledge of acids and alkalis. Write a letter to Yawe a farmer in Kayunga district on ways she can reduce acidity and alkalinity of her garden soil to ensure that crop yields are high every year.

10. Musa rents a single room where he sleeps with his wife, their five children, hens and 2 goats. The room has small ventilators with a door which is always closed at night. Most of the time, his wife keeps burning charcoal stove more so when cooking beans in the night. Write an informal letter to him telling him of the possible dangers which could happen to his family. Also advice him on what he should do to avoid the dangers. (10 marks)

'END'

zinartjonah@gmail.com \*Working for a just full world\*

NB// In Every Activity book Question,  
every learner must atleast score  
a minimum of 3

In other words every learner has already  
got 3 marks incase they wrote anything

that is  $\frac{3}{10}$  Maths; R/A/C/E  
 $\frac{3}{0}0 - \underline{03}$   
or R/A/F/C  
 $\frac{1}{1}11 - \underline{03}$

Nº 9

ZINAH JONAH  
P.O BOX 801  
~~KALUTHA - KENYA~~

08<sup>th</sup> NOVEMBER 2023

Dear Yaw,

Am writing to inform you on how you can improve on your yields next year by reducing on the acidity and alkalinity of your garden.

You can spray fertilizers that are slightly acidic because you tested and found your soil alkaline so as to neutralize and form favorable soils. If you tested the soils and they are acidic, you can spray slightly alkaline fertilizers so as to neutralize and form suitable pH soils for your plants.

You can also use animal fertilizers / manure as they are the best. You can carry out crop rotation, agro-forestry, give rest to your land so as it develops humus of its own.

You can carry out mixed farming as there are all suitable methods of farming that control over shoot in pH ranges of soil.

max 10

Yours faithfully,

ZINAH

ZINAH JONAH

N°10

ZINART JONAH

P.O BOX 502

KIGALI-ENTEBBE

(5)

08<sup>th</sup> NOVEMBER, 2023

Dear Musa,

Am writing to inform you about the possible dangers you can face if you continue to sleep in a poorly ventilated house at which your wife cooks in using charcoal, I'll also inform you the possible solutions.

The dangers include; You and your family members are more likely to suffocate and die due to insufficient Oxygen supply to your tissues. This is due to the incomplete combustion of charcoal your wife uses. This incomplete combustion produces carbon monoxide and haemoglobin in our blood 3 has a higher affinity for carbon monoxide than Oxygen thus it will bind with Carbon monoxide rather than Oxygen to form an acidic compound carboxyhaemoglobin thus no oxygen will be supplied to your respiring tissues and you will die of suffocation. description of carboxyhaemoglobin takes 3 marks

Other solutions

take 5 marks The possible solutions are; you can resort to non-carbon based fuels to cook like hydroelectric power, you can improve on your house ventilation by opening windows or inserting new ventilators, cook from outside, having your domestic animals sleep outside in a kattle or kraal, etc.

max 10

Yours faithfully,  
Zinart Jonah

N<sup>o</sup> 8.

- a) on graph
- b) Solubility of salts increases with increase in temperature.
- c) 114 - 124 g/100g of water ✓ (Accept 1e)  
(digits in flat range)
- d) Potassium Nitrate, because its curve is the highest one.

dy

A graph showing variation of solubility of different salts with change in temperature

scale:

v/s 2cm : 20g/100g  
Hg 2cm : 10°C

