# ADWARI SENIOR SECONDARY SCHOOL

# END OF TERM I EXAMINATION, 2022

# UGANDA CERTIFICATE OF EDUCATION (U.C.E)

Name:……

Date:……Stream:……Signature:……..……..

**545/2**
**CHEMISTRY**
**PAPER 2**
**AUGUST 2022**
**TIME: 2 HOURS: 30 MINUTES** **EXPCTEDMARKS:……..**

S.3

## INSTRUCTIONS TO CANDIDATES:

- ✓ Write your name, & signature in the space provided.
- ✓ Write stream and date of examination in the space provided.
- ✓ This paper consists of **TWO** sections **A and B.**
- ✓ **Section A** consists of **10** structured questions, attempt **ALL** questions in this section. Answers to section **A** must be written in the spaces provided.
- ✓ Section **B** consists of **4** semi-structured questions. Attempt any **TWO** questions from this section. Answers to this section must be written in the answer booklet provided and **Neat** handwriting is very paramount (Vital).
- ✓ In both sections **ALL** working **MUST** be clearly shown.

| For Examiner's Use Only | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | Total |
| | | | | | | | | | | | | | | |

**This paper consists of 10 printed pages. You should check the question paper to ensure that all pages are printed as indicated and no questions are missing.**

*Success is the sum of small efforts, repeated day in day out*

# SECTION A [50MARKS]

(Attempt **ALL** questions in this section)

1. a) With a reason state whether the following **processes is a chemical** or **physical change**.

   i) Burning of magnesium in air. (1½ mark)

……

……

   ii) Melting of naphthalene. (1½ mark)

……

……

   iii) Adding of water to calcium oxide. (1½ mark)

……

……

   b) When a roll of sulphur was heated on a deflagrating spoon it burns with a **blue flame** and gradually **decreases in amount** with gradual production of a **colourless gaseous substance**.

   i) State whether the above observations indicate a **physical** or **chemical** change. (½ mark)

……

   ii) From the observations above give three reasons to support your answer in (b) (i). (1½ marks)

……

……

……

2. a) What is **basicity of an acid**? (1mark)

……

……

b) Basicity of acids is categorized in to three. Name them and give one each example, the name and the symbol. (1½ mark)

……

……

……

c) **45.5grams** of a saturated solution of **Y** at **15ºC** gave **9.1grams** of **Y** on a careful evaporation calculate the **solubility of Y** at this temperature. (2½ marks)

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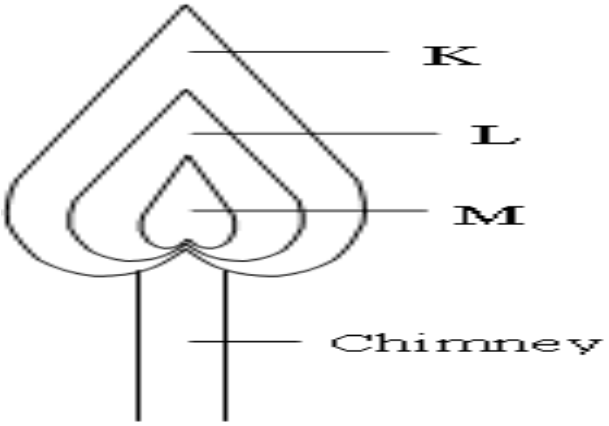
3. The diagram below is a flame. Study it and answer the questions that follow.




a) i) Name the type of flame shown in the diagram. (1mark)

……

ii) Define the type of flame you named in (a) (i) (1mark)

……

……

……

b) Name the parts: (@½ mark)

i. K:……..

ii. L:……..

iii. M:……..

4. a) Define the term mixture. (1½ marks)

……

……

……

……..

b) Classify each of the following into either, an element, and compound, homogenous mixture, or heterogeneous mixture:

i) Air. (½ mark)

……

ii) Water ($H_2O$) (½ mark)

……

iii) Carbon dioxide (½ mark)

……

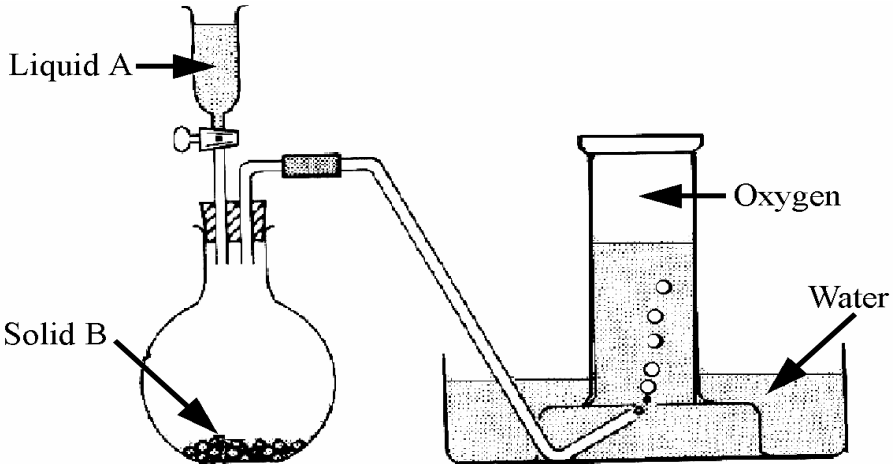
5. a). Name the two major components of air. (1 mark)

……

b). State the methods/processes that can increase the amount of carbon dioxide gas in the atmosphere. (½ mark)

……

c). Oxygen can be prepared by using the chemicals indicated in the diagram below.




(i). Name liquid A. (½ mark)

……

(ii). Name solid B. (½ mark)

……

(iii). Define the term catalyst? (1 mark)

……

(iv). which one of the two chemicals was used as the catalyst? (½ mark)

……

(v). Name a catalyst that you have used in the school laboratory and give a reaction that it catalyses. (2 marks)

……

……

6. An atom of element **Z** contains **13** electrons and **14** neutrons.

a) i) State the mass number of **Z**. (½ mark)

……

ii) Write electronic configuration of **Z**. (1 mark)

……

b) i) Write the formula of an oxide of **Z**. (½ mark)

……

ii) State the class of oxide to which the oxide of **Z** belong. (½ mark)

……

c) Write the equation for the reaction between the oxide of **Z** and dilute sulphuric acid. (1½ mark

……

7. A mixture containing zinc sulphate and zinc carbonate with excess water and filtered.

a) Identify the residue. (½ mark)

……

b) The dry residue was heated strongly:

i) State what is observed. (1½ marks)

……

……..

ii) Write the equation of reaction that took place in b) i) (1½ marks)

……

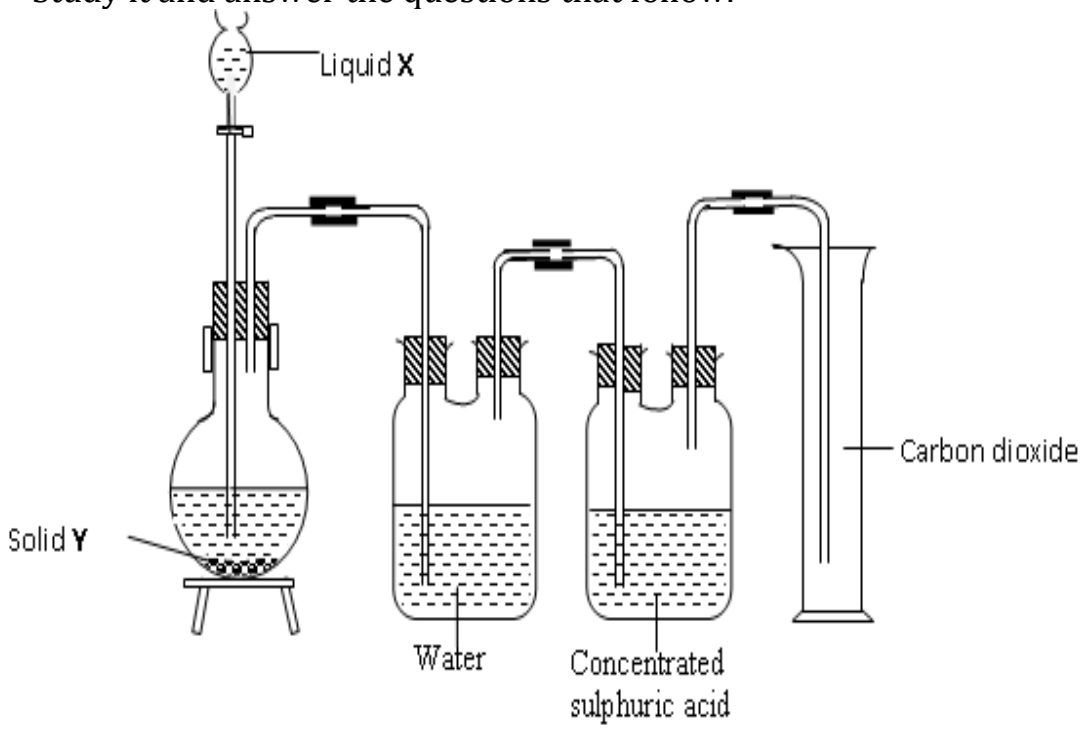
c) i) Name the reagent that can be used to identify the anion in the filtrate. (½ mark)

……

ii) Write ionic equation for the reaction between reagent and the anion. (1½mark)

……

8. The diagram below show laboratory preparation of carbon dioxide gas. Study it and answer the questions that follow.




a) Name

i) Liquid **X**. (½ mark)

……

ii) Solid **Y**. (½ mark)

……

b) Write equation for the reaction leading to formation of carbon dioxide. (1½ marks)

……

c) State the role of:

i) Water. (½ mark)

……

ii) concentrated sulphuric acid. (½mark)

……

d) Write equation of reaction that would take place when burning magnesium is lowered into a gas jar carbon dioxide. (1½ mark)

……

9. a) What do you understand by the term "allotrope"? (1mark)

……

……

……

b) i) Name the two crystalline allotropes of carbon. (1mark)

……

ii) State two differences each between the two allotropes named in (b) (i). (2marks)

……

……

……

……..

c) Give one use of the allotropes named above. (1mark)

……

……

10. a) Lead (II) nitrate was strongly heated is a hard glass test-tube until there is no further change.

i) State what is observed. (2½ marks)

……

……

……

ii) Write the equation for the reaction that took place. (1½ marks)

……

b) The residue formed in (a) above was added to dilute nitric acid and heated.

i) State what is observed. (1mark)

……

……

ii) Write equation for the reaction. (1½ marks)

……

# SECTION B [30MARKS]

(Attempt any <u>TWO</u> questions from this section)

11. a) Draw a diagram f a Daniel cell consisting of zinc rod deep in zinc sulphate band a magnesium ribbon dipped in magnesium sulphate solution, the solution is separated by a porous wall and rods connected by a wire. (4 marks)

b) Indicate:

i) The charges on each electrode. (1 mark)

ii) the direction of electron in the wire. (½ mark)

c) Write:

i) Equation for the reaction at each electrode. (3 marks)

ii) An equation for the overall reaction. (1½ marks)

d) Molten lead (II) bromide was electrolyzed between carbon electrode:

i) State what was observed at the: (@1 mark)

i). the anode

ii). the cathoode

ii) Write equation for the reaction that took place at each electrode. (3 marks)

12. a) Briefly describe how a pure dry sample of zinc sulphate-7-water can be prepared in the laboratory starting with zinc oxide. (6 marks)

b) Zinc sulphate-7-water was heated 1st gently and the strongly until there was no further change.

i) State what was observed. (1½ marks)

ii) Write equation(s) for the reaction(s) that took place. (3marks)

iii) State and explain what would be observed when dilute sodium hydroxide solution was added drop wise until in excess to the aqueous solution obtained in (b) (i). (4½ marks)

13. Li, Na and K are elements in the same group in the Periodic Table. Their atomic numbers are **3**, **11** and **19** and their mass numbers are **7**, **23** and **39** respectively.

a) Write:
   i) The electronic configuration of Li ion. (½ mark)
   ii) Electronic configuration of Na and K. (1mark)

b) To which group in the Periodic Table does the three elements belong? Give reason for your answer. (2marks)

c) How many neutrons are there in the nuclei of Na and K.? (1mark)

d) i) Describe what would be observed when a piece of Na is dropped on the surface of water. (2½ marks)
   ii) Write equation of reaction to show the reaction between K and water. (1½ marks)

e) Each of the three elements reacts with chlorine to form chloride.
   i) Name the chlorides formed by the three elements. (1½ marks)
   ii) What type of bond exists in the chlorides? (½ mark)
   iii) Write equations of reactions showing the formation of the named chloride in (e) (i) above. (4½ marks)

14. a) Sodium, aluminium and sulphur can combine with oxygen to form oxides. Complete the table to show the formula, class and bond in the oxide of each of these elements. (2marks)

| Element | Formula of oxide | Class of oxide | Type of the bond in oxide |
|---|---|---|---|
| Sodium | | | |
| Aluminium | | | |
| Sulphur | | | |

b) The oxide of sodium and sulphur were separately treated with water. Write equation show what took place in each case. (3marks)

c) Explain what is meant the following terms: (4½ marks)
   i) "Normal salt" ii) "Acidic salt"

d) Below is a table showing the solubility of potassium nitrate ($KNO_3$) at different temperatures.

| Temperature | 0 | 10 | 20 | 30 | 40 | 55 |
|---|---|---|---|---|---|---|
| Grames of $KNO_3$/100g of water | 14 | 18 | 29 | 45 | 70 | 115 |

i. Plot a graph of solubility of potassium nitrate against temperature. (2 marks)

ii. Comment on the relationship between solubility of potassium nitrate and temperature. (2½ marks)

iii. From the graph, determine the solubility of potassium nitrate at:
(i) **25°C** (ii) **35°c** (1 mark)

**This is the last page of printed paper, Page 10**

**-END-**

Success is the sum of small efforts, repeated day in day out