

545/1

CHEMISTRY

Nov/Dec 2023

2 Hours: 30 Mins



# MEBU EXAMINATIONS BOARD

*Uganda Certificate of Lower Secondary Education*

**S.3 END OF YEAR ASSESSMENT 2023**

**CHEMISTRY**

**TIME: 2:30 MIN**

## INSTRUCTIONS

- This paper consists of two sections A and B. Attempt all questions from section A and section B.
- Answers to section A must be written in the spaces provided. For section B, write answers on the answer sheets provided.
- Present your work neatly.

**@ MEBU EXAMINATIONS BOARD 2023 +256753822283 / +256761762094**

## SECTION A

1. a) An atom of element **R** has 11 protons and mass number 23. write the formula of the oxide of **R**. ( 1 scores)

.....

.....

.....

b) The oxide of **R** was dissolved in water and the aqueous solution tested with a blue litmus paper

i) State what was observed. (1 score)

.....

.....

ii) Write equation for the reaction between the oxide of **R** and water. (1½ scores)

.....

.....

c) Name the type of bond in the oxide of **R** (1 score)

.....

.....

d) State the structure that is exhibited by element **R**. (1 score)

.....

.....

2. Carbon dioxide can best be prepared by reacting a carbonate Y with dilute hydrochloric acid. The reaction proceeds according to the following reaction.



- i) Name the mineral/ ore that can be used to prepare carbon dioxide gas in the laboratory (1 scores)

.....  
.....

- i) Explain why sulphuric acid is not normally used instead of hydrochloric acid when such a substance is used. (2 ½ scores)

.....  
.....  
.....  
.....

- b) (i) Excess carbon dioxide was bubbled through an aqueous solution of sodium hydroxide solution for a long period of time, state what was observed. (2 scores)

.....  
.....  
.....  
.....

- (ii) write equation(s) for the reaction(s) that took place ( 3 scores)

.....  
.....  
.....

.....  
.....  
(iii) state any two uses of the final product in b) (i) above (2 scores)

.....  
.....  
.....  
b) Carbon dioxide was bubbled through lime water for a long time, state what was observed. (1 score)

.....  
.....  
3. a) Describe briefly what is meant by the term an acid (1 score)

.....  
.....  
b) Out line any three examples of mineral acids (1 ½ scores)

.....  
.....  
c) Acids commonly react with bases or alkalis to form a salt and water.

i) Which name is given to the type of reaction that is under gone when an acid reacts with a base or alkali? ( ½ scores)

- ii) Name any two salts that are suitably prepared by the reaction you have named in (c) (i) above (1 score)

.....

.....

4. (a)(i) Define the term “alloy” (1 score)

.....

.....

- (ii) Give a reason why alloys are more useful than pure substances. (1 score)

.....

.....

- (b) State the composition of the following alloys

- (i) Bronze (1 score)

.....

.....

- (ii) Solder (1 score)

.....

.....

- c) Steel is one of the alloys that are used to make strong metallic substances like steel iron bars, iron sheet, iron nails, auto parts and others.

Give a reason why;

- i) It takes a few days for iron nails to rust as compared to iron sheet (3 scores)

.....

.....

.....

.....

- ii) Steel iron bars are used in construction mainly of slabs and bridges. (3 scores)

.....

.....

.....

5. Analysis of an inorganic salt gave out the following results, 14.27% carbon, 1.19% hydrogen, 28.05% sodium and the rest being oxygen.

- a) (i) determine the empirical formula of the salt (3 ½ scores)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(ii) calculate the molecular formula of the salt (1 ½ scores)

.....

.....

.....

.....

.....

b) Name any one industrial application of the salt above in (a) (i) (1 score)

.....

.....

6. Busolo is a village where cereals like maize, sorghum, and millet are the main cash crops grown by the people in this village. Two years ago they noticed a fall in the yields. They were advised by agricultural officer to apply either organic inorganic fertilizer in order to regain more yields. Ammonium nitrate ( $\text{NH}_4\text{NO}_3$ ) and ammonium sulphate [ $(\text{NH})_2\text{SO}_4$ ] are some of the substances that they can use to overcome the problem.

a) With a reason, state which one of the fertilizers they can apply (1 score)

.....

.....

b) Excessive use of such fertilizers can lead to a change in the soil pH

(i) what would be the pH of the soil if such fertilizers are used (1 mark)

.....

.....

(ii) give a reason for your answer in (b) (i) above ( 2 scores)

.....

.....

.....

7. Air is mainly composed of two gases X and Y in the ratio 4:1

Name gasses (2 scores)

i) Y.....

ii) X.....

b) (i) name the physical method that can be used to separate the two gases

(1 score)

.....

.....

ii. State the principal behind the method you have stated in (b) (i) above

(1 score)

.....

.....

c) State any one large scale use of gas Y in the medical field ( 1 score)

.....

.....



8. Aluminium is one of the most reactive elements in the reactivity series. However, it is mostly used in satellite discs without protecting it. Explain why aluminium is not protected. (score 04)

.....

.....

.....

.....

**SECTION B (ATTEMPT ANY TWO QUESTIONS)**

9. a) Angel is a senior three student; she added dilute hydrochloric acid little at a time to dilute sodium hydroxide solution that contained a few drops phenolphthalein indicator until the colour of the solution changed

- i) State the colour the solution changed to (1 score)
- ii) Write an equation for the reaction that took place (1 score)
- iii) State one application of such a reaction (1 score)
- iv) Name the method that can be used to salt product formed in the reaction above (1 score)
- v) Name any one other salt that can prepared in a similar way as above (1 score)

b) if angel used  $20.0\text{cm}^3$  of a  $0.2\text{M}$  hydrochloric acid and  $25.0\text{cm}^3$  of sodium hydroxide for complete reaction, determine

- i) the number of moles of hydrochloric acid that reacted (2 scores)
- ii) number of moles of sodium hydroxide that reacted (2 scores)
- iii) concentration of sodium hydroxide in  $\text{g/l}$  ( $\text{Na}=23$ ,  $\text{H}=1$ ,  $\text{O}=16$ ,  $\text{Cl}=35.5$ ) (3 ½ marks)

c) What is the mass of sodium hydroxide required to react with excess hydrochloric acid in order to produce **5000g** of sodium chloride (2 ½ scores)

10. In one of the parliamentary sessions of the 11<sup>th</sup> parliament of the republic of Uganda, one of the honorable members raised a concern that the enhanced salary for the science teachers should be scrapped off which created a heated debate in that sitting with many saying that the subjects including chemistry have done nothing for this country. As a young chemist justify the statement of these members of parliament. (15 scores)

11. The school management committee (SMC) of Yawe secondary school has organized a budget meeting for the academic year 2024 to purchase learning materials for the school and a member has proposed that the modern periodic table should be one of the materials to be purchased which many members did not agree. Insist on the need to include the modern periodic table among the items to be purchased. (score 15)

12. Lake Katwe in western Uganda is known to be the source of salts that is used in homes for cooking and other uses. The president of the republic of Uganda has therefore asked the scientists for whom he had increased their salaries to do everything possible to get the common salt from this lake. As a young scientist, guide the fellows on how salt can be obtained from this lake. (score 15)

**\*\*\*\*\*END\*\*\*\*\***