

NAME..... SIGNATURE.....

545/2

Chemistry

Paper 2

2020

Time: 2 hours

ST. BRUNO SSERUNKUMA SENIOR SECONDARY SCHOOL GGOLI

SELF ASSESSMENT EXAMS

Uganda Certificate Of Education

CHEMISTRY

Paper 2

2 HOURS

INSTRUCTIONS TO CANDIDATES.

- Section **A**: consists of **10** structured questions. Answer all questions in this section. Answers to questions in this section must be written in the spaces provided.
- Section **B**: consists of **4** semi structured questions. Answer any **two** questions from this section. Answers to questions in this section **must** be written in the answer sheets provided. In both sections all working must be clearly shown

For examiners' use only														
1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total

SECTION A: (50 MARKS)

Answer **all** questions from this section

1. (a) Distinguish between an acid and a base (01 mrk)

An Acid	A base

b) Name three Oxides which behave both as an acid and a base (1 ½ marks)

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.....

c) Water was added to sodium oxide and the resultant solution was tested with litmus paper.

(i) State what was observed (01 mrk)

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.....

(ii) Write the equation for the reaction that took place between sodium oxide and water (1 ½ Marks)

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2. (a) What is the purpose of each of the following procedures in water treatment?

(i) Adding a coagulant (aluminum sulphate or alum) and lime (1 mark)

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.....

(ii) Passing water through a bed of fine sand (1 mark)

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.....

b) Steam was passed over heated magnesium ribbon.

i) State what was observed (1 mark)

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.....

ii) Write the equation for the reaction that took place. (1 ½ marks)

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3. A knife made of iron got lost in the banana plantation but was found after five days with a brown coating formed on its surface.

a) State

(i) The chemical name of the brown coating (1 mk)

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.....

(ii) The conditions for the reaction leading to the formation of the brown coating. (1 mrk)

.....
.....

b) Give **one** advantage and **one** disadvantage of the formation of the brown coating describe above

i) Advantage (½ mrk)

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.....

ii) Disadvantage (½ mark)

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.....

c) What are the reasons for using alloys more than pure metals (2 marks)

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.....

4. The table below describes some particles (atoms and ions)

Particle	Electrons	Neutrons	protons
S	10	12	13
W	12	14	12
X	12	12	12
Y	10	8	8
Z	9	10	9

(a) Identify

(i) Two particles which are atoms of the same element. (1 mrk)

.....
.....

(ii) A cation (1mk)

.....
.....

(iii) An anion (1/2 mk)

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.....

b) Write the electronic structure of

(i) X (½mk)

.....
.....

(iii) Z (1/2 mk)

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.....

b) State the type of bonding in the compound of X and Z (1/2 mk)

.....
(c) Describe three properties of the compound formed between X and Z (1½ mks)
.....
.....

5. A hydrated substance, G, of relative formula mass 249, consists of 25.5% copper, 12.8% sulphur, 25.7% oxygen and 36.0% water of crystallization.

(a) Calculate the empirical formula of G (2 mks)
($C_u = 63.5$, $S = 32$; $O = 16$, $H = 1$)
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.....
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.....
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.....

(b) Determine the molecular formula of G (1½ mks)
.....
.....
.....

c) G was heated strongly in a hard test tube. Write an equation for the reaction that took place. (1½ mks)
.....

6. (a) (i) State the conditions for the reaction between sodium sulphite and sulphuric acid forming sulphur dioxide. (1 mark)
.....
.....
.....

ii) Write an ionic equation for the reaction (1 ½ mks)
.....
.....

(b)(i) Name **one** reagent that can be used to identify sulphur dioxide. (½mk)
.....
.....

(ii) State what is observed when sulphur dioxide is bubbled into the reagent named. (1 mark)
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.....

(c) Explain how dry sulphur dioxide is collected in the laboratory. (1mark)

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.....
.....
7. (a) Give three uses of graphite (1½ marks)

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.....
.....
(b) State **two** differences in properties between graphite and diamond. (2 marks)

Graphite properties	Diamond properties
(i)	
(ii)	

(c) Concentrated sulphuric acid reacts with graphite according to the equation
$$\text{C (s)} + 2\text{H}_2\text{SO}_4(\text{l}) \longrightarrow \text{CO}_2(\text{g}) + 2\text{SO}_2(\text{g}) + 2\text{H}_2\text{O (l)}.$$

Calculate the mass of carbon needed to produce 400cm³ of carbon dioxide at room temperature
(C = 12, 1 mole of gas occupies 24000 cm³ at room temperature.) (1½ marks)

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.....
8. (a) What is enthalpy of neutralization? (1mk)

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.....
.....
(b) When 50cm³ of 2M sodium hydroxide solution was mixed with 50cm³ of 1M sulphuric acid in a plastic cup, the temperature rose by 12.5°C

(i) State whether the reaction is exothermic or endothermic. (½mk)

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.....
.....
(ii) Give a reason for your answer (½mark)

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.....
.....
iii) Calculate the enthalpy of neutralization of sodium hydroxide and indicate the sign of the enthalpy. (3 marks)

(Density of water = 1gcm³ specific heat Capacity of water = 4.2Jg⁻¹°C⁻¹)

9. Ethane, $\text{H}_2\text{C} = \text{CH}_2$ can be prepared from ethanol

(a) (i) State the conditions for the reaction (1 mk)

.....
.....

ii) Write the equation for the reaction (1 ½ marks)

.....

b) Under suitable conditions, ethane reacts to form a large molecule, Z

i) Identify Z (½mk)

.....

ii) Write the equation for the formation of Z.

.....

c) State:

i) One use of Z (½ mark)

.....

.....

ii) One disadvantage of using Z. (½mk)

.....

10. State what would be observed and write the equation for the reaction that would take place if the following salts were heated strongly.

(a) Zinc nitrate crystals

Observation (½mark)

.....

.....

Equation (1 ½ marks)

.....

.....

(b) Copper(ii) carbonate

Observation (½mark)

.....

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Equation (1½ marks)

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SECTION B: (30 MARKS)

- Answer any **two** questions from this section
- Additional questions answered will **not** be marked.

11. (a) Explain how an increase in each of the following affect the rate of the reaction.
- (i) Concentration of reactants (½mark)
 - (ii) Temperature (½mark)
 - (iii) Surface area of solid reactants (½mark)
- (b) The table below shows the results of the effect of temperature on the rate of the reaction

Temperature (oC)	10	20	30	40	50
Time(s)	133	77	48	31	17
$\frac{1}{\text{Time}}$ (S ⁻¹) rate of reaction					

- (i) Determine the value of $\frac{1}{\text{time}}$ (to 3 decimal places) and enter your answers in the spaces in the table (2½ marks)
- (ii) Plot a graph of $1/\text{time}$ against temperature. (4 ½ marks)
- (iii) From your graph deduce how the rate of reaction varies with temperature From your deduce (½ mark)
- (c) Sketch a curve to show the variation of volume of gas with time (1 mark)
12. (a) With the use of a drawing describe briefly how pure dry chlorine can be prepared in the laboratory using potassium manganate (vii) (6 marks)
- (b) Write the equation for the reaction between chlorine and each of the following (4 ½ marks)
- (i) Hydrogen
 - (ii) Potassium iodide solution
 - (iii) Heated iron filings
- (c) A test tube filled with chlorine water was inverted onto a beaker containing chlorine and exposed to sunlight for some time.
- i) State what was observed (½mark)
 - ii) Explain your observation illustrating the answer with equation(s) (3 marks)
- (c) Give two uses of chlorine (1 Mark)
13. (a) Describe how ammonia is made in the Haber process (include conditions and equation) (3 ½ marks)
- (b) Write the equation for the reaction between ammonia and
- (i) lead (ii) Oxide on heating (1 ½ marks)
 - (ii) Write the equation for the reaction (1½ marks)
- (c) Ammonia can be converted to Nitrogen Oxide
- (i) State the conditions for the reaction. (1 mark)
 - (ii) Write the equation for the reaction. (1½ marks)
- (d) Show how Nitrate Acid is made from Nitrogen Oxide. (3 marks)

- (d) Aqueous ammonia was added drop wise until in excess to lead (ii) nitrate solution
(i) State what was observed (1 mark)
(ii) Write an ionic equation for the reaction which took place.

(1½ Marks)

- (e) Give two uses of ammonia (½mark)

14. (a) Briefly describe how dry crystals of copper (II) sulphate can be prepared in the laboratory from copper (II) oxide (6 marks)

- (b) A dilute solution of copper (ii) sulphate was electrolyzed using graphite electrodes.

- (i) State what was observed at the cathode (1 mark)

- ii) Write the equation for the reactions at the cathode and anode (2½ marks)

- (c) The electrolysis of copper(II) sulphate solution was repeated using copper electrodes. Explain what was observed at the anode. Use an equation to illustrate your answer. (2½ Marks)

- (d) Explain why molten ionic compounds conduct electricity whereas solid ionic compounds do not conduct electricity (2 marks)

- (e) Give two applications of electrolysis . (1 mark)

END