NAME: ---------- INDEX No. ----------

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545/2

CHEMISTRY

PAPER 2

JULY/AUGUST, 2023

TIME: 2 Hrs

LANGO SECONDARY SCHOOLS MOCK EXAMINATIONS ASSOCIATION

UGANDA CERTIFICATE OF EDUCATION

CHEMISTRY

PAPER TWO

Time: 2 Hours

INSTRUCTIONS TO CANDIDATES:

- *Section **A** consists of **10** structured questions.*
- *Answer **all** the questions in this Section*
- *Answers to the questions must be written in the spaces provided.*
- *Section **B** consists of **4** semi – structured questions. Answer any **two** questions from this Section. Answers to the questions must be written in the answer booklet(s) provided.*

(C = 12, H = 1, O = 16, Cu = 64, S = 32, N = 14, P = 31)

*1 mole of gas occupies 22.4l at **s.t.p**.*

1 mole of gas occupies 24l at room temperature.

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 in this Section.*

1. Air is a mixture of gases.

(a) State: -

(i) Two reasons why air is regarded as a mixture and not a compound. *(01 Mk)*

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.....

.....

(ii) The method by which the major components of air are separated industrially.

.....

(1/2 Mk)

(b) Give a reason for your answer in (a)(ii)

.....

(c) Write equation to show the reaction that can take place between the most abundant component of air and magnesium. *(1 ½ Mks)*

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(d) A clean iron-nail that remained exposed in air overnight had a reddish brown solid deposited on it.

(i) Name the component(s) of air that caused the formation of the reddish brown solid on the iron nail. *(01 Mk)*

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(ii) State one industrial method that is normally used to avoid formation of the reddish brown solid on iron. *(1/2 Mk)*

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.....

2. The atomic numbers of elements **Q, R** and **T** are 6, 17 and 19 respectively.

(a) Write the electronic configuration of: -

(i) **Q**: ..... *(1/2 Mk)*

(ii) **R**: ..... *(1/2 Mk)*

(iii) **T**: ..... *(1/2 Mk)*

(b) R reacted separately with **Q** and **T** to form compounds **X** and **Y** respectively. State the types of bond that exists in compound: -

(i) **X**: ..... *(1 Mk)*

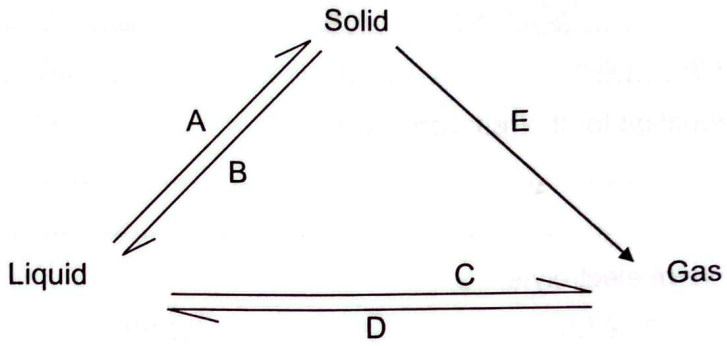
(ii) **Y**: ..... *(1 Mk)*

(c) Identify which one of the compounds in (b) would be soluble in

(i) Water: ..... *(1/2 Mk)*

(ii) Petrol: ..... *(1/2 Mk)*

3. The diagram below shows how states of matter can change under different conditions.



(a) Name the change of states of matter represented by: - *(2 ½ Mks)*

(i) A: .....

(ii) B: .....

(iii) C: .....

(iv) D: .....

(v) E: .....

(b) Name two substances which can undergo the change of state represented by E.

.....

..... *(2 Mks)*

(c) State one condition other than temperature that can bring about the change of state represented by D. *(1/2 Mk)*

.....

.....

4. A compound **P** of molecular mass 28, contains 85.7% carbon and 14.4% hydrogen.

(a) Calculate the simplest formula of **P**. *(1 ½ Mk)*

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.....

(b) (i) Determine the molecular formula of **P**. *(01 Mk)*

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(ii) Write the structural formula of **P**. *(1/2 Mk)*

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.....

.....

(c) State what is observed if **P** is reacted with bromine water. *(01 Mk)*

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.....

(d) Write an equation for the reaction in (c). *(01 Mk)*

.....

.....

5. (a) Define the term electrolyte. *(1 ½ Mks)*

.....

.....

(b) Name the particle by means of which electric current is conducted in

(i) Graphite: .....

..... *(1 ½Mks)*

(b) Molten lead (II) bromide: .....

..... *(01 Mk)*

(c) Give a reason why: -

(i) Lead (II) bromide when in molten state conducts electricity but when in solid state does not. *(01 Mk)*

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.....

.....

(ii) Electrolysis of concentrated sodium chloride solution is done using graphite anode but not a metal like iron. *(01 Mk)*

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6. (a) (i) Write equation to show how hydrogen can be prepared using Zinc and dilute sulphuric acid. *(1 ½ Mks)*

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.....

.....

(ii) State how hydrogen can be tested in the laboratory. *(01 Mk)*

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.....

(b) Hydrogen reacts with copper (ii) oxide according to the following equation

$CuO_{(s)} + H_{2\,(g)} \longrightarrow Cu(s) + H_2O_{(l)}$

(i) State what is observed when dry hydrogen is passed over heated copper (II) oxide. *(01 Mk)*

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.....

(ii) Calculate the volume of hydrogen at **s.t.p** that would react with copper (II) oxide to form 3.20g of copper. *(2 Mks)*

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7. (a) Name the industrial process by which ammonia gas is manufactured. *(01 Mk)*

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(b) Ammonia is used to manufacture fertilizers such as ammonium sulphate, $(NH_4)_2\,SO_4$ and diammonium phosphate, $(NH_4)_2\,HPO_4$. Calculate the percentage of nitrogen in: -

(i) Ammonium sulphate. *(1½ Mks)*

.....

.....

.....

(ii) Diammonium phosphate. *(1 ½ Mks)*

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.....

.....

(c) (i) Which of the two fertilizers in (b) is better? *(1/2 Mk)*

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(ii) Give a reason for your answer in (c)(i). *(1/2 Mk)*

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.....

.....

8. (a) Natural rubber is soft and it is normally made hard before use.

(i) Name one process by which natural rubber is made hard. *(01 Mk)*

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.....

(ii) State how natural rubber is made hard by the process you have named in (a)(i). *(01 Mk)*

.....

.....

(b) State: -

(i) Two reasons why natural rubber is made hard before use. *(01 Mk)*

.....

.....

(ii) Two uses of rubber. *(01 Mk)*

.....

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9. (a) Oxygen can be prepared using sodium peroxide and water.

(i) Write an equation for the reaction between sodium peroxide and water.

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.....*(01½ Mks)*

(ii) Name one other substance from which oxygen can be prepared in the laboratory. *(01 Mk)*

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(b) (i) State the condition(s) under which oxygen can react with Iron. *(01 Mk)*

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.....

(ii) Write an equation for the reaction that takes place when iron is treated with oxygen under the condition(s) you have stated in (b)(i). *(1½ Mks)*

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10. (a) Define the term neutralization reaction. *(01 Mk)*

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(b) $25.0cm^3$ of 0.1M hydrochloric acid solution required $10.0cm^3$ of sodium carbonate solution for complete reaction.

(i) Write an equation for the reaction between sodium carbonate and dilute hydrochloric acid. *(1 ½ Mks)*

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(ii) Determine the concentration of sodium carbonate solution in moldm^{-3}.

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..... *(3 ½ Mks)*

SECTION B.

*Answer any **two** questions from this Section. Additional question answered will not be marked.*

11. (a) (i) With the aid of a labelled diagram, describe how a pure dry sample of carbondioxide gas can be prepared in the laboratory. *(5 ½ Mks)*

(ii) Write the equation for the reaction. *(1½ Mks)*

(iii) State two commercial uses of carbodioxide gas. *(2 Mks)*

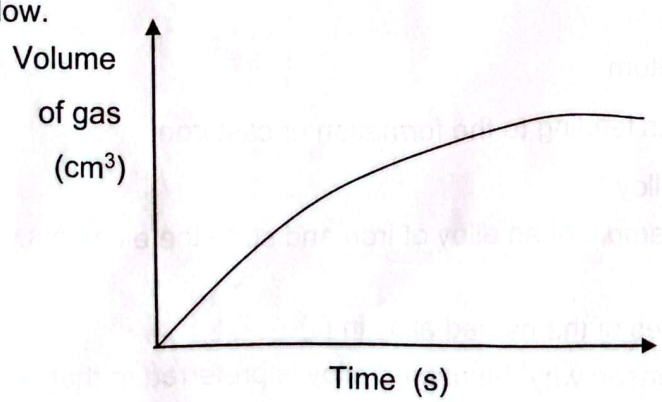
(b) (i) State what is observed when burning magnesium is plunged into a gas jar containing dry carbondioxide gas. *(1 ½ Mks)*

(ii) Explain the observation in b(i) above. *(03 Mks)*

(iii) Write the equation for the reaction that takes place in b(i) above. *(1 ½ Mks)*

12. (a) State and explain how any three factors can affect the rate of a reaction. *(6 Mks)*

(b) A mixture of a known mass of zinc granules and a certain volume of 2M sulphuric acid was put in a conical flask attached to a 100cm^3 graduated gas syringe. The volume of the gas was recorded at various intervals and a graph plotted as shown below.



On the same axes, sketch and label a graph that would be obtained when the experiment was repeated with: -

(i) 1M sulphuric acid. *(1 ½ Mks)*

(ii) 2M sulphuric acid and powdered zinc. *(1 ½ Mks)*

(c) 10.0g of copper (II) carbonate were reacted with 40cm³ of 2M hydrochloric acid.

(i) Write an equation for the reaction between the acid and copper (II) carbonate. *(1 ½ Mks)*

(ii) Calculate the volume of the carbon dioxide produced at room temperature. *(4 ½ Mks)*

13. (a) (i) Which word is used to mean 'formation of soap'? *(01 Mk)*

(ii) Name two sources of vegetable oils that can be used for preparation of soap. *(01 Mk)*

(b) Briefly describe how soap is prepared. *(4 ½ Mks)*

(c) State: -

(i) One advantage of using a detergent over soap when washing. *(01 Mk)*

(ii) One disadvantage of the detergent to the environment. *(01 Mk)*

(d) Explain the following observations: -

(i) Water containing calcium hydrogen carbonate does not lather readily with soap unless after boiling. *(05 Mks)*

(ii) Water containing magnesium sulphate will not lather even after boiling. *(1 ½ Mks)*

14. In the extraction of cast iron using a blast furnace, spathic iron ore which contains some impurities is first roasted in air. It is then mixed with some other substances and finally introduced into the blast furnace.

(a) Name the major impurity in the iron ore. *(01 Mk)*

(b) (i) Give the chemical name of spathic iron ore. *(01 Mk)*

(ii) Write an equation for the reaction which takes place when spathic iron ore is roasted in air. *(2 ½ Mks)*

(c) Name the substances that are fed into the blast furnace.

(i) From the top *(1 ½ Mks)*

(ii) From the bottom *(1 ½ Mks)*

(d) Outline the reactions leading to the formation of cast iron. *(05 Mks)*

(e) (i) What is an alloy? *(1/2 Mk)*

(ii) Name an example of an alloy of iron and state the elements contained in it. *(01 Mk)*

(iii) State two uses of the named alloy in (ii) *(01 Mk)*

(iv) Suggest a reason why the named alloy is preferred to that of pure iron. *(01 Mk)*

END