MARANDA HIGH SCHOOL

The Kenya Certificate of Secondary Education

PRE-MOCK FORM 4 TERM 1

233/2 Chemistry (Theory) Paper 2

March, 2024 Time: 2 Hours

Name: …… Adm No: ……

Stream: …….. Signature: ……..…..

233/2 Chemistry PP2 - Theory
Thursday, 26th , 2023
Evening
Time: 7.00-9.00Pm

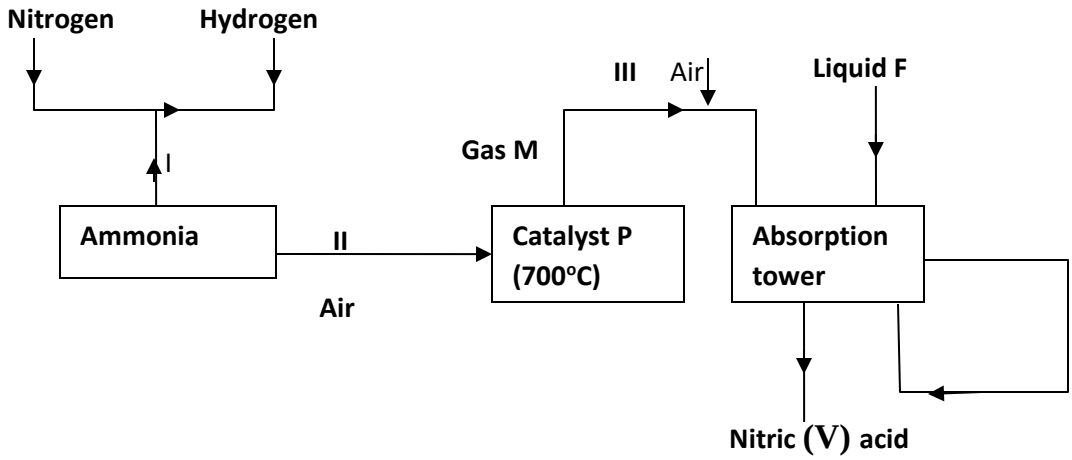
Instructions to candidates

(a)Write your Name, Stream, Admission Number and sign in the spaces provided above.
(b)Answer all the questions in the spaces provided in the question paper.
(c)KNEC mathematical tables and electronic calculators may be used for calculations.
(d)All workings MUST be clearly shown where necessary.
(e)This paper consists of 14 Printed pages. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
(g)Candidates should answer the questions in English.

FOR EXAMINERS USE ONLY

Questions	Maximum Score	Candidate's Score
1	9	
2	12	
3	12	
4	12	
5	12	
6	11	
7	10	
TOTAL	80	

1.Study the flow chart below and answer the questions which follow:



(a) (i) Write the equation for the formation in step I (1mark)

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(ii) State two optimum conditions for the reaction in step I (1mark)

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(b) Identify gas **M** and catalyst **P** (1mark)

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(c) Write the equation for the reaction that occurs in step III (1mark)

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(a) (i) Identify liquid F (1mark)

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(a) (ii) Write the equation for the reaction that occurs in the absorption tower. (1mark)

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(e) (i) Name process IV (1mark)

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(ii) State the importance of process IV (1mark)

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(d) 60-65% Nitric (V) acid is produced in the absorption chamber. state how the acid can be concentrated (1mark)

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(f) State two uses of nitric(V)acid (1mark)

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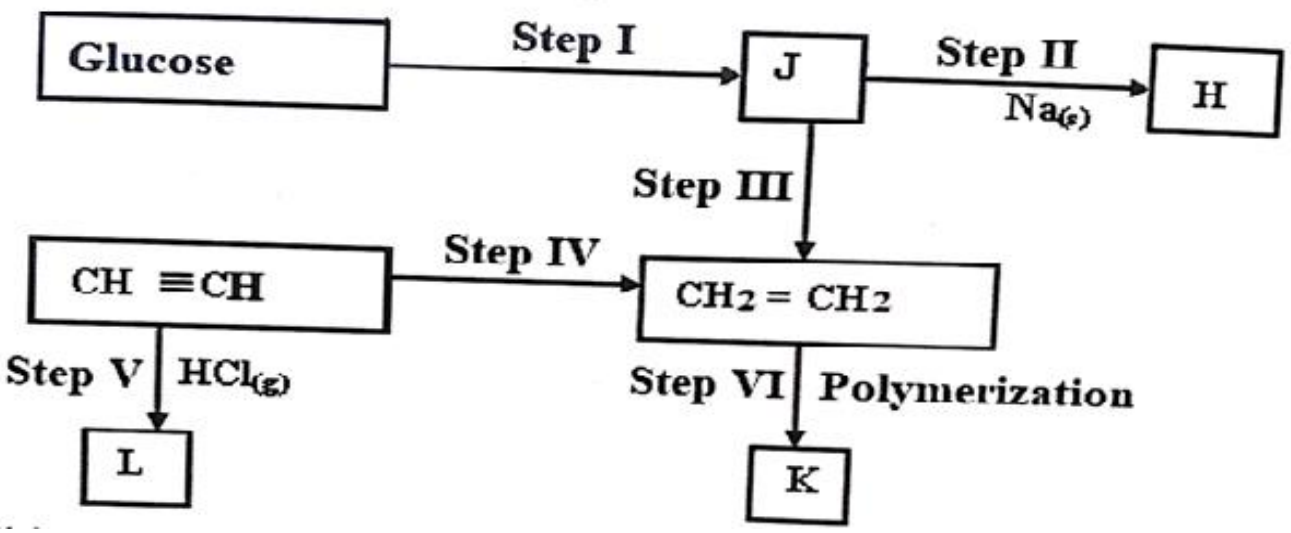
2. (a)Study the flow chart below and use it to answer the questions that follow.



(i)State the conditions for step I and step IV (2marks)

I……...

IV……

(ii) Write an equation for the reaction in step II (1mark)

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(iii) I. Identify the process in step III (1mark)

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II.Name the reagents and conditions necessary for the process named in(iii)I above (1mark)

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(iv)I. Identify process IV (1mark)

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II.State one industrial application of the process named in (iv)I above (1mark)

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(V).Write an equation for step V (1mark)

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(vi)I. Write the formula of substance K (1mark)

……

II.State one use of substance K (1mark)

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(b) A compound whose structure is shown below is found in a detergent.

With reference to the structure, explain how the detergent removes grease during washing

(3marks)

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3.(a) The grid given below represents part of the periodic table. Study it and answer the questions that follow. *(The letters do not represent the actual symbols of elements)*

A								
C	**D**		**E**				**B**	
J	**H**						**F**	**G**

(a)Select two elements that form basic oxides (1mark)

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(b)(i) Write the equation of the reaction between element H and water (1mark)

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(ii) Compare the reactivity between element D and H with chlorine. Explain (2marks)

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(c) Compare the reactivity between elements B and F (2marks)

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(d)Compare the melting points of elements

(i) D and E (2marks)

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(ii) C and J (2marks)

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(e) State one use of element G (1mark)

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4. (a) What is meant by molar heat of neutralization (1mark)

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(b) In an experiment to determine molar heat of neutralization ,50$cm^3$of 1M hydrochloric acid was neutralize by adding 10cm^3 portion of dilute sodium hydroxide. During an experiment the data in the table below was obtained.

Volume of sodium hydroxide(cm^3)	0	10	20	30	40	50	60
Temperature of mixture(^{0}C)	25.0	27.0	29.0	31.0	31.0	30.0	29.0

(i) Write the equation for the reaction in this experiment (1mark)

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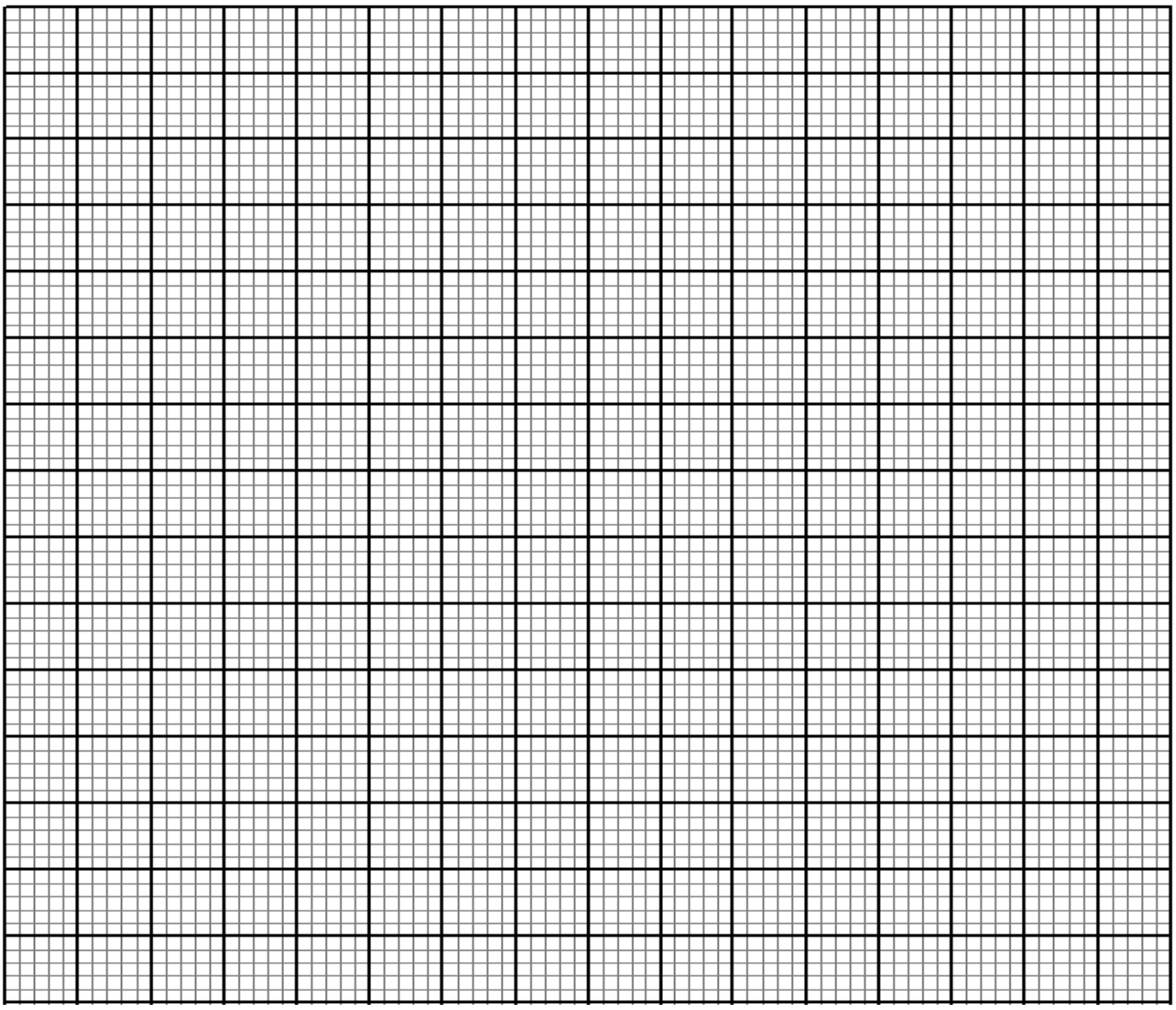
(ii) On the grid provided, plot a graph of temperature (Y-axis) against volume of sodium hydroxide(x-axis) added. (3marks)



(iii) Determine from the graph the:

I. Volume of sodium hydroxide which completely neutralizes $50cm^3$ of 1M hydrochloric acid

(1mark)

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II.Change in temperature, ΔT when complete neutralization reaction (1mark)

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(iv) Calculate:

I. The heat change , ΔH ,when complete neutralization occur

(Specific heat capacity=4.2J/g/K, density of solution of solution=1g/cm^3) (2marks)

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II.Molar heat of neutralization of hydrochloric with sodium hydroxide (1mark)

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(v) How would the value of molar heat differ if 50cm^3 of 1M ethanoic acid was used instead of 1M hydrochloric acid? Give a reason (2marks)

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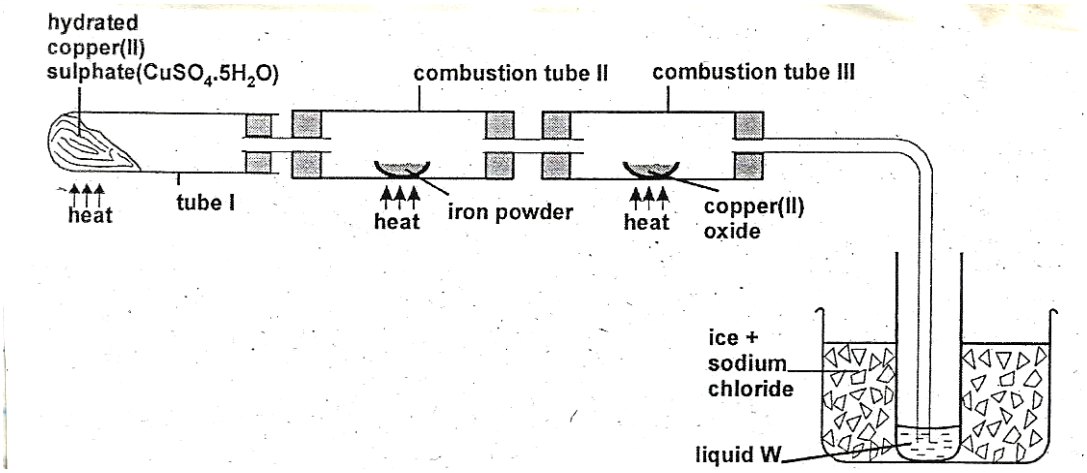
5. The diagram below shows the apparatus for the preparation of gas A and investigate on its properties. Study it and answer the questions that follow.



a) (i) Name gas **A** (1 mark)

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(ii) Suggest the property of gas **A** under investigation. (1 mark)

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(iii) Write chemical equations for the reactions in the;

Boiling tube I (1 mark)

……

Combustion tube II (1 mark)

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b) (i) State and explain the observation made in

Tube I. (2 marks)

……

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Combustion tube II (2 marks)

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c) (i) What is the use of hydrated copper (II) sulphate in the experiment. (1 mark)

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(ii) Name liquid W. (1 mark)

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(iii) What is the role of sodium chloride in the ice (freezing mixture) (1 mark)

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(iv) Explain why hydrogen gas has been replaced by helium in filling of aeroplane tyres. (1 mark)

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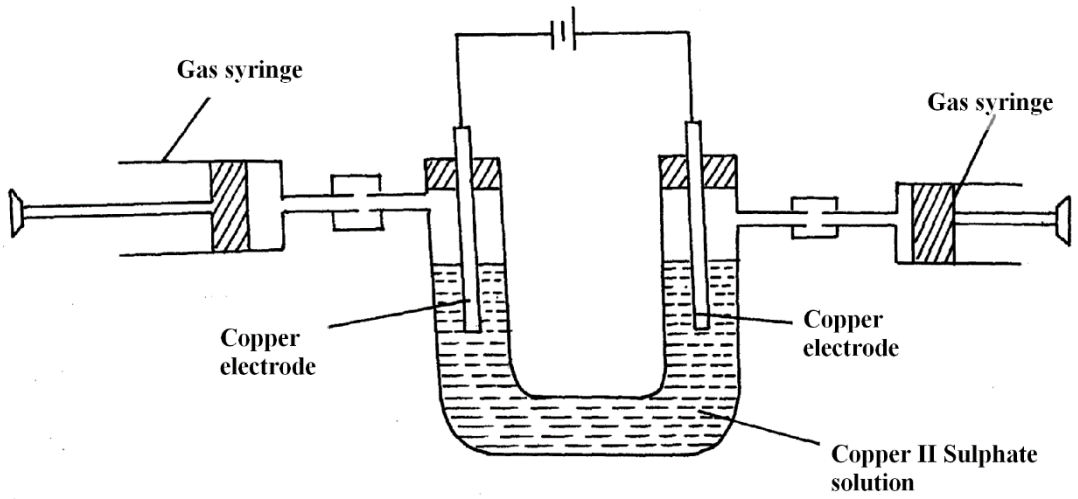
6.Aqueous copper II sulphate was electrolysed using the set up represented by the diagram below



a) After sometimes it was found that no gas was produced at both electrodes. Explain. (1 mark)

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b)Write an equation for the reaction at each electrode.

(i) Anode

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(ii) Cathode (2marks)

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c) What happens to the colour of the electrolyte during electrolysis. Explain (2marks)

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d) If in the above set up inert electrodes were used instead of copper electrodes; write equation at each electrode

Anode (1 mark)

……

Cathode (1 mark)

……

e) An iron spoon is to be electroplated with silver. Draw a labeled diagram of the set-up that could be used to represent the process. (2marks)

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f)The table below shows ammeter readings obtained when different electrolytes of the same concentration were tested.

Electrolyte	Ammeter reading amps
Copper II sulphate solution	4.4
Ethanoic acid	1.2

g) Explain why ethanoic acid has a lower ammeter reading (2marks)

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7. (a) State Le Chatelier's principle (1 mark)

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(b) State and explain how a catalyst affect:

(i) Rate of reaction (2 marks)

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(ii) Yield of the product (1 mark)

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(c) One of the reaction in the manufacture of nitric (V) acid involves catalytic oxidation of ammonia as shown in the equation below.

$$4\ NH_{3(g)} + 5O_{2\ (g)} \rightleftharpoons 4NO_{(g)} + 6H_2O_{(g)}\ ;\ \Delta H = -909\ kJ\ mol^{-1}$$

The reaction is carried out at a pressure of 9 atmospheres and a temperature of 900 ^{0}C

(i) State and explain the effect on the position of equilibrium if the reaction is carried out:

I. At 9 atmospheres and 500 ^{0}C ; (2 marks)

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II. At 900 ^{0}C and 15 atmospheres pressure; (2 marks)

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(d) State and explain the effect on the rate of the reaction if the reaction is carried out at 9 atmosphere and 450 ^{0}C (2 marks)

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