NYAMBARIA HIGH SCHOOL

END OF YEAR EXAMS

Paving Way For Kenya Certificate of Secondary Education Success

Name …….. Admission no…….
Candidate's Signature…… Date…….

FORM 3
CHEMISTRY
PAPER 2
TIME: 2Hours

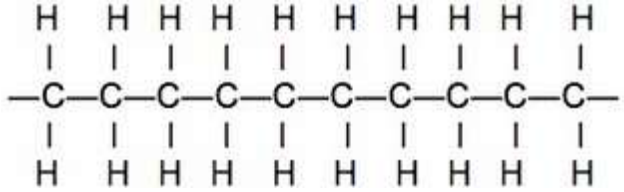
INSTRUCTIONS TO CANDIDATES

- Write your name, school and index number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** questions in the spaces provided.
- Mathematical tables and silent electronic calculators may be used.
- All workings **MUST** be clearly shown where necessary.

Questions	Maximum Score	Candidate's Score
1	14	
2	14	
3	11	
4	14	
5	16	
6	11	
TOTAL	80	

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1. The following represents a section of a polymer.



(a) Draw the structure of the monomer and name it. **(2 marks)**

(b) The molecular formula of the polymer is 42,000. Find the number of monomers that form the polymer molecule. **(2 marks)**

(c) Explain the following:

i.Alkanes are insoluble in water. **(2 marks)**

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ii.Ethyne is a gas at room temperature while hex-2-yne is a liquid at room temperature.

(2 marks)

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(d) What do you understand by the terms used in organic chemistry:

i.Catalytic cracking **(1 mark)**

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ii. Thermal cracking **(1 mark)**

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(e) Draw the **structures** and write the **molecular formula** of the following organic compounds.

i. 2- methylpropane **(2 marks)**

ii. 2,3- dibromopentane **(2 marks)**

2. The table below shows the elements in period 3 of the periodic table. Study it and answer the questions that follow.

Element	Na	Mg	Al	Si	P	S	Cl	Ar

(a) Write the formulae of two oxides for each of the following: **(2 marks)**

(i) Sodium: Oxide I …… Oxide II ……..

(ii) Sulphur: Oxide I …… Oxide II ……..

(b) The products of the reaction between phosphorus and chlorine depend on the conditions used.

Write the equation for the reaction when phosphorus reacts with limited phosphorus. **(1 mark)**

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(c) Identify the most electronegative element. Give a reason. **(2 marks)**

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(d) State and explain the differences in the boiling points of:

(i) Magnesium oxide and sulphur (IV) oxide. **(2 marks)**

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(ii) Sulphur and phosphorus. **(2 marks)**

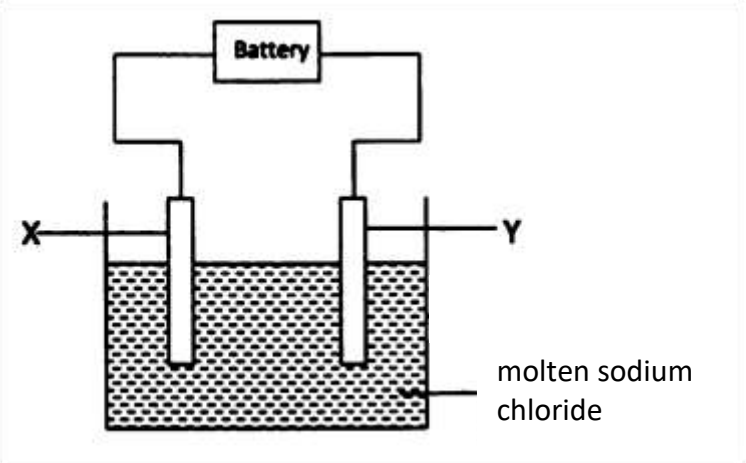
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(e) The diagram below shows the electrolysis of the chloride of sodium.



(a) On the diagram, indicate the missing condition. **(1 mark)**

(b) During the electrolysis, chlorine gas was formed at electrode Y. Identify the:

(i) Anode……. **(1 mark)**

(ii) Cathode…….. **(1 mark)**

(c) Write the half equation for the reaction taking place at the:

(i) Anode. **(1 mark)**

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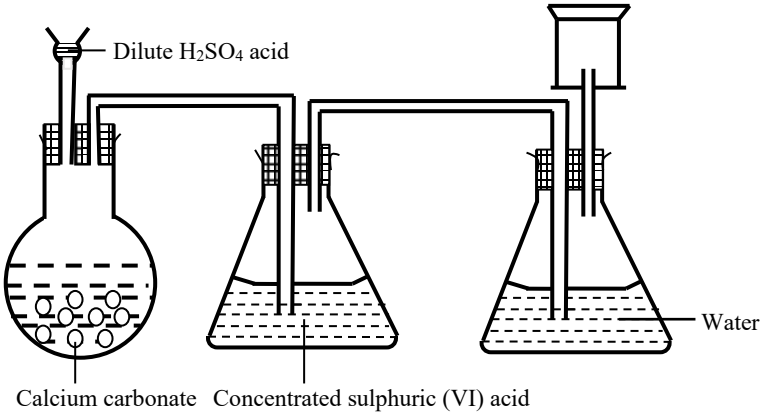
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(ii) Cathode. **(1 mark)**

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3. A student set up the apparatus shown below to prepare and collect dry carbon (IV) oxide gas.



(a) State a correction for three mistakes in the set up above **(3 marks)**

(i) ……

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(ii) ……

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(iii) ……

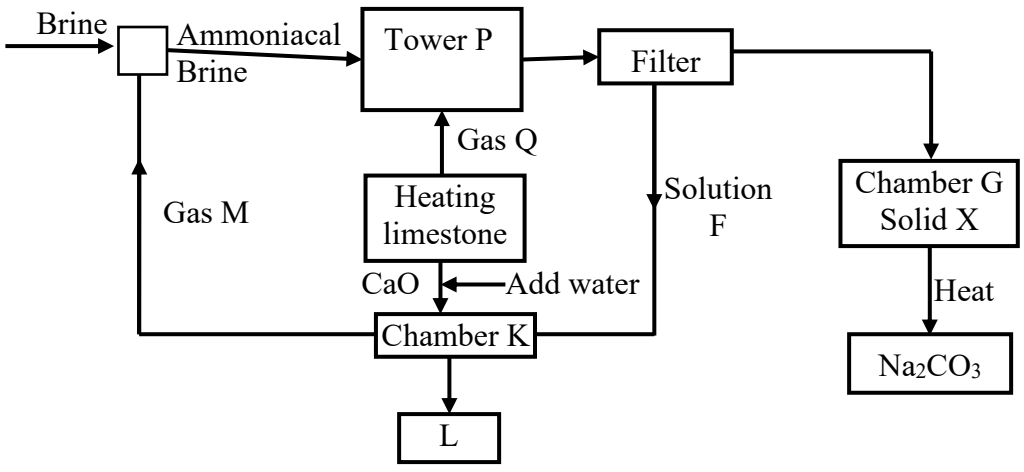
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(b) Give two reasons why carbon (IV) oxide is used as a fire extinguisher **(1 mark)**

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(c) The flow chart below is for the manufacture of sodium carbonate by the Solvay process. Use it to answer the questions that follow.



(i) Name:

Gas M …… Gas Q …….…… **(1 mark)**

Solution F …… Solid X ……..…….. **(1 mark)**

(ii) Name the product L formed and give one of its uses. **(2 marks)**

Name: ……

Use: ……

(iii) Write equations of the reactions in: **(2 marks)**

Tower P (Overall equation)

……..……..

Chamber K

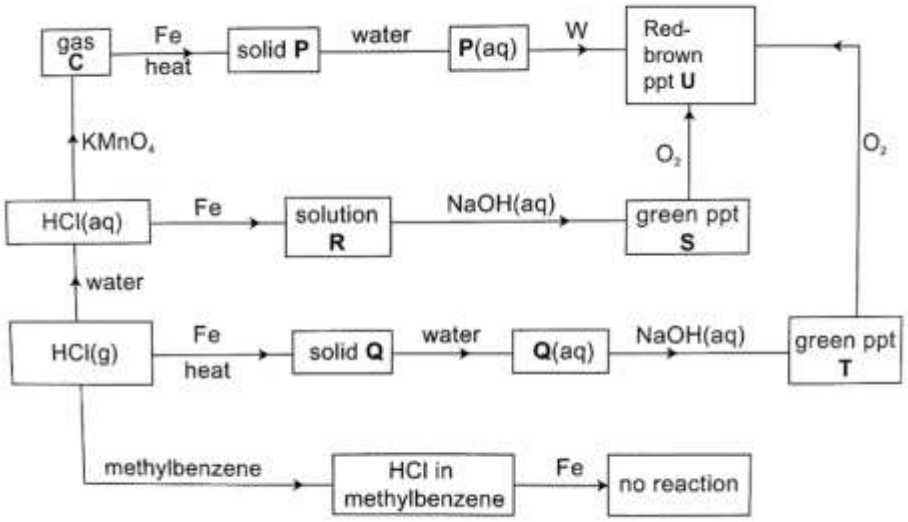
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(v) Name the two raw materials required in the manufacture of sodium carbonate **(1 mark)**

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4. Study the flow chart below and answer the questions that follow.



(a) Identify:

(i) Gas C …… **(½ mark)**

(ii) Solid Q …….. **(½ mark)**

(iii) Solid P …… **(½ mark)**

(b) From the flow chart, give two solutions that contain the same metallic ions. **(1 mark)**

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(c) Give two precipitates in the flow chart that are the same and name them. **(3 marks)**

Precipitates: …….

Name: …….

(d) Explain the difference between HCl (g) in water and in methylbenzene as shown in the flow chart. **(2 marks)**

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(e) Name reagent W. **(½ mark)**

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(f) Write the equations for:

(i) The formation of solid P. **(1 mark)**

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(ii) The formation of solid Q. **(1 mark)**

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(g) In the preparation of a bleaching agent (sodium hypochlorite), excess chlorine gas was bubbled into 15 litres of cold 2M sodium hydroxide.

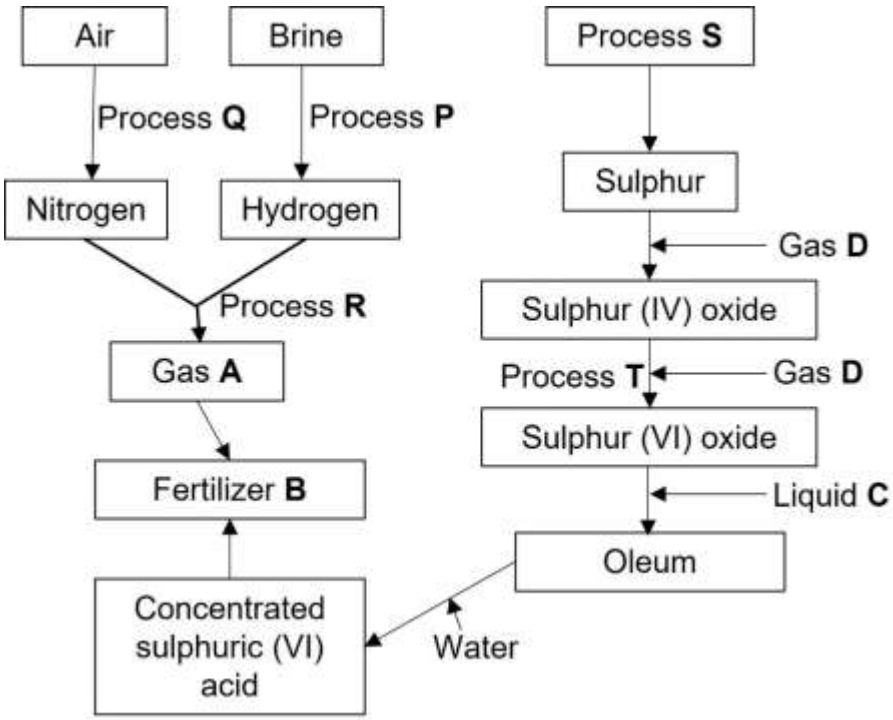
(i) Write the equation for the reaction between chlorine gas and cold dilute sodium hydroxide. **(1 mark)**

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(ii) Calculate the mass in **kilograms** of sodium hypochlorite produced. (Na = 23.0, Cl = 35.5, O = 16.0)

(3 marks)

5. Study the flow chart below and answer the questions that follow.



(a) Name the following: **(3 marks)**

(i) Process **Q** …….

(ii) Process **R** ……..

(iii) Process **S** ……..

(iv) Process **T** ……..

(v) Gas **A** ……

(vi)Fertilizer **B** ……

(b) Why is liquid C used instead of water? **(1 mark)**

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(c) Write the formula of oleum. **(1 mark)**

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(d) Write the equation for the formation of:

(i) fertilizer **B**. **(1 mark)**

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(ii) gas **A**. **(1 mark)**

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(e) Name the **catalyst** and give the **conditions** for:

(i) Process **R**. **(3 marks)**

Catalyst ……

Conditions ……

(ii) Process **T**. **(3 marks)**

Catalyst ……

Conditions ……

(h) Explain how nitrogen is obtained from air using process **Q**. **(3 marks)**

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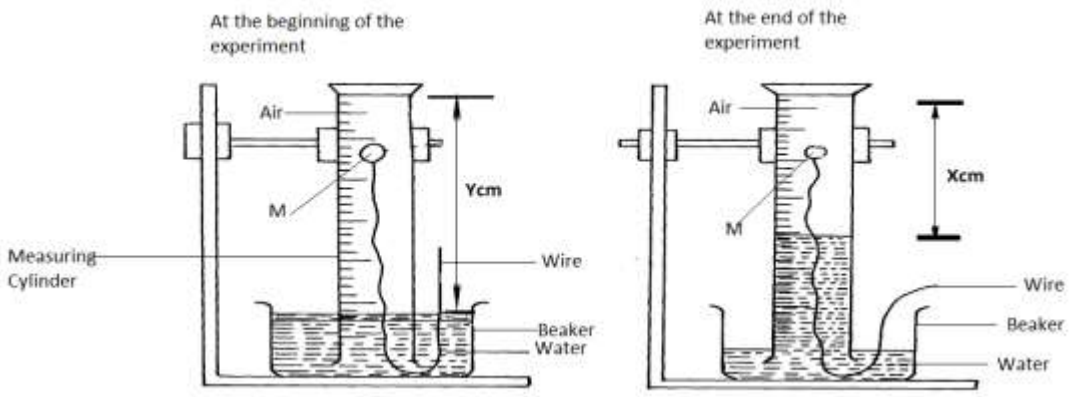
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6. A form one class carried out an experiment to determine the active part of air. The diagram below shows the set-up of the experiment and also the observation made.



I.

(a) Identify substance M …… **(1mark)**

(b) State two reasons for the suitability of substance M for this experiment **(2marks)**

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(c) Write the equation for the reaction of substance **M** and the active part of air **(1mark)**

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II. The table below shows the pH values of solutions J to N

Solution	J	K	L	M	N
pH	5	13	2	10	7

(a) Which two solutions are likely to react and give a solution with a pH of 7?

..... **(1 mark)**

(b) Which solution is likely to be a solution of acetic acid?.....**(1mark)**

III. Magnesium was burnt in air forming a white residue T. When put in a boiling tube with water effervescence was noticed and colourless gas D with a characteristic pungent smell was evolved. The gas turned a wet red litmus paper blue.

(a) Identify

(i) Residue **T** …… **(1mark)**

(ii) Gas D…… **(1mark)**

(b) **Write** an equation for liberation of gas D. **(1mark)**

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IV. Explain why the bleaching action of chlorine is permanent while bleaching by sulphur (IV) oxide is temporary. **(2 marks)**

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