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The Sign of Knowledge
Fr. Stephen O. Oketch

Name: …… Index No. ……

School: …… Candidate's Sign. …….....

Date: …….....

233/2
CHEMISTRY
PAPER 2
FORM IV
TIME: 2 hours

BRILLIANT PUBLISHERS PRE-MOCK 2020

Kenya Certificate of Secondary Education (K.C.S.E.)

233/2
CHEMISTRY
FORM IV

INSTRUCTIONS TO THE CANDIDATES:
Write your **name** and **index number** in the spaces provided above
Sign and write the **date** of examination in the spaces provided.
Answer ***all*** the questions in the spaces provided.
All working **must** be clearly shown where necessary.
Mathematical tables and electronic calculators can be used.

For Examiners Use Only

Question	**Maximum score**	**Candidate's score**
1	9	
2	10	
3	10	
4	13	
5	8	
6	12	
7	9	
8	9	
Total	**80**	

This paper consists of 9 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. (a) Petrol is a mixture of several alkane molecules ranging from pentane (C_5H_{12}) to decane ($C_{10}H_{22}$).Name the process by which petrol is obtained from crude oil. (1mk)

(b) A decane molecule derived from petrol is cracked into hydrocarbon with equal number of carbon atoms in each molecule.

(i) What is cracking? (1mk)

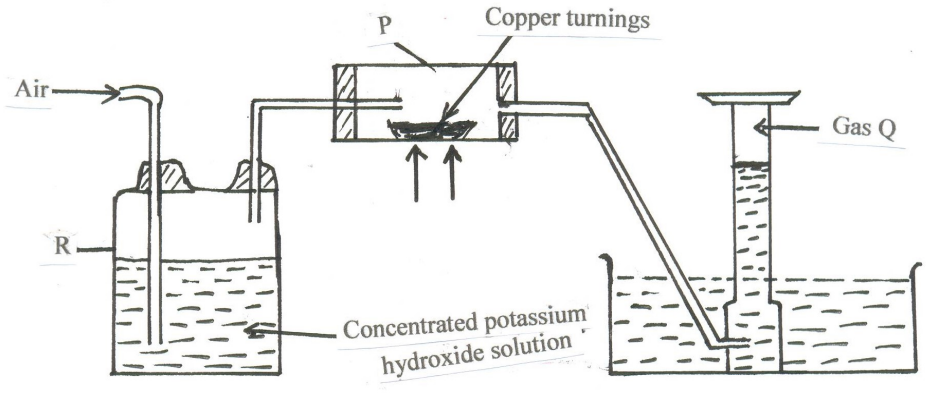
(ii) State **two** conditions necessary for the above process. (2mks)

(iii) Write an equation for the cracking of decane molecule. (1mk)

(iv) Draw and name **two** isomers of molecule with lower molecular mass obtained from cracking of decane as shown in b (iii) above. (2mks)

(v) How would you distinguish the products formed by cracking as shown in b (iii) in the laboratory. (2mks)

2. A. Study the diagram below that is used to prepare a gas Q.



i) (a) What component of air is eliminated in wash bottle labelled R? (1 mark)

(b) Write the reaction equation for the reaction that eliminates the component of air in a (i) above. (1 mark)

ii) What component of air is removed in hard glass tube labeled P? (1 mark)

iii) Identify gas Q. (1 mark)

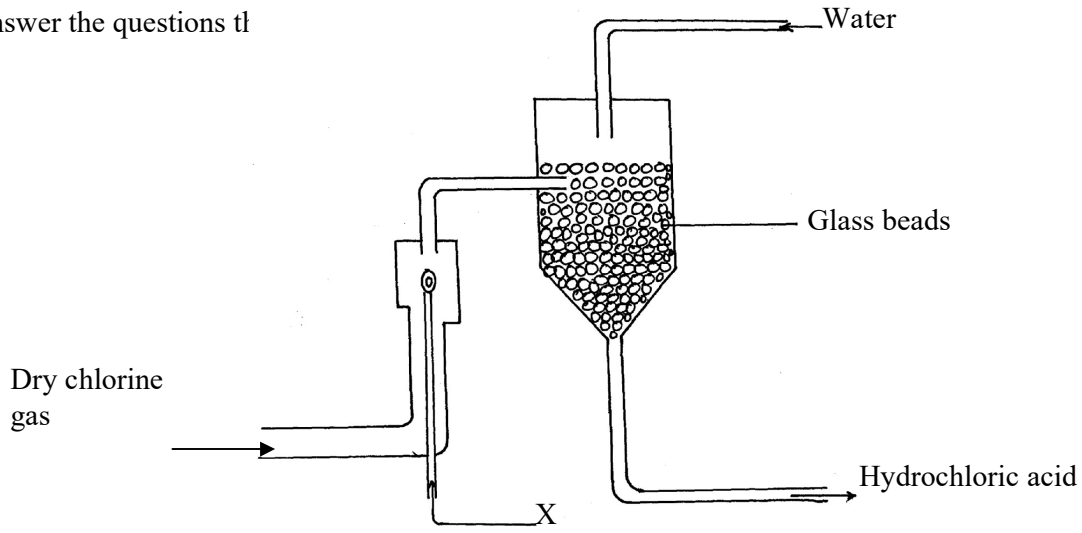
B. In an experiment 1.54g of nitrogen reacted with 3.53g of oxygen to form a compound.
N = 14, O = 16

i) Calculate the moles of nitrogen and oxygen that reacted. (2 marks)

ii) Determine the simplest formula of the compound formed between nitrogen and oxygen. (2 marks)

(iii) Comment on the melting and boiling points of the compound in B (ii) above, explain. 2marks)

3. The diagram below represents a set up for large scale manufacture of hydrochloric acid. Study it and answer the questions th



a) Name substance X (1mk)

b) What is the purpose of glass beads? (1mk)

c) Give one source of substance X used in the above process. (1mk)

d) Write an equation from the reaction producing hydrogen Chloride gas in the above process

(1mk)

e) The reaction in (d) above is very explosive, what precaution must be taken to prevent this.

(1mk)

f) 25.0 cm^3 of 0.1M HCl reacted with 8.4g of a mixture of sodium carbonate and sodium chloride. During the reaction, 20.0 cm^3 of the mixture reacted. Calculate the percentage of sodium chloride in the mixture. (3mks)

g) Give two uses of hydrochloric acid. (2mks)

4. (a) The grid below show part of the periodic table.(The letter do not represent the actual symbols).Use it to answer the questions that follow.

T								Q
				S		R	K	
A	J		Y		U		L	
W							M	B
	C						N	

(i) Select the most reactive non-metal. (1mk)

(ii) Select an element that forms a divalent cation. (1mk)

(iii) Element Z has atomic number 14.Show its position in the grid. (1mk)

(iv) How do the atomic radii of U and J compare? (2mks)

(v) How do electrical conductivity of A and Y compare? (2mks)

(vi) How does the boiling point of elements K, L and M vary? Explain (2mks)

(b) The table below gives information on four elements by letters K, L, M and N. Study it and answer the questions that follow. (The letters do not represent the actual symbols of the elements)

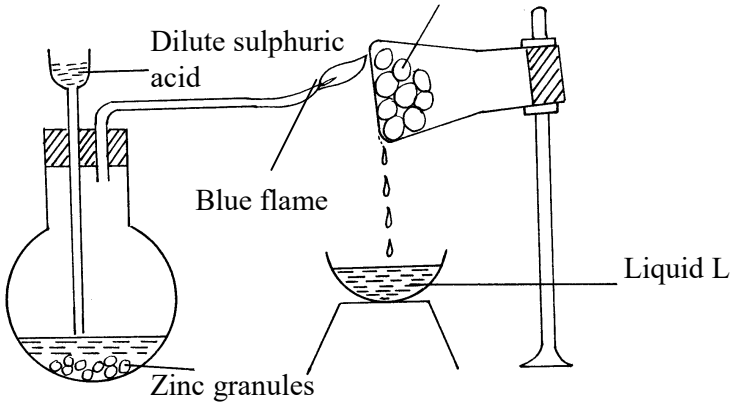
Element	Electron arrangement	Atomic radius	Ionic radius
K	2:8:2	0.136	0.065
L	2:8:7	0.099	0.181
M	2:8:8:1	0.203	0.133
N	2:8:8:2	0.174	0.099

(i) Which two elements have similar properties? Explain. (2mks)

(ii) Which element is a non-metal? Explain. (1mk)

(iii) Which one of the elements is the strongest reducing agent? (1mk)

5. The diagram below shows a set-up of apparatus that was used to prepare hydrogen gas.



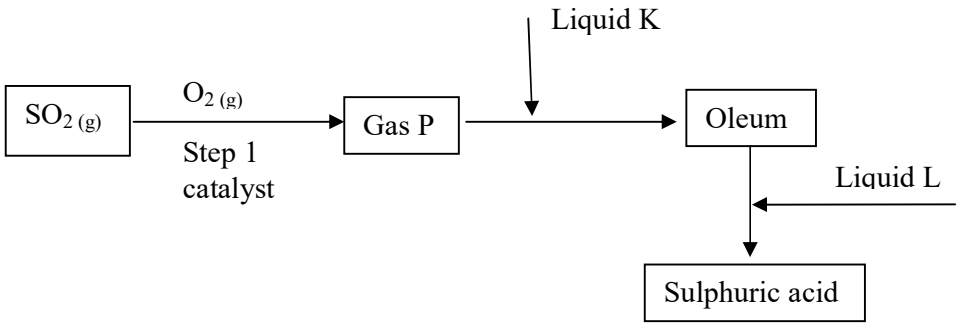
a) Explain the observations that would be made if calcium turnings were used instead of zinc granules in the above experiment. 2mks

b) (i) Explain how liquid L can be identified by chemical means. 2mks

(ii) How could the purity of liquid L be confirmed? 1mk

c) During this experiment, 100cm^3 of XM sulphuric acid was reacted. The volume of the gas produced was found to be 480cm^3. Determine the value of x, the concentration of the acid in moles per litre. (1 mole of gas occupies 24000cm^3 at r.t.p) 3mks

6. The diagram below is a flow chart showing the contact process. Study it and answer the questions that follow



a) Give two sources of SO_2 gas 2mks

b) Identify the catalyst used in step 1 1mk

c) Give two reasons why the catalyst you have named in (b) above is preferred in the process 2mks

d) Name liquids K and L 2mks
K –

L –

e) Write equations to represent the following 3mks
(i) Formation of gas P

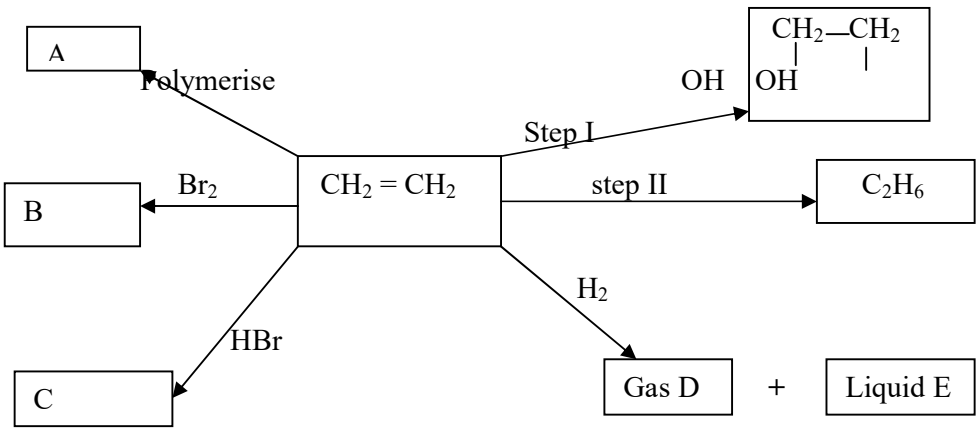
(ii) Formation of oleum from gas P and liquid K

(iii)Formation of sulphuric acid from oleum and liquid L

f) Give two uses of sulphuric acid 2mks

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

a)



(i) State the conditions and reagents required to effect step I and II.

Step I

Reagent: ……..……1mk

Condition: ……..……..…… 1mk

Step II:

Reagent: …….. 1mk

Condition: …… 1mk

(ii) Give the formulae of the following products:

A …… 1mk

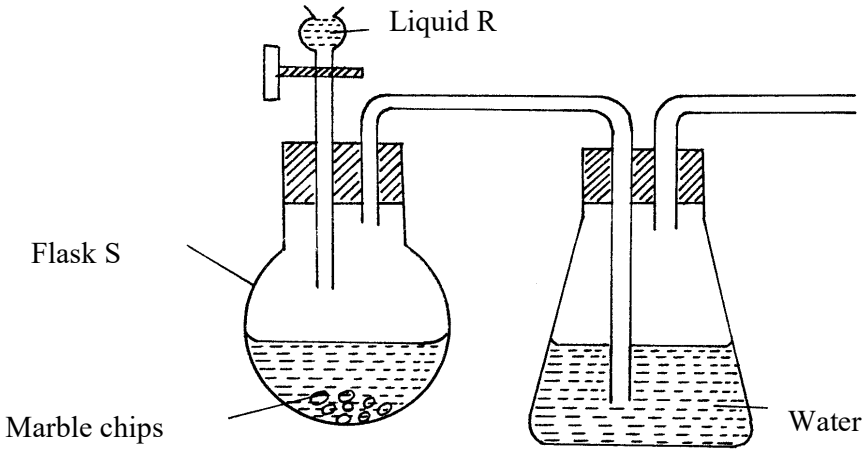
B …… 1mk

C ……..…… . 1mk

Gas D ……..…..……1mk

Liquid E……..……..1mk

8. The diagram below represents an incomplete set-up of apparatus can be used to prepare and collect **dry carbon (IV) oxide gas**. Complete the diagram and answer the questions that follow.



a) Complete the above diagram. 2mks

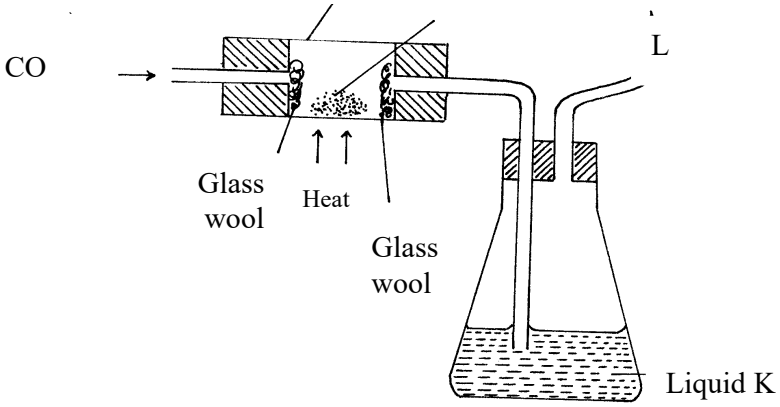
b) Identify liquid R. 1mk

c) Write the equation for the reaction taking place in the flask S 1mk

d) Explain why it is not advisable to use lead (II) carbonate in place of marble chips. 1mk

II The diagram below is used to investigate the effect of carbon (II) oxide on lead (II) oxide. Study it and answer the questions that follow.

Combustion tube M Lead (II) oxide



a) Write an equation for the reaction taking place in combustion tube M. 1mk

b) State the observation in the combustion tube M. 1mk

c) Identify liquid K and state its function 1mk

d) Why is it necessary burn excess gas at L 1mk