CHEMISTRY PAPER 1

EXPECTED QUESTIONS IN KCSE

Comprises 6 KCSE prediction set exams (Class of KCSE March 2022).

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PREDICTION 1

Name: _____ Adm. No_____Index No: _____

School:_____Candidate's Sign_____

Date: _____

233/1
CHEMISTRY
Paper 1
THEORY
FORM 4 2021
Time: 2 Hours

Instructions to candidates:

a) *Write your name, Admission Number, index number and school in the spaces provided* ***above***
b) Sign and write the date of examination in the spaces ***above***
c) Answer ***ALL*** *the questions in the spaces provided below each question.*
d) Mathematical tables and silent electronic calculators may be used.
e) All working ***MUST*** *be clearly shown where necessary*
f) This paper consists of 10 printed pages.

FOR EXAMINER'S USE ONLY

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1 -28	80	
TOTAL SCORE	80	

1. (a). Under what condition does the Bunsen burner produce luminous flame? (1 mark)

_____

(b). Luminous flame is yellow and sooty. Explain. (2 marks)

2. (a). Distinguish between isotopes and allotropes (2 marks)

(b). Name one allotrope of Sulphur that is stable at temperature above 96^{o}C (1 mark)

3. Sodium metal burns with a yellow flame in excess oxygen forming yellow solid. The yellow solid react with water to form gas F.

(a). Name the yellow solid (1 mark)

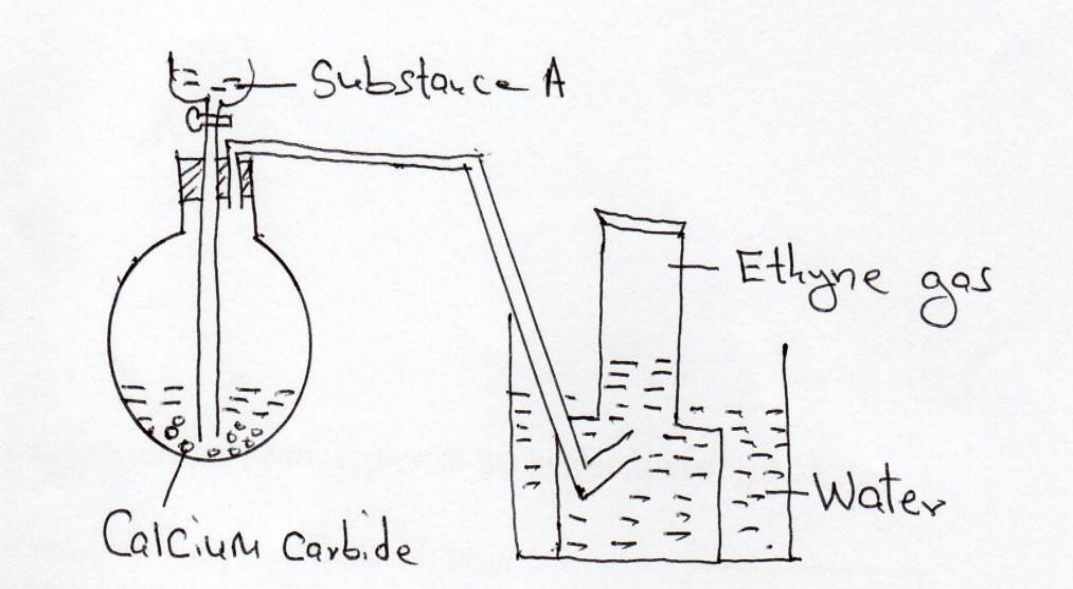
(b). Identify gas F (1 mark)

(c). Write an equation for the reaction of the yellow solid with water. (1 mark)

4. (a). State Boyle's law. (1 mark)

(b). Explain why the pressure of a fixed mass of a gas increases with increase in temperature in a fixed volume container. (2 marks)

5. The set up in figure 1 can be used to prepare ethyne gas. Use it to answer the questions that follow.



[a]. Name substance A (1 mark)

_____

[b]. Write an equation for the reaction which occurred in the flask (1 mark)

_____

_____

(c). Draw and name the structure of the compound formed when one mole of ethyne reacts with one mole of chlorine gas. (1 mark)

6. Starting with zinc carbonate solid describe how zinc hydroxide can be prepared in the laboratory. (3 marks)

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7. 24.0cm^3 of 0.18M hydrochloric acid was added to 0.38g of sodium carbonate solid. Calculate the mass of sodium carbonate that did not react. (0=16, Na=23 C=12) (3 marks)

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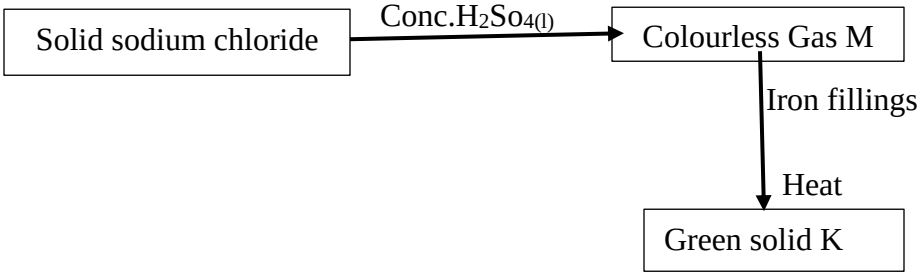
8. The reaction scheme below represent the preparation of gas M.



[a]. Identify gas M and solid K

Gas M_____ ($^1/_2$ mark)

Green solid K _____ ($^1/_2$ mark)

[b]. Describe a chemical test for gas M (2 marks)

_____

_____

_____

9. (a). 0.95g of Magnesium Chloride was dissolved in 250cm^3 of water. Calculate the molar concentration of Chloride ions in the solution. (Mg=24 Cl=35.5) (3 marks)

_____

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_____

10. (a). What is an acid-base indictor? (1 mark)

_____

_____

(b). Describe how the pH of a soil sample can be determined in the laboratory. (2 marks)

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11. In an experiment, Hydrogen sulphide gas was bubbled into a solution of iron (III) chloride. State and explain the observations made. (3 marks)

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12. The diagram below represents part of the periodic table. Use it to answer the questions that follow. The letters are not the actual symbols of the elements. (2 marks)

M						Q			
T	V		W						

(a). Write the Electronic arrangement for the stable ion formed by **M**. (1 mark)

_____

_____

(b). Write an equation for the reaction between T and **Q**. (1 mark)

_____

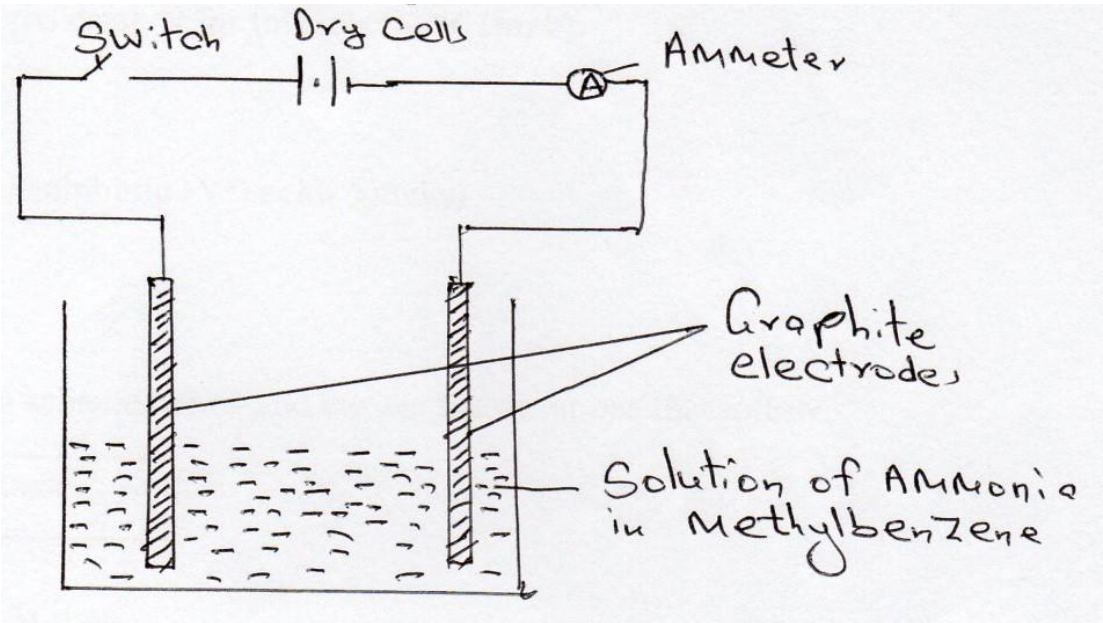
_____

(c). Compare the melting point of element T and V. (1 mark)

_____

_____

13. Study the set-up below and answer the questions that follow.



State and explain the observation made when the switch is closed. (2 marks)

14. (a). Define molar heat of combustion. (1 mark)

_____

_____

(b). X g of element Q was completely burned in air. The heat evolved was used to heat $250cm^3$ of water. The temperature of water rose from 32^oC to 50^oC. Molar heat of combustion of element Q is -360 $kJmol^-$ .Calculate the value of X. (Density of water is $1gcm^{-3}$ and specific heat capacity of water is 4.2kJ mol^{-3} R.A.M of Q=24) (2 marks)

_____

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15. A sample of water is suspected to contain chloride ions. Describe an experiment that can be carried out to determine the presence of chloride ions. (3 marks)

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16. In contact process, Sulphur (IV) oxide reacts with oxygen to form Sulphur (VI) oxide in presence of a catalyst.

(a). Name the preferred catalyst for this reaction. (1 mark)

_____

_____

(b). Give two uses of sulphuric (VI) acid (2 marks)

_____

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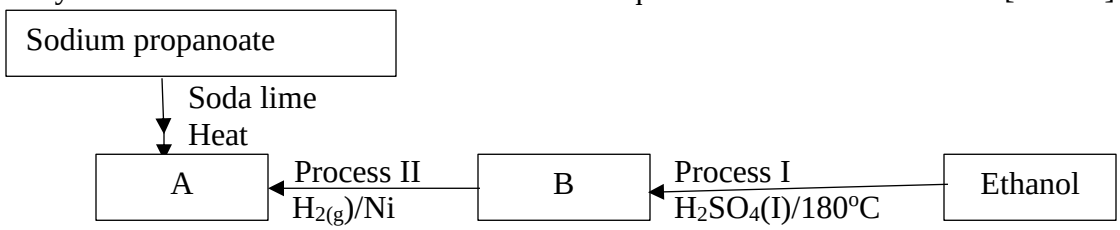
17. Study the reaction scheme below and answer the questions that follow. [1 mark]



a). Identify substances (1 mark)

A-

B-

[b]. Name process I (1 mark)

_____

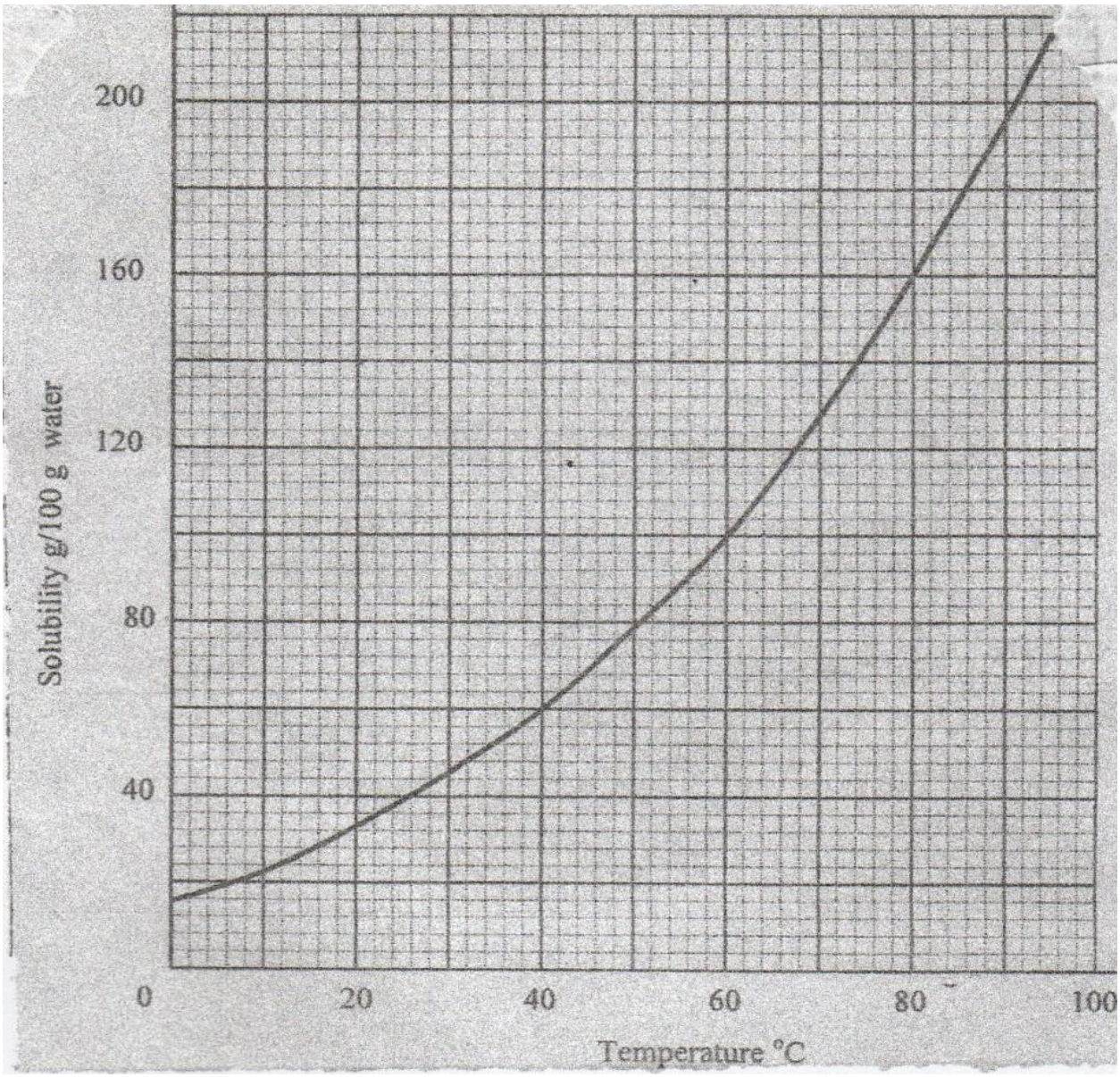
_____

(c). Name the substance produced when Sodium Propanoate react with Soda lime. (1 mark)

_____

_____

18. The solubility curve of potassium nitrate is shown below.



[a]. Determine the solubility of potassium nitrate at 40^{o}C (1 mark)

_____

_____

[b]. Determine the molar concentration of saturated potassium nitrate at 40^{o}C
(K = 39.0, O =16.0 N=14.0 and density of water 1g/cm^{3} (2 marks)

_____

_____

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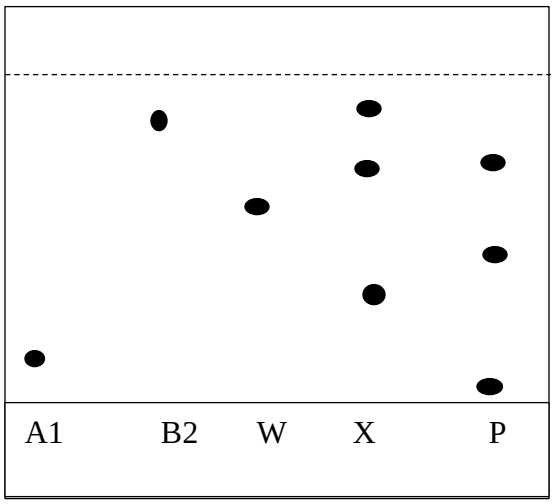
19. Sample of urine from three participants W, X and P at an international sports meeting were spotted onto a chromatography paper alongside two from illegal drugs, A_1 B_2. A Chromatogram was run using methanol. The figure below shows the chromatogram.



(a). Identify the athlete who had used an illegal drug. (1 mark)

_____

(b). Which drug is more soluble in methanol. Give a reason. (2 marks)

_____

_____

20. State and explain the change in mass that occur when the following substances are separately heated in open crucibles.

(a). Magnesium ribbon (1 mark)

_____

_____

(b). Sodium carbonate (1 mark)

_____

_____

21. With the help of a well labeled diagram, draw a set-up of an arrangement of assembled apparatus that can be used to prepare dry hydrogen gas, including the appropriate reagents.

(3 marks)

22. Dry carbon (II) oxide gas was passed over heated lead (II) oxide.
(a). Write an equation for the reaction. (1 mark)

_____

_____

(b). Give one industrial application of the above reaction. (1 mark)

_____

23. A student burnt magnesium ribbon in a gas jar full of Sulphur (IV) oxide gas
(i). State two observations made in the gas jar. (2 marks)

_____

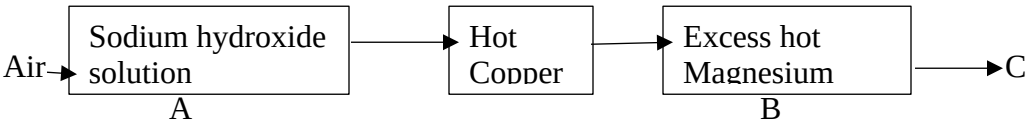
_____

(ii). Write an equation for the reaction that took place. (1 mark)

_____

_____

24. Air was passed through reagent as shown below.



(i).State the role of sodium hydroxide solution. (1 mark)

_____

(ii). Name one component in C. Explain. (1 mark)

_____

_____

25. Analysis of a compound showed that it had the following composition. 69.42% Carbon, 4.13% Hydrogen and the rest Oxygen
Determine the empirical formula of the compounds. (3 marks)
(C=12.0, H=1.0 , O=16.0

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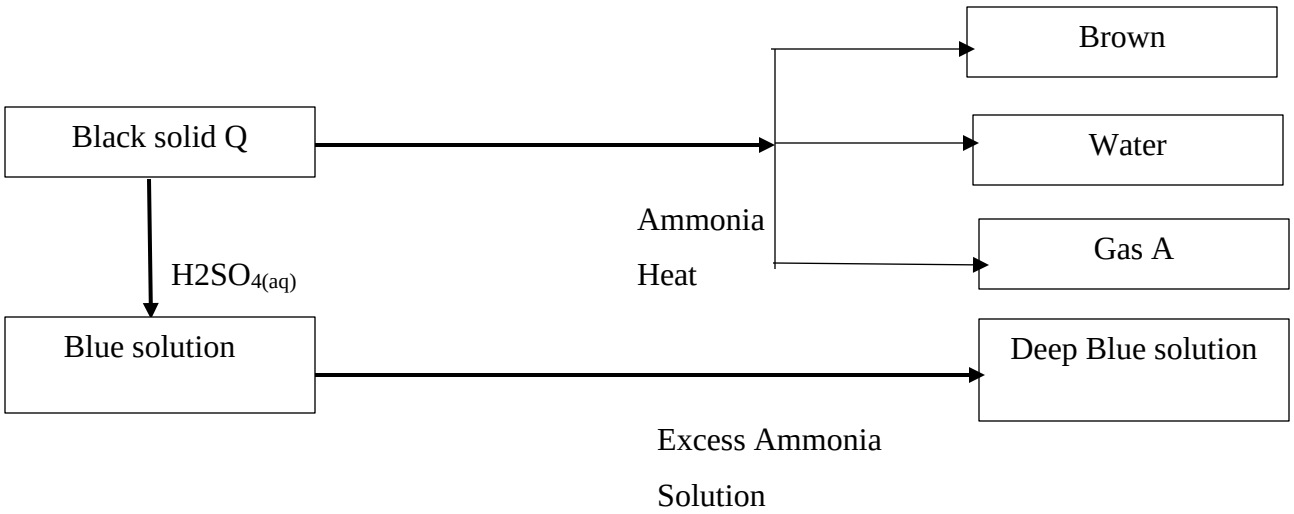
_____

26. Study the reaction scheme below and answer the questions that follow. (1 mark)



(a).Identify

i. Black solid Q (1 mark)

_____

ii. Gas A (1 mark)

_____

(b). Write an equation for the reaction between ammonia and black solid Q. (1 mark)

_____

_____

(c). Write the formula of the complex ion in deep blue solution. (1 mark)

_____

_____

27. Element **S** has an atomic number of 14 and **R** has an atomic number of 17

(a). Write the formula of the ion of element S. (1 mark)

_____

(b). Using dot (**.**) and cross (x) diagrams show how **S** an **R** combine to form a compound.

(2 marks)

_____

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_____

28. Explain why the following substances conduct an electric current.

(a). Aluminium metal (1mark)

_____

(b). Molten magnesium chloride (1 mark)

_____

PREDICTION 2

NAME ……..…….. **DATE** ……

INDEX NO. ……..……..……...…..… **SIGNATURE** ……..……..

233/1
CHEMISTRY
(THEORY)
PAPER 1
TIME: 2 HOURS.

Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES

a) Write your **NAME** and **INDEX NUMBER** in the space provided above
b) Sign and write the date of examination in the spaces provided above
c) Answer **ALL** the questions in the spaces provided
d) **ALL** working must be clearly shown where necessary.
e) Mathematical tables and silent electronic calculators may be used.

FOR EXAMINER'S USE ONLY

Question	Maximum score	Candidate's score
1 –31	80	
Total score	80	

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

1. An element K has atomic number 20 while element M has atomic number 8.

a) Write the electronic configuration for K and M

K

…….. **1mark**

M

……..…… **1mark**

b) Write the symbol of the most stable ion of K and M

K

……. **1mark**

M

……. **1mark**

2. Molten Lead (II) bromide is electrolyzed using carbon electrodes. Write the half equations of the reactions that occur at the anode and the cathode.

a) Anode

……..…… **1mark**

b) Cathode

……...…….…… **1mark**

3. Explain why the conductivity of metals decreases with increase in temperature. **2marks**

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4. Three metal oxides XO, YO, and ZO are heated with powdered metal Y. Hot powdered Y will remove oxygen from XO but not from ZO. Arrange the metals in order of reactivity, starting with the most reactive. **1mark**

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5. Some sodium chloride was found to be contaminated with copper (II) oxide. Describe how a sample of sodium chloride can be separated from the mixture. **2marks**

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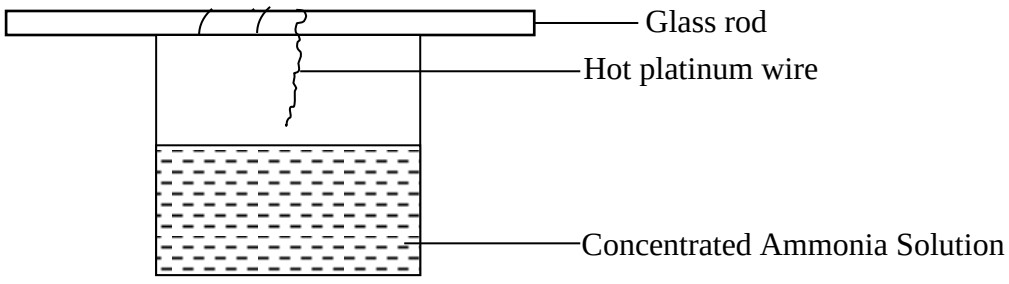
6. Hot platinum wire was lowered into a flask containing concentrated ammonia solution as shown below.



State and explain the observations made. **3marks**

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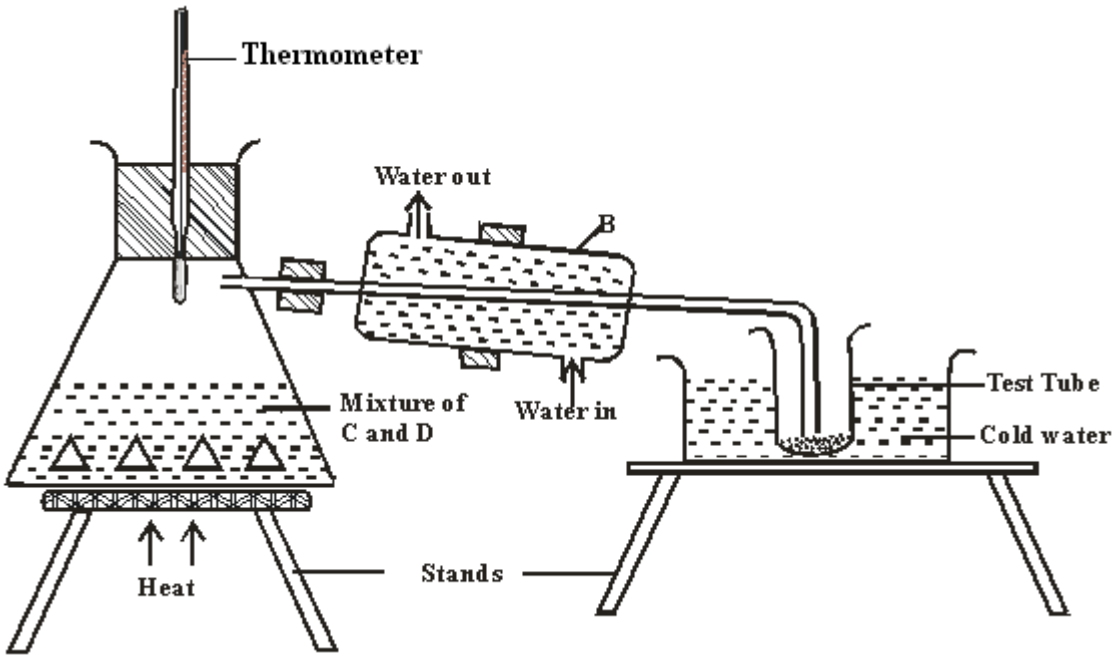
7. The set up below represents the apparatus that may be used to separate a mixture of two miscible liquids C and D whose boiling points are 80^0C and 110^0C.



a) Name B

…….. **1mark**

b) What is the purpose of the thermometer **1mark**

……

……

c) Which liquid was collected in the test tube? **1mark**

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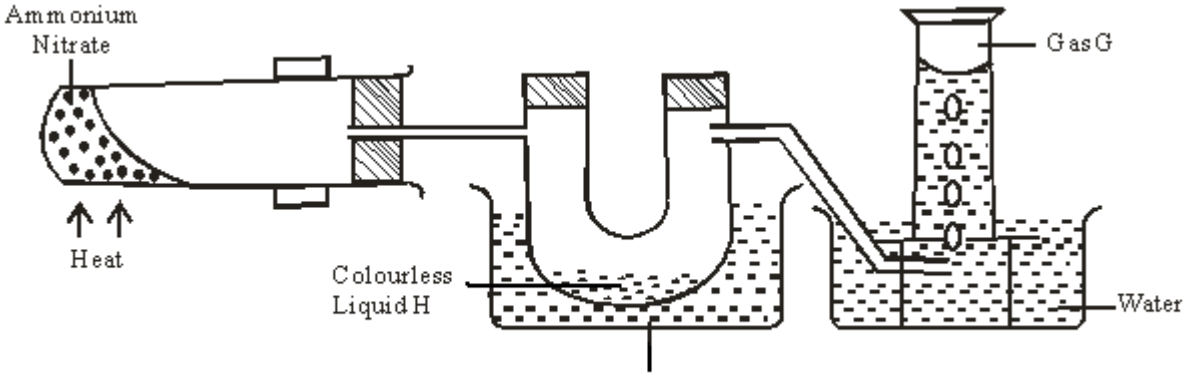
8. Draw a dot (.) and cross (x) diagram to show bonding in carbon (II) oxide. **2marks**

9. Ammonium nitrate was gently heated and the products collected as shown in the diagram.



a) Identify:
   i. Colourless liquid H

   …… **1mark**

   ii. Gas G

   …… **1mark**

b) Describe one physical and one chemical test that can be used to identify gas G. **2marks**

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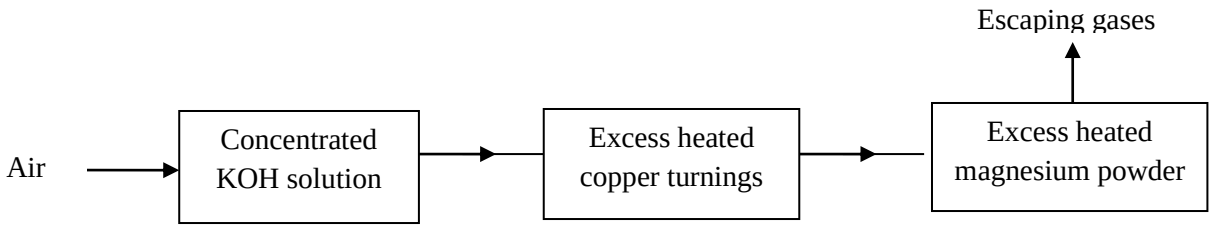
10. Air was passed through several reagents as shown in the flow chart below.



a) What is the purpose of concentrated potassium hydroxide solution? **1mark**

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……

b) Write an equation for the reaction which takes place in the chamber with magnesium powder. **1mark**

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c) Name one gas which escapes from the chamber containing magnesium powder.

……..

Give a reason for your answer **2marks**

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11. Name the following substances.

a) $CH_2\,CH\,CH_2\,CH_3$ **1mark**

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b) $CH_3\,CH\,CH\,CH_2\,CH_3$ **1mark**

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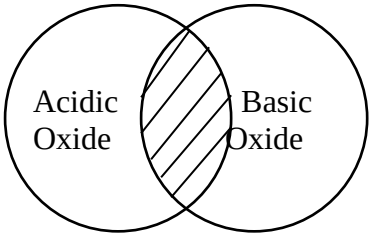
12. The diagram below shows the acidic and basic oxides fit into the general family of oxides.



a) State the name given to the type of oxide that would be placed in the shaded area. **1mark**

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b) Give the name of any oxide that would be placed in the shaded area. **1mark**

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13. Study the information in the table below and answer the questions that follow. The letters do not represent the actual symbols of the elements.

Substance	**Solubility in water**	**Electrical conductivity**	
		Solid	**Molten**
A	Insoluble	Good	Good
B	Soluble	Poor	Good
C	Insoluble	Poor	Poor

i) Which of the substances is highly likely to be sodium chloride? Explain **2marks**

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ii) What type of bond exists in substance A? **1mark**

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iii) State a possible structure in substance C? **1mark**

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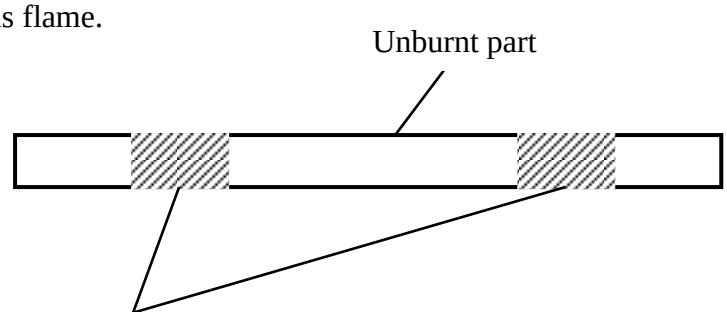
14. Laboratory results showed the composition of a compound to be 58.81% barium, 13.72%, sulphur and 27.47% Oxygen. Calculate the empirical formula of the compound. Ba=137, S = 32, O = 16. **2marks**

15. The diagram below shows a wooden splint that was placed horizontally across the middle part of a non-luminous flame.



a) Explain the observation made **2marks**

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b) Explain why non-luminous flame is preferred for heating than the luminous flame. **2marks**

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16. $200cm^3$ of oxygen gas took 60 seconds to diffuse through a porous plug. Determine the time taken by $300cm^3$ of sulphur (IV) oxide to diffuse through the same plug under the same conditions.
(O=16, S = 32) **3marks**

17. Explain why?

i) Both methane and diamond are covalently bonded. Methane is a gas but diamond is a solid with very high melting point. **2marks**

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ii) Ammonia is dissolved in water using an inverted funnel. **1mark**

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18. Explain giving reasons why?

a) Sulphuric acid is not used with marble in the preparation of carbon (IV) oxide **2marks**

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b) Water cannot be used to distinguish oil fire. **1mark**

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19. A gas occupies $4dm^3$ at -23^0C and 152 mmHg. At what pressure will its volume be halved, if the temperature then is 227^0C.? **2marks**

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20. a) Sodium, Magnesium and Aluminium are elements in the periodic table. Explain why aluminium has a higher melting and boiling point than sodium and magnesium. **2marks**

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b) The ionization energy of an atom is strongly influenced by three atomic parameters. State two of these parameters. **2marks**

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21. $15cm^3$ of a solution containing $2.88g/dm^3$ of an alkali XOH completely reacts with $20cm^3$ of 0.045M sulphuric acid. Calculate the molarity and relative atomic mass of X present in the alkali. **3marks**

22. Describe how a solid sample of calcium sulphate can be prepared using the following reagents; dilute nitric (v)acid, dilute sulphuric (vi) acid and solid calcium carbonate **4marks**

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23. Crude oil is the main source of organic compounds such as hydrocarbons. The hydrocarbons in the crude oil have to be separated.

a) Name two important hydrocarbons obtained from crude oil. **2marks**

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b) Give the uses of the two hydrocarbons named in (a) above. **2marks**

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24. A hydrocarbon Q was found to decolourise potassium manganate (vii) solution. When two moles of Q were burnt completely six moles of carbon (iv) oxide and six moles of water were formed.

a) Write the structural formula of Q. **1mark**

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b) Name the homologous series to which Q belongs **1mark**

……

……

25. Dilute sulphuric acid was added to a compound X, of magnesium. The solid reacted with the acid to form a colourless solution, Y and a colourless gas Z which formed a white precipitate when bubbled through lime water.

Name:-

(i) Compound X **1mark**

……

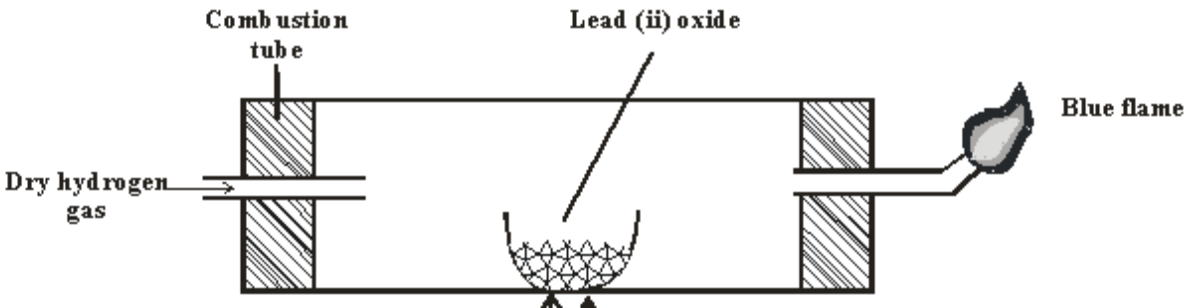
(ii) Solution Y **1mark**

……

(iii)Colourless gas Z **1mark**

……

26. When dry hydrogen gas passed over heated Lead (II) oxide in combustion tube, a grey solid was formed.



a) Identify the grey solid. **1mark**

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b) Write the equation of the reaction taking place in the combustion tube. **1mark**

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……

c) Write the equation involving the blue flame. **2marks**

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27. What do (C F C' S) mean? **1mark**

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28.

a) What is meant by the term allotrophy? **1mark**

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b) Explain in terms of structure and bonding why graphite is soft with greasy feeling. **2marks**

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PREDICTION 3

NAME……...… INDEX NUMBER……..…

SCHOOL …….. CANDIDATE SIGN ……..

DATE ……..

233/1

CHEMISTRY

PAPER 1

TIME: 2 HOURS

KCSE PREDICTION 3

INSTRUCTIONS TO CANDIDATES

a) Write your name and index number in the spaces provided above
b) Sign and write the date of examination in the spaces provided
c) Answer all questions in the spaces provided
d) KNEC mathematical tables and silent electronic calculators may be used
e) All workings must be clearly shown where necessary
f) Candidates should answer all questions in ENGLISH

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1 - 32	80	

1 a) What is meant by allotropy? (1mk)

b) Identify the two crystalline allotropes of carbon. (1mk)

c) Give one use of carbon black. (1mk)

2. When hydrated sample of iron (II) Sulphate $FeSO_4$. nH_2O was heated until there was no further change in mass, the following data was recorded.

Mass of evaporating dish = 78.94g
Mass of evaporating dish + hydrated salt = 84.14g
Mass of evaporating dish + residue = 81.78g
Determine the empirical formula of the hydrated salt
(Relative formula Mass of $FeSO_4$ = 152, H_2O =18) (3mks)

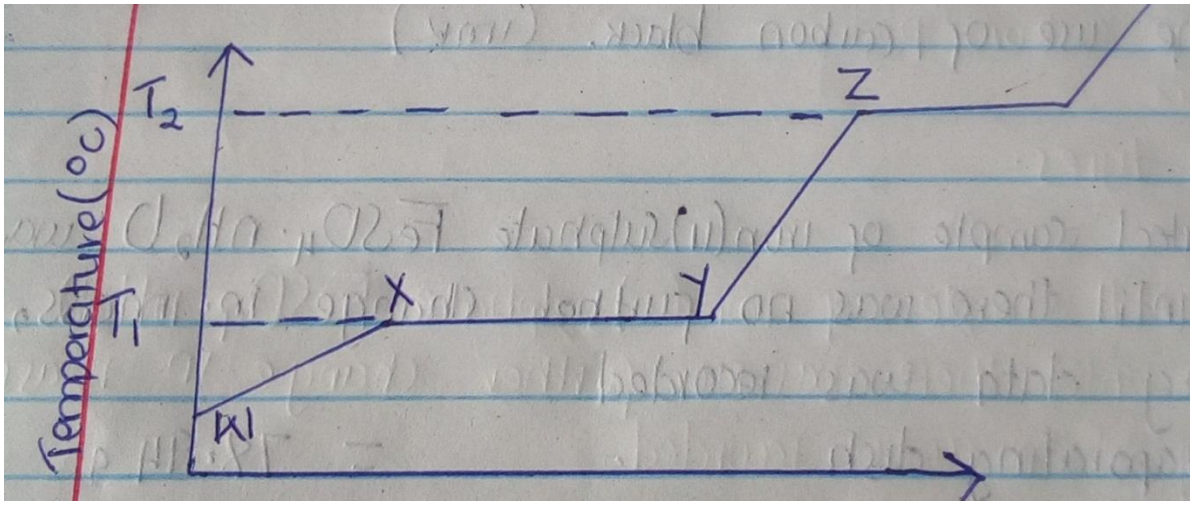
3. Equal volumes of 2M monobasic acids R and S were each reacted with excess magnesium ribbon. The table below shows the volume of the gas produced after one minutes

Acid	Volume of gas (cm^3)
R	80
S	30

a) Write the ionic equation for reaction which took place (1mk)

b) Explain the difference in the volumes of the gas produced (2mks)

4. The graph below shows the changes which takes place when a solid is heated.



a) What happened to the molecules between W and X? (1mk)

b) What is the significance of temperatures T_1 and T_2 (1mk)

c) Explain why the temperature does not rise between X and Y (1mk)

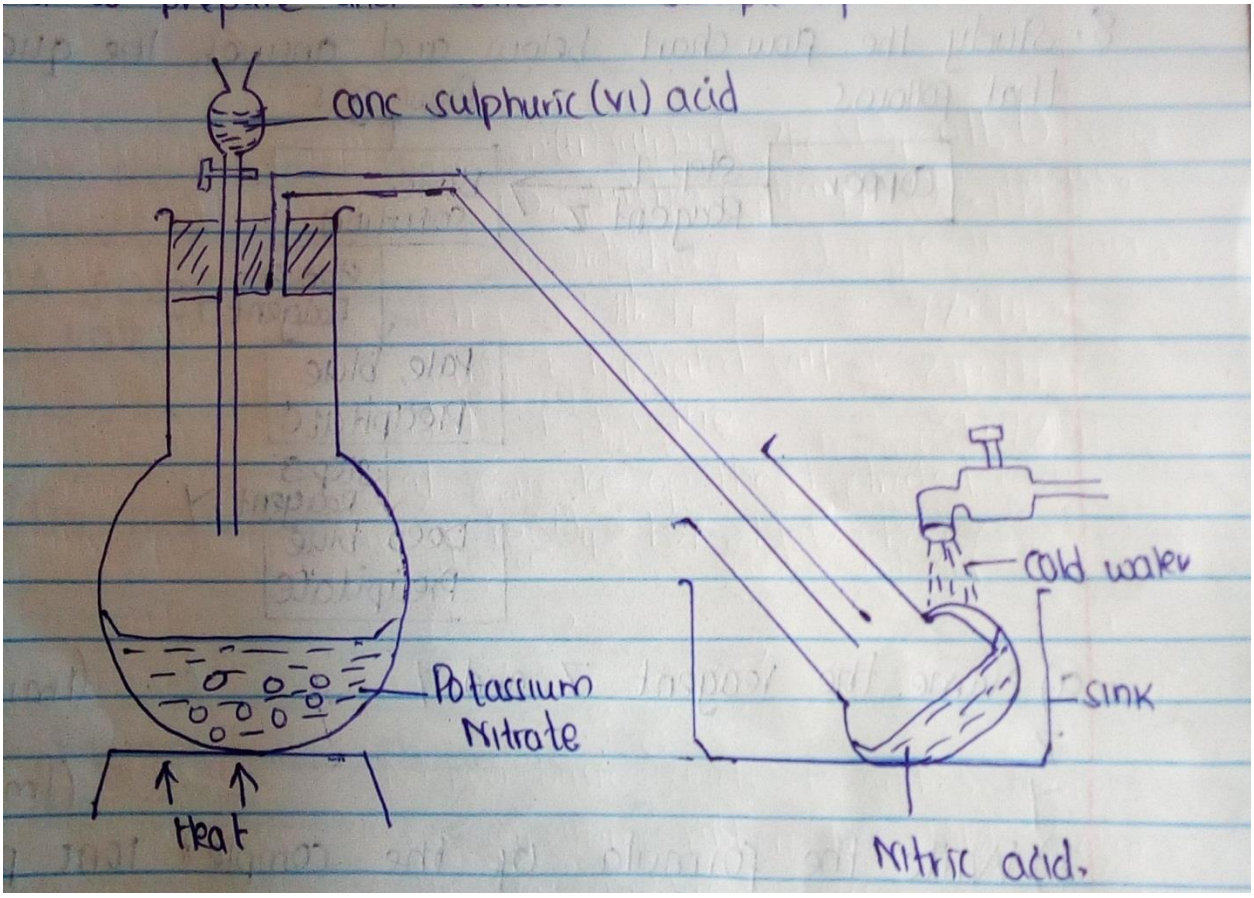
5. In an experiment to determine the solubility of potassium nitrate at 30^0c, a saturated solution was heated in an evaporating dish until there was no further change in mass. The following

data was obtained.

Mass of dish + solution	= 128.9 g
Mass of dish + dry salt	= 103.9 g
Mass of empty dish	= 94.3 g

Determine the solubility of potassium nitrate at 30^0c. (3mks)

6. The diagram below shows a set up that was used to prepare and collect a sample of nitric acid.

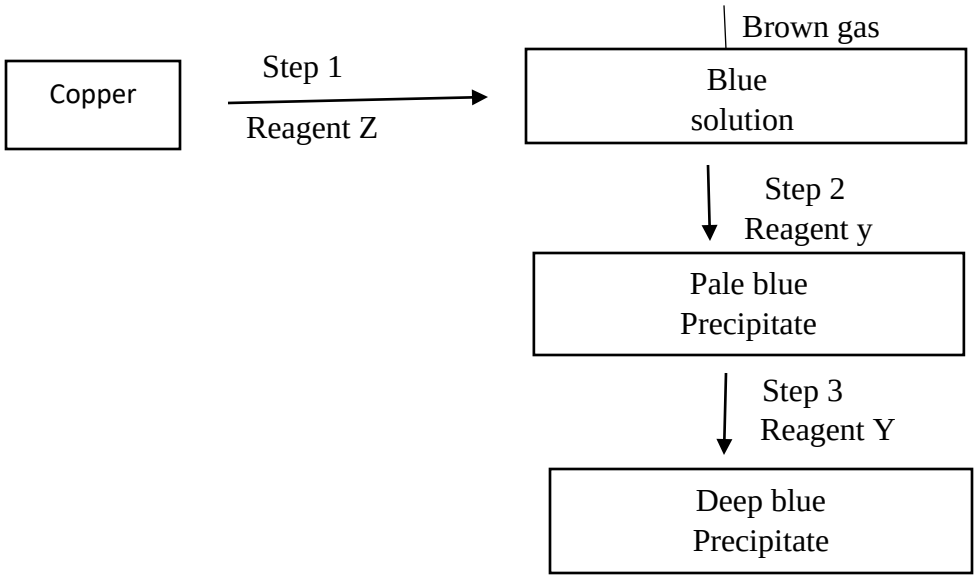


a) Give a reason why it is possible to separate nitric acid from Sulphuric acid in the set up. (1mk)

b) Name another substance that can be used instead of potassium nitrate. (1mk)

7. Starting with lead oxide, nitric acid, sodium sulphate, water and all necessary apparatus, describe how you would prepare a dry sample of lead (II) sulphate (3mks)

8. Study the flow chart below and answer the questions that follows:



a) Name the reagent Z and Y

Z (1mk)

Y (1mk)

b) Write the formula of the complex ions presented in the deep blue solution (1mk)

9. The equations below shows the molar enthalpies of combustion of carbon, hydrogen and methane.

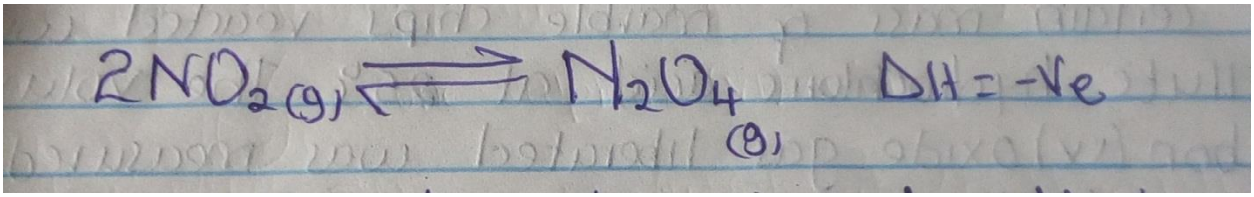
$C(s) + O_2(g) \longrightarrow CO_2(g)$ $\Delta H_c = -393\ KJmol^{-1}$

$H_2(g) + ½\ O_2(g) \longrightarrow H_2O(l)$ $\Delta H_c = -285\ KJmol^{-1}$

$CH_4(g) + O_2(g) \longrightarrow CO_2(g)$ $\Delta H_c = -890 KJmol^{-1}$

Use the energy cycle diagram to calculate the heat of formation of methane (3mks)

10. NO_2 and N_2O_4 gases exist in equilibrium at 20^0c

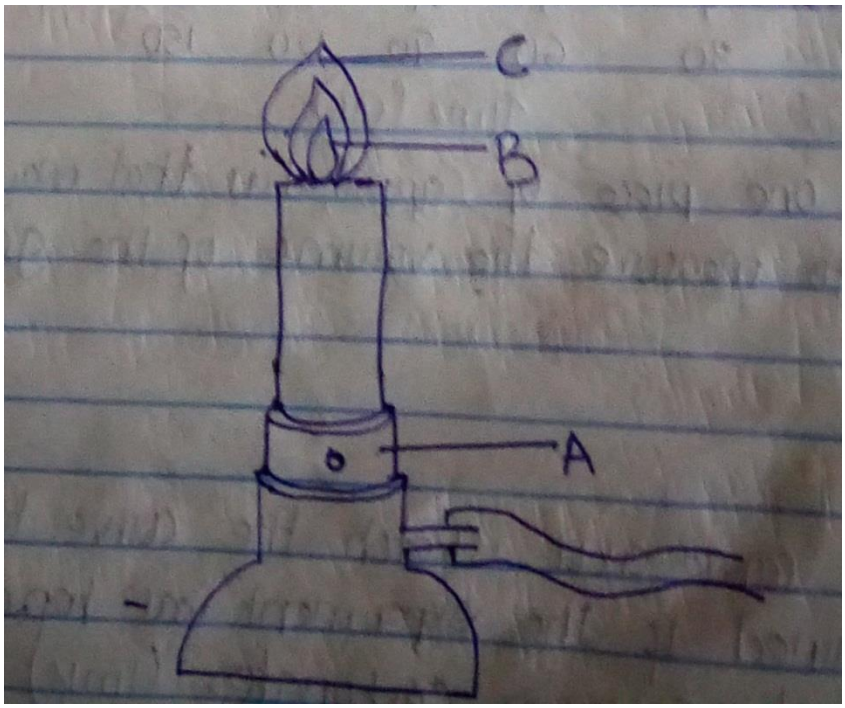


State and explain the observation that would be made when

a) A syringe containing the mixture 20^0c is heated to 40^0c (1mk)

b) The gaseous mixture in a syringe is compressed. (1mk)

11. The diagram below shows a Bunsen burner when in use



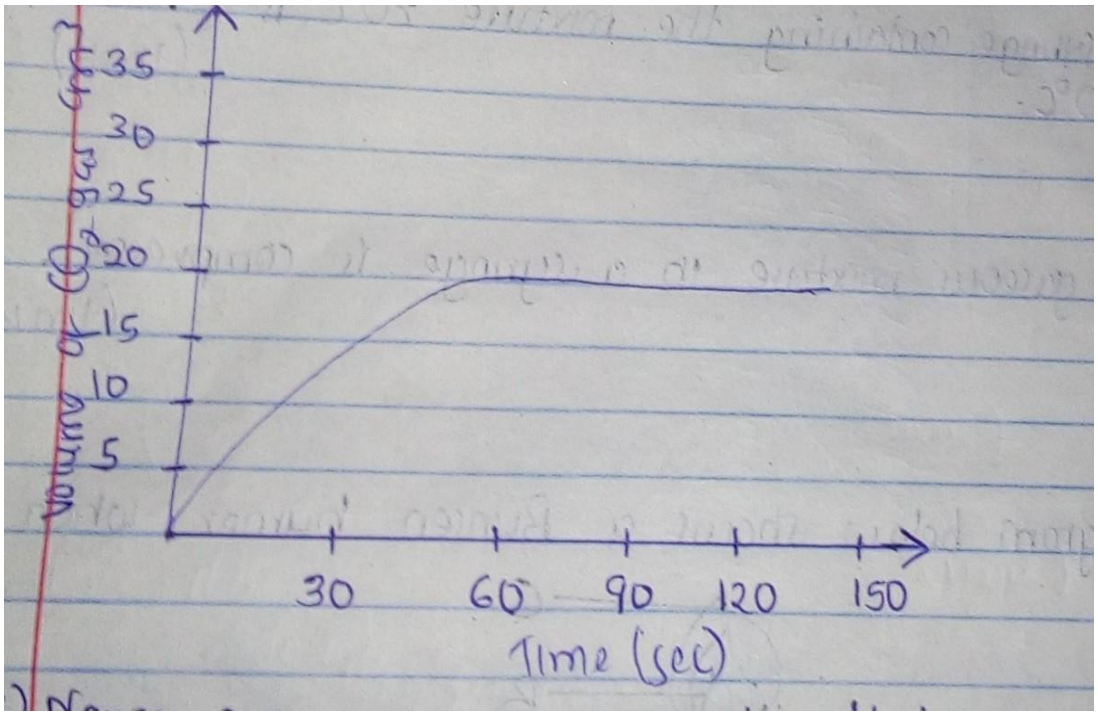
a) Name the regions labelled B and C (1mk)

B

C

b) What is the function of the part labelled A? (1mk)

12. A certain mass of marble chips reacted with excess dilute hydrochloric acid at 25^0c. The volume of carbon (iv) oxide gas liberated was measured after 30 seconds. The results were presented as shown in the graph below.



a) Name one piece of apparatus that may have been used to measure the volume of the gas liberated. (1mk)

b) On the same axis sketch the curve that would be obtained if the experiment was repeated using powdered calcium carbonate. (1mk)

13. When hydrogen Sulphide gas was bubbled into an aqueous solution of iron (iii) chloride, a yellow precipitate was deposited.

a) State another observation that would be made (1mk)

b) Write an equation of the reaction that took place. (1mk)

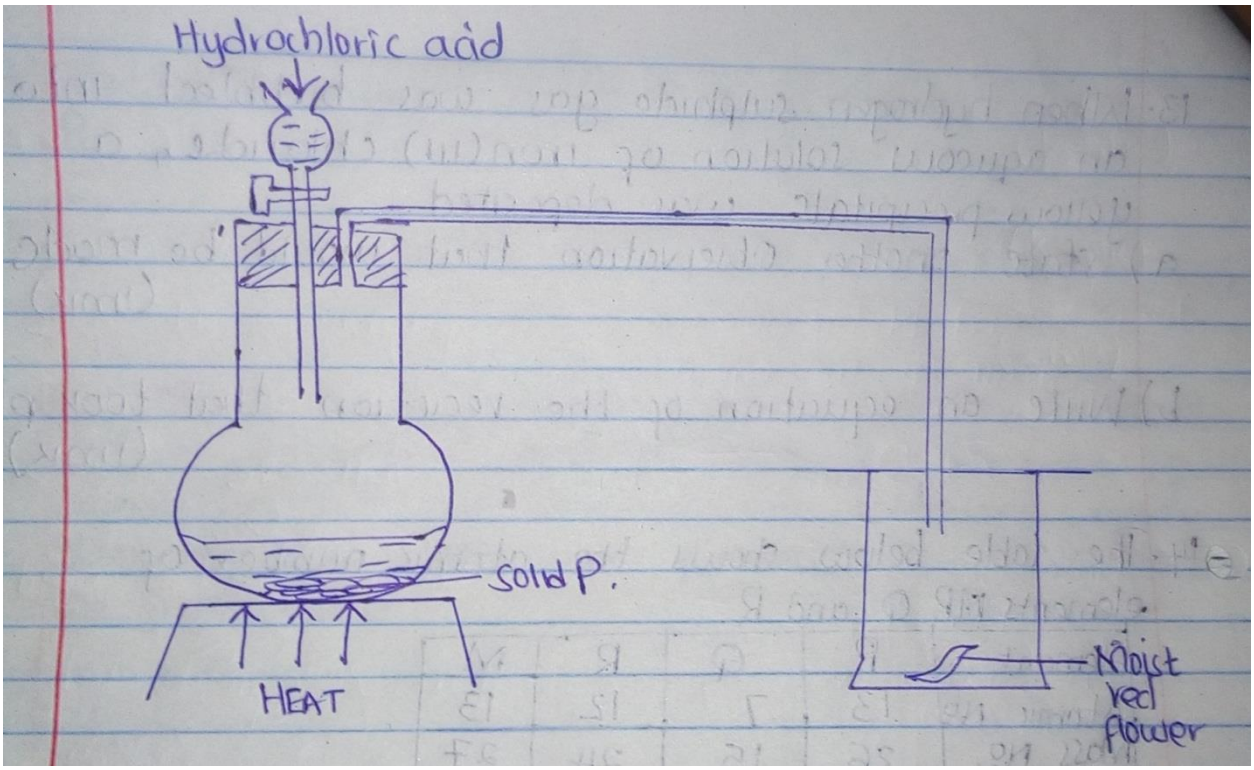
14. The table below shows the atomic number of elements M, P, Q and R.

Element	P	Q	R	M
Atomic No	13	7	12	13
Mass No	26	15	24	27

a) Which two letters represent the same element? Give reasons (1mk)

b) Give the number of neutrons of an atom of element Q (1mk)

15. The diagram below show the set up that was used to prepare and collect Sulphur (iv) oxide gas.



a) Identify the solid P (1mk)

b) i) Why is it possible to collect Sulphur (iv) oxide as shown? (1mk)

ii) What happened to the red flower? (1mk)

16 a) State Charles' law (1mk)

b) The volume o f a sample of nitrogen gas at temperature of 298k and 600mmHg pressure was $0.048m^3$, calculate the temperature at which the volume of the gas would be $0.032m^3$ if pressure remains the same. (2mks)

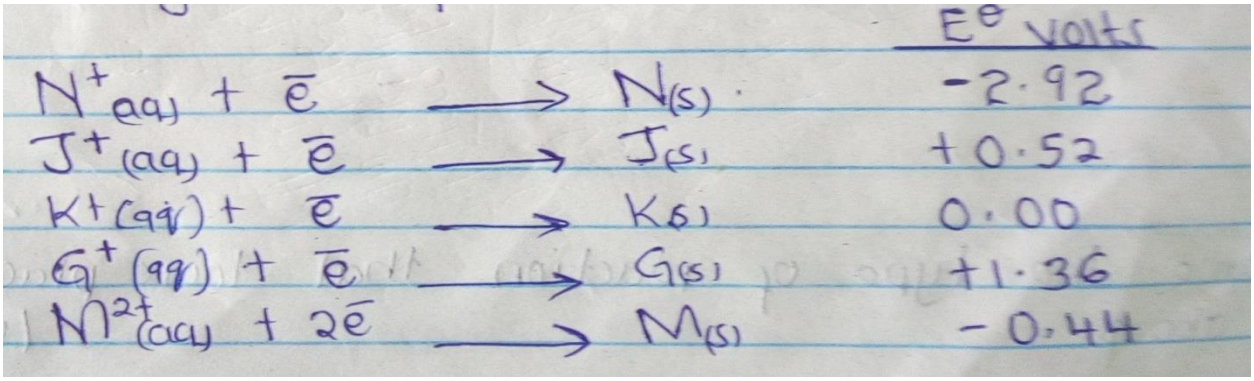
17. Element T consists of two isotopes ^{62}T and ^{64}T in the ratio 7:3 respectively. Calculate the Relative atomic mass of element T (3mks)

18. Name the process which takes place when

a) Solid carbon (iv) oxide changes directly into gas (1mk)

b) Butanol reacts with hexanoic acid in the presence of Sulphuric (iv) acid. (1mk)

19. Study the standard electrode potentials for the half-cells give below and answer the questions that follows (the letters do not represent the actual symbols of the elements)



a) Identify

i) The strongest reducing agent (½ mks)

ii) The strongest oxidizing agent (½mks)

b) Calculate the e.m.f of the cell (2mks)

$N_{(s)}/N^{+}_{(aq)}$ // $G^{+}_{(aq)}$ / $G_{(s)}$

20. Study the table below and answer the questions that follow

Bond type	Bond energy KJ/mol
C - C	346
C = C	610
C - H	413
C - Br	280
Br - Br	193

a) Calculate the enthalpy of the following reaction. (2mks)

$C_2 H_{4(g)} + Br_2 (g) \longrightarrow C_2H_4 Br_2 (g)$

b) Name the type of reaction that took place in a) above (1mk)

21. Briefly explain how you would obtain pure sample of lead (ii) chloride from a mixture of lead (ii) chloride and silver chloride (3mks)

22. Explain the following observations: very little carbon (iv) oxide is evolved when lead carbonate reacts with dilute hydrochloric acid (2mks)

23. The table below gives some properties of compounds P, Q, R and S

Compound	B.P^{0}C	M.P^{0}C	Conductivity in water
P	77	-23	Does not conduct
Q	74	-19	Does not conduct
R	-161	-85	Conduct
S	2407	714	Conduct

a) Which one of the compounds in the table is ionic?
Explain (1mk)

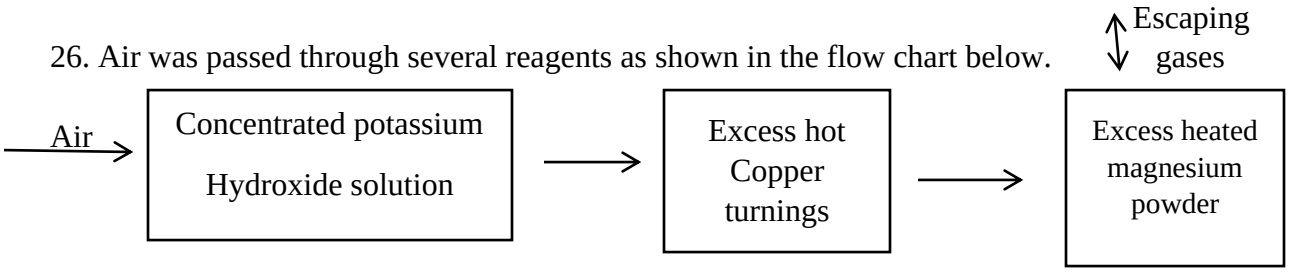
b) Give the compound that is liquid at room temperature. (1mk)

24. When butan – 1 – 0L is oxidized by acidic potassium dichromate, a weak organic acid is formed. Draw and name the structure formula of the acid obtained from the above reaction. (2mks)

25. When a hydrocarbon fuel burns, one of the main products is acidic gas R
i) Identify gas R (1mk)

ii) What two effects does gas R have when its concentration in the atmosphere exceeds its acceptable level. (2mks)

26. Air was passed through several reagents as shown in the flow chart below.



a) Write an equation for the reaction that took place in the chamber with the magnesium powder (1mk)

b) Name one gas that escapes from the chamber containing magnesium powder. Give a reason for your answer. (1mk)

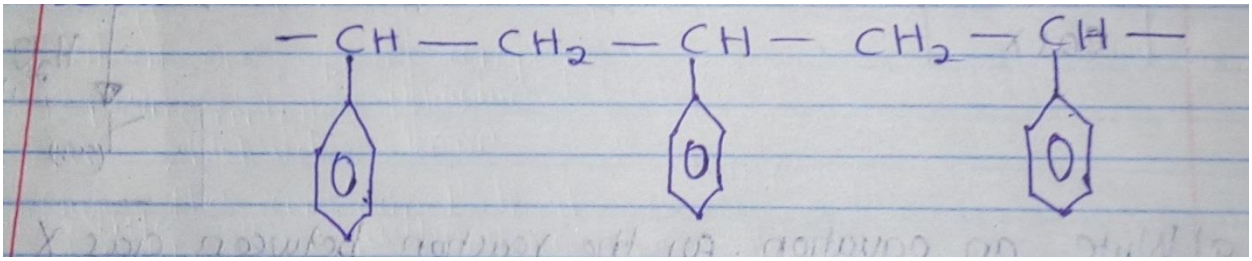
27. When a current of 6.42 Amperes was passed through an electrolyte Y^{2+} for 10 minutes, 2.74g of Y were deposited. (1mk)

i) Calculate the quantity of the electricity passed in the experiment.

ii) Determine the relative atomic mass of (1 faraday = 96,500 coulombs) (2mks)

28. Explain why aluminium metal is not extracted from aluminium chloride (2mks)

29. Part of the structure of a polymer is given below.



i) Identify the polymer. (1mk)

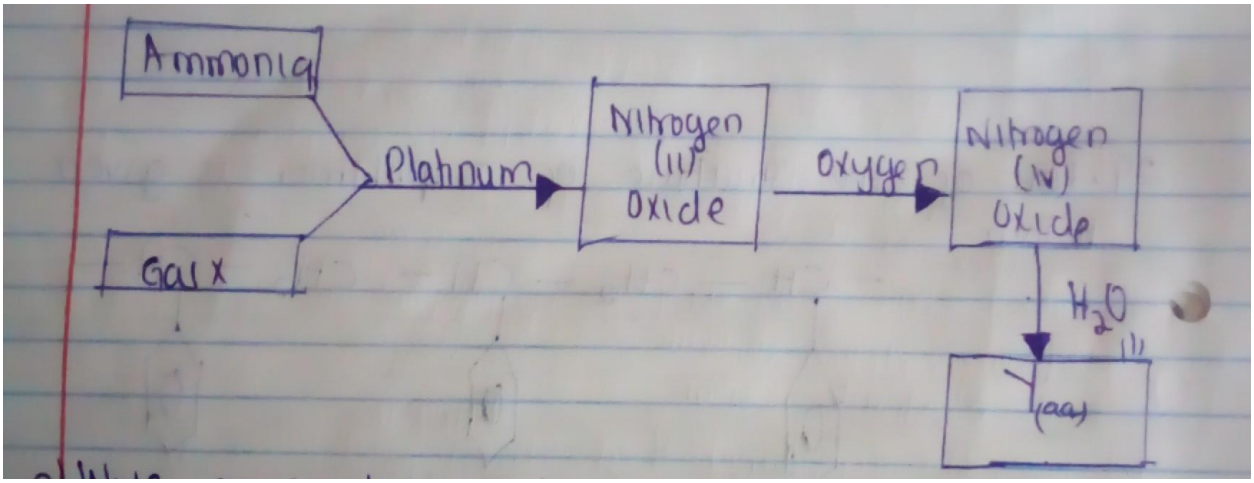
ii) State one disadvantage of continued use of this polymer (1mk)

30. The table below gives the rate of decay for a radioactive element M

Number of days	Mass (g)
0	12.8
280	0.8

Determine the half – life of the radioactive element M (2mks)

31. Study the flow chart below and answer the questions that follows.



a) Write an equation for the reaction between gas X and ammonia (1mk)

b) Write the formulae of the substance present in the mixture Y(aq) (2mks)

32. When the air hole is fully opened, the Bunsen burner produces a non-luminous flame
Explain (1mk)

PREDICTION 4

Name: …… Index No.…….....

School: ……. Class ……..

Date: ……

233/1

CHEMISTRY THEORY

PAPER 1

TIME: 2 HOURS

KCSE PREDICTION 4

Instructions to Candidates

(a)Write your name and index number in the spaces provided above.

(b) Sign and write the date of examination in the spaces provided above

*(c) Answer **ALL** the questions in the spaces provided in the question paper*

(d) KNEC Mathematical tables and electronic calculators may be used for calculations

*(e) All working **MUST** be clearly shown where necessary*

(f) This paper consists of 12 printed pages

(g) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing

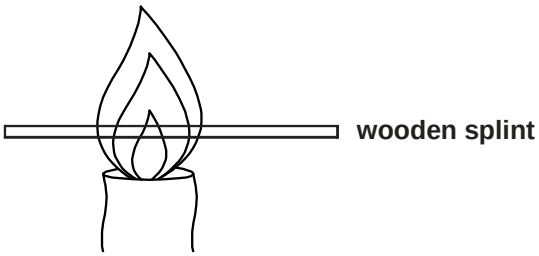
(h) Candidates should answer the questions in English

FOR EXAMINER'S USE ONLY

Question	Maximum score	Candidate's score
1 – 29	80	

This paper consists of 12 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. Study the diagram below then use it to answer the questions that follow.



a) Draw the wooden splint at the end of the experiment. If it was slipped then removed. (1 mark)

b) Explain the appearance of the wooden splint in (a) above. (2 marks)

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2. (a) The half-life of $^{210}_{83}M$ is 7 days. Determine the mass of remaining if 100g decayed in 35 days. (1 mark)

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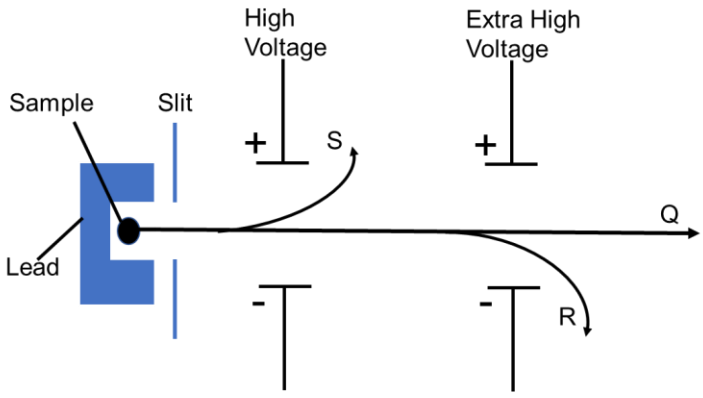
(b) The diagram below shows the radiations emitted by a radioactive sample.



(i) Identify radiation particles **S** and **R**. (1 mark)

S……

R……

(ii) Which emission causes most harm to human cells. Give a reason. (1mark)

……

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3. a) Starting with copper metal, describe how a solid sample of copper (II) carbonate can be prepared. (3 marks)

……1……

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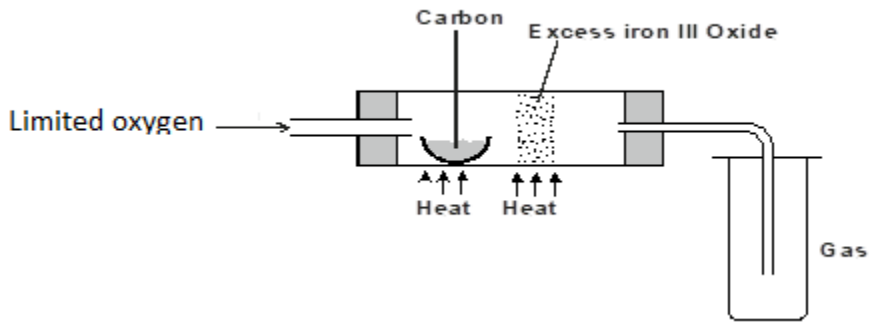
4. The set-up below was used to obtain a sample of iron.



Write two equations for the reactions which occur in the combustion tube. (2 marks)

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5. Below are the bond dissociation energies of some elements.

Bond	Bond dissociation energy
C – C	343 kJ mol^{-1}
C – H	414 kJ mol^{-1}
H – H	435 kJ mol^{-1}
C = C	612 kJ mol^{-1}

Use this information to calculate the heat of reaction for (3 marks)

$$C_2H_{4(g)} + H_{2(g)} \rightarrow C_2H_{6(g)}$$

6. Sulphur (IV) oxide is oxidized catalytically to sulphur (VI) oxide in the reaction.

$$2SO_{2(g)} + O_{2(g)} \longrightarrow 2SO_{3(g)} \quad \Delta H = -197kJ$$

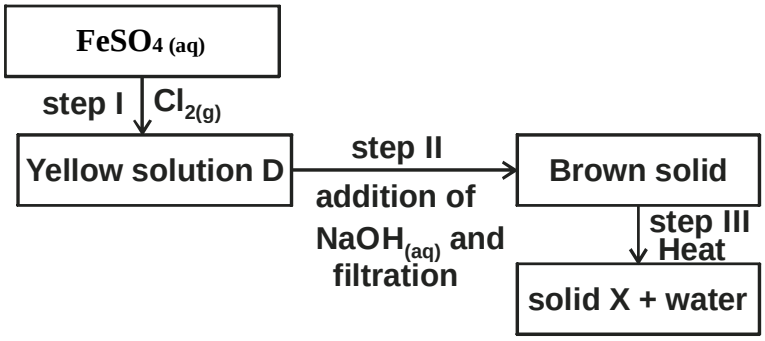
a) What information about the reaction is given by ΔH = -197kJ ? (1 mark)

……

b) Name one catalyst that can be used in this reaction. (1 mark)

……

7. Study the scheme below and answer the questions that follow.



a) Write the formula of the cation present in solution D. (1 mark)

……

b) What property of chlorine is shown in step 1. (1 mark)

……

c) Write an equation for the reaction which occurred in step III. (1 mark)

……

8. 0.63g of lead powder were dissolved in excess nitric (V) acid to form lead (II) nitrate solution. All the lead (II) nitrate was then reacted with sodium sulphate solution.

a) Write an ionic equation for the reaction between sodium sulphate solution and lead (II) nitrate solution. (1 mark)

……

b) Determine the mass of the lead salt formed in the reaction in (a) above (Pb = 207, S = 32, O = 16) (2 marks)

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9. Use the cell representation below to answer the questions that follow.

$$Cr_{(s)} / Cr^{3+}_{(aq)} // Fe^{2+}_{(aq)} / Fe_{(s)}$$

a) Write an equation for the cell reaction. (1 mark)

……

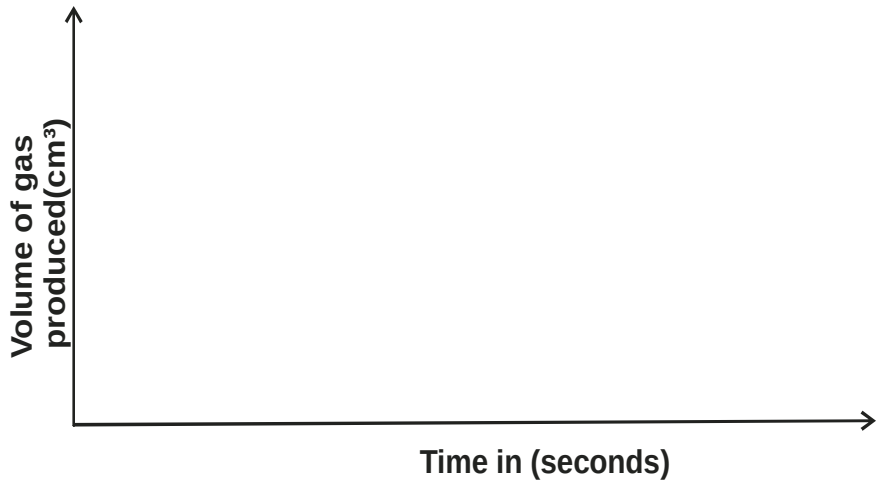
b) If the emf of the cell is 0.30V and the E^0 value for $Fe^{2+} / Fe_{(S)}$ is -0.44V. Calculate the E^0 value for $Cr_{(s)} / Cr^{3+}_{(aq)}$ (2 marks)

10. An element Q has a relative atomic mass of 88. When a current of 0.5A was passed through the fused chloride of Q for 32 minutes and 10 seconds, 0.44g of Q were deposited at cathode. Determine the charge on the ion of Q. (1 Faraday = 96500 coulombs) (3 marks)

11. The table below gives three experiments on the reaction of excess sulphuric (VI) acid and 0.5g Zinc done under different conditions. In each case the volume of gas liberated was recorded at different time intervals.

Experiment	Form of Zinc	Sulphuric (VI) acid
I	Powder	0.8M
II	Powder	1.0M
III	Granules	0.8M

On the axes below, draw and label the three curves that would be obtained from the results above.
(3 marks)



12. a) Starting with red roses, describe how a solution containing the red pigments may be prepared? (2 marks)

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b) How can the solution be shown to be an indicator. (1 mark)

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13. The table below provides data on the successive ionisation energies of carbon.

Ionisation numbers	1st	2nd	3rd	4th	5th	6^{th}
Ionisation energy (kJ/mol)	1090	2350	4610	6220	37800	47300

a) Explain why each ionisation energy increase in nature. (2 marks)

……

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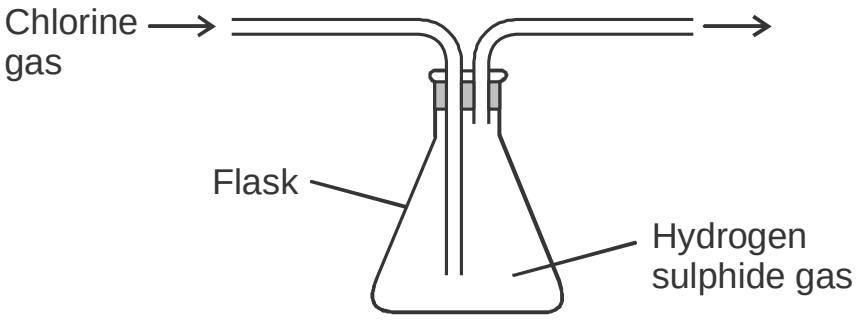
b) Write an equation for the 5th ionisation energy of carbon. (1 mark)

……

14. The figure below was set by a student to investigate the reaction between chlorine gas and hydrogen sulphide gas.



a) Write an equation for the reaction that took place in the flask. (1 mark)

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b) What observation was made in the flask ? (1 mark)

……

c) What precaution should be taken in carrying out the experiment ? (1 mark)

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15. A certain carbonate, QCO_3, reacts with dilute hydrochloric acid according to the equation given below.

$$QCO_{3(S)} + 2HCl_{(aq)} \rightarrow QCl_{2(aq)} + CO_{2(g)} + H_2O_{(l)}$$

If 1g of the carbonate reacts completely with $20cm^3$ of 1M hydrochloric acid. Calculate the relative atomic mass of Q.(C = 12.0, O=16.0) (3 marks)

16. When bismuth (III) chloride is added to water, a reaction occurs and a white precipitate forms as shown below.

$BiCl_{3(aq)} + H_2O_{(l)} \rightleftharpoons BiOCl_{(s)} + 2HCl_{(aq)}$

What would be the effect on the amount of the precipitate formed if sodium hydroxide solution is added to the equilibrium mixture? Explain your answer. (2marks)

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17. (a) State the Gay Lussac's Law. (1 mark)

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(b) $10cm^3$ of a gaseous hydrocarbon, C_2H_X required $30cm^3$ of oxygen for complete combustion. If steam and $20cm^3$ of carbon (IV) oxide were produced, what is the value of X? (2 marks)

18. (a) Give Bronsted and Lowry definition of an acid (1mk)

……

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(b) Differentiate between a strong acid and a concentrated acid (2mks)

……

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19. When a hydrated sample of $CaSO_4.xH_2O$ was heated until all water was lost, the following data was recorded

Mass of crucible = 30.296 g
Mass of crucible + hydrated salt = 33.111 g
Mass of crucible + anhydrous salt = 32.781 g

Determine the empirical formula of the hydrated salt. *($CaSO_4=136, H_2O=18$).* (3marks)

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20. Describe a chemical test used to distinguish butane from butene in the laboratory. (2marks)

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21. The table below gives the atomic numbers of elements W, X, Y and Z.

Element	W	X	Y	Z
Atomic number	14	17	16	19

a) Name the type of bonding that exist in the compound formed when **X** and **Z** reacts. (1mark)

……

……

b) Select the letter representing the strongest reducing agent. Give a reason for your answer. (2mks)

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22. In an electrochemical cell, the standard hydrogen electrode uses platinized platinum. State **three** functions of the platinized platinum. (3 marks)

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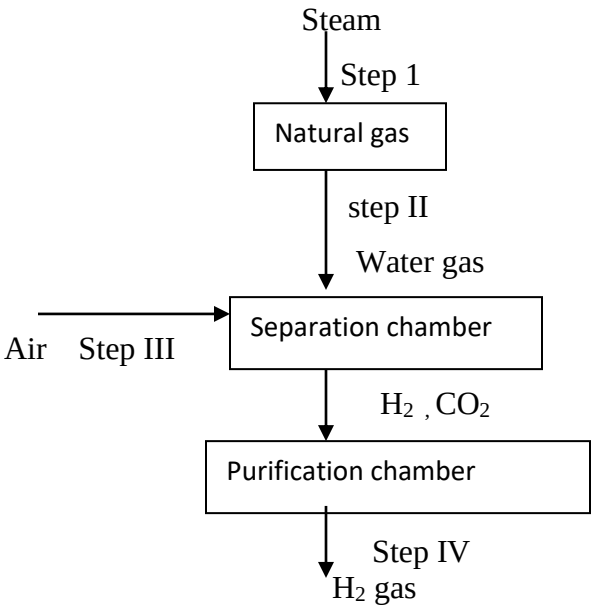
23. The flowchart below shows the scheme for extraction of Hydrogen from hydrolysis of natural gas, study it and answer the questions that follow.



a) In step II water gas is formed. State one use of water gas. (1marks)

……

b) When air is added in step III CO is converted to CO_2 name one chemical substance that can be used to separate CO_2 from H_2 in step IV (1marks)

……

c) State one large scale use of Hydrogen gas formed. (1marks)

……

24. Aluminium is obtained from the ore with the formula Al_2O_3. $2H_2O$. The ore is first heated and refined to obtain pure aluminium oxide (Al_2O_3). The oxide is then electrolysed to get Aluminium and oxygen gas using carbon anodes and carbon as cathode.

i) Give the common name of the ore from which aluminium is extracted. (1 mark)

.....

ii) What would be the importance of heating the ore first before refining it ? (1 mark)

.....

iii) The refined ore has to be dissolved in cryolite first before electrolysis. Why is this necessary?

……. (1 mark)

iv) Why are the carbon anodes replaced every now and then in the cell for electrolysing aluminium oxide? (1 mark)

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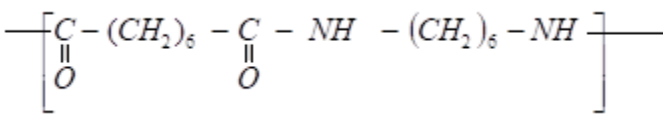
26. Nylon polymer has the structure below.



i) Determine the structures of the monomers. (2mks)

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ii) State the type of polymerization. (1mk)

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27. (a) Define the term solubility. (1 mark)

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b) The following were the results obtained in an experiment to determine solubility of potassium nitrate at room temperature.

Mass of evaporating dish = 14.32 g

Mass of evaporating dish + saturated solution = 35.70 g

Mass of evaporating dish + salt (residue) = 18.60 g

Calculate the solubility of potassium nitrate from the above results. (2 marks)

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28. Describe a simple laboratory experiment that can be used to distinguish between sodium sulphide and sodium carbonate. (2mks)

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29. (a)Give **one** reason some of the laboratory apparatus are made of ceramics.

(1 mark)

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(b) Name **two** apparatus that can be used to measure approximately 75 cm^3 of dilute sulphuric (VI) acid. **(2 marks)**

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Last Printed Page

PREDICTION 5

Name...…….. Index Number...……..

Candidate's Signature ……..…… Date…….

233/1
CHEMISTRY (THEORY)
PAPER 1
2 HOURS

KCSE PREDICTION 5

Kenya Certificate of Secondary Education (KCSE)

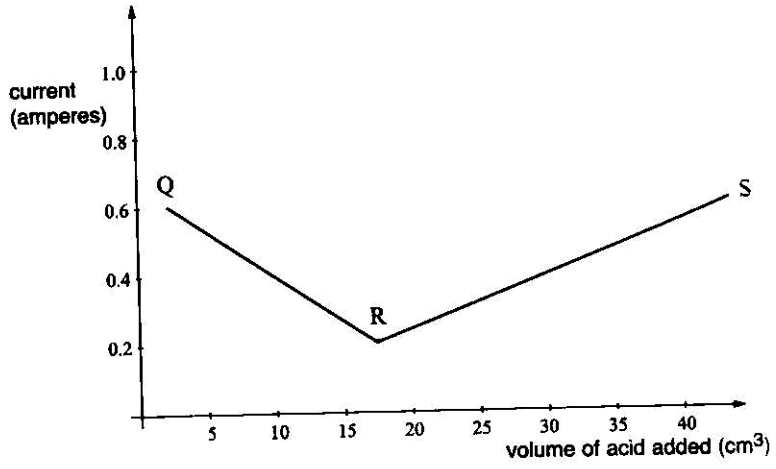
INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. Answer **ALL** the questions in the spaces provided in the question paper.
4. KNEC Mathematical tables and silent non-programmable electronic calculators may be used.
5. All working **MUST** be clearly shown where necessary
6. This paper consists of **13** printed pages.
7. Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing.
8. Candidates should answer all the questions in English.

For Examiner's Use Only

Question	Maximum Score	Candidate's Score
1 – 29	80	

1. The electrical conductivity of barium hydroxide solution was measured after each addition of 1.0 cm^3 of dilute sulphuric (VI) acid from a burette. The graph below was obtained.



(a) Write the chemical equation of the reaction that took place. (1 mark)

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(b) Explain the graph between,

(i) Q and R (1 mark)

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(ii) R and S (1 mark)

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2. A mass of 14.2 g sodium nitrate saturated 32.1 cm^3 of water at 32 ^oC. Determine the solubility of sodium nitrate at 32 ^oC. (Density of water = 1g/cm^3). (2 marks)

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3. Explain why sulphur is a solid while oxygen is a gas at room temperature. (2 marks)

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4. Study the electrode potential in the table below and answer the questions that follow.

	E volts
$Cu^{2+}_{(aq)} + 2e^- \rightarrow Cu_{(s)}$	+0.34
$Mg^{2+}_{(aq)} + 2e^- \rightarrow Mg_{(s)}$	-2.38
$Ag^{+}_{(aq)} + e^- \rightarrow Ag_{(s)}$	+0.80
$Ca^{2+}_{(aq)} + 2e^- \rightarrow Ca_{(s)}$	-2.87

(a) Identify the strongest reducing agent. (1 mark)

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(b) What would be observed when magnesium ribbon is dipped in solution of copper (II) sulphate. Explain. (2 marks)

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5. In a reaction, 0.65 g of impure zinc oxide reacted with 100 cm^3 of 0.15 M nitric (V) acid.

(a) Write equation of the reaction. (1 mark)

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(b) Calculate percentage purity of the zinc oxide sample. (2 marks)
(Zn = 65, O = 16)

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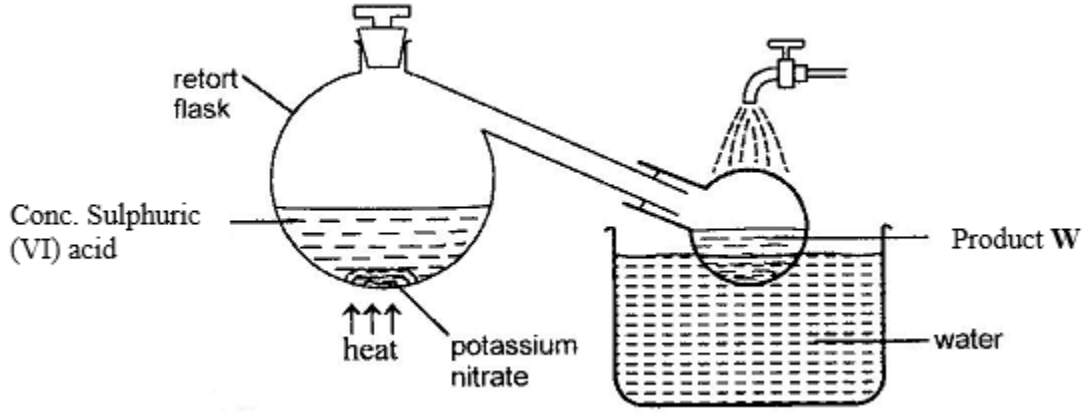
6. The set up below can be used for the laboratory preparation of product **W**.



(a) Write chemical equation for the reaction that takes place in the retort flask. (1 mark)

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(b) Explain why product W appears yellow in colour. How is the colour removed? (2 marks)

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7. The table below shows information of four elements **A**, **B**, **C** and **D**. Study it and answer the questions that follow. The letters do not represent the actual symbols of the elements.

Element	Electronic arrangement	Atomic radius	Ionic radius
A	2.8.2	0.136	0.065
B	2.8.7	0.99	0.181
C	2.8.8.1	0.203	0.133
D	2.8.8.2	0.174	0.099

(a) Which two elements have similar properties? (1 mark)

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(b) Explain why **B** ionic radius is larger than its atomic radius. (2 marks)

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8. The production of ammonia gas involves a reversible reaction as shown.

$$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)} \quad \Delta H = -92\ kJmol^{-1}$$

(a) What condition is necessary for the chemical equilibrium to be established? (1 mark)

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(b) Suggest **two** conditions that are likely to shift the equilibrium from right to left. (2 marks)

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9. Describe how chloride ions are tested in a solution. (2 marks)

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10. The empirical formula of X is CH_2Br. Given that 0.235 g of X occupies a volume of 56 cm^3 at 546 K and 1 atmosphere pressure, determine its molecular formula.
(H = 1.0, C = 12.0, Br = 80.0, molar gas volume at STP = 22.4 dm^3) (3marks)

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11. When a piece of sodium metal is place in cold water in a beaker it melts producing a hissing sound, as it moves on the surface of the water. Explain these observations. (3 marks)

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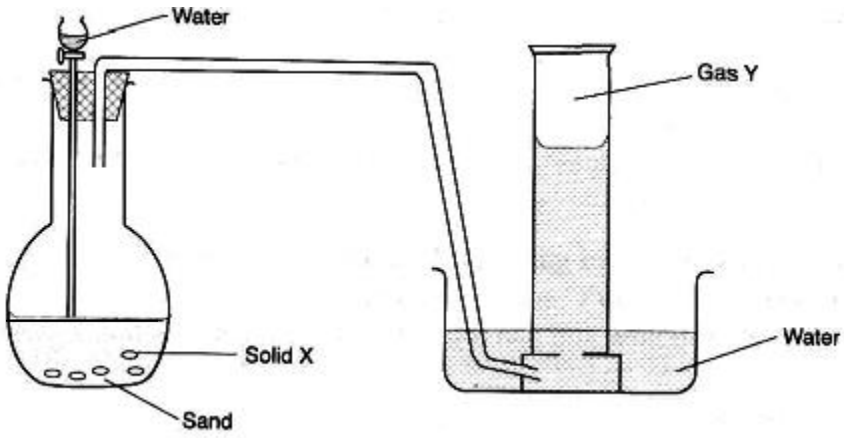
12. The set-up below was used to prepare a hydrocarbon. Study it and answer the questions that follow.



(a) Identify solid X and gas Y.

Solid X……..... (1 mark)

Gas Y……..... (1 mark)

(b) Write a chemical equation for the complete reaction between gas Y and bromine vapour. (1 mark)

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13. (a) When excess chlorine gas is bubbled through cold, dilute sodium hydroxide solution, the resulting solution acts as a bleaching agent. Using an equation, explain how the resulting solution acts as a bleaching agent. (1 mark)

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(b). What is observed when chlorine gas is bubbled through a solution of potassium bromide? Explain. (2 marks)

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14. (a) Explain why the pH of 1.0 M hydrochloric acid is 1 while that of 1.0 M ethanoic acid is 5.0. (1 mark)

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(b) How can a precipitate of barium sulphate be distinguished from that of barium sulphite? (2 marks)

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15. **A**, **B**, **C** and **D** are dyes present in a mixture. In a given solvent, **C** is more soluble than **B** and **A** is more soluble than **C**. **D** is the least soluble. Draw an ascending paper chromatogram showing how they would appear when separated using the solvent. (2 marks)

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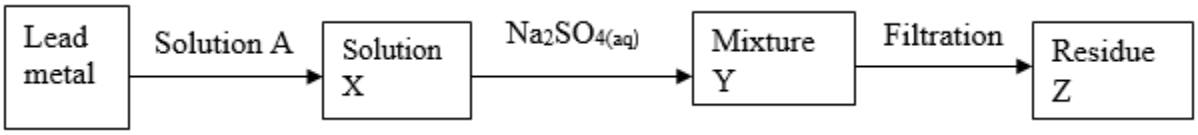
16. The reaction below refers to the preparation of lead (II) sulphate starting with lead metal.



(a) Name solution A…….. (1 mark)

(b) Write an ionic equation for the reaction in (a) above. (1 mark)

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(c) Explain why it is not possible to prepare residue Z using lead metal and dilute sulphuric acid. (1 mark)

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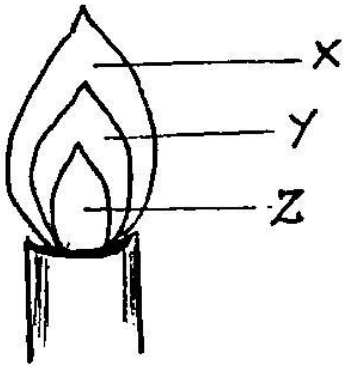
17. The diagram below represents a Bunsen burner flame. Study it and answer the questions that follow.



(a) Under what condition is the represented flame produced? (1 mark)

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(b) Which of the regions shown represents the hottest part of the flame? (1 mark)

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(c) Name region Y (1 mark)

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18. A typical electrolysis cell uses a current of 40,000 amperes. Calculate the mass in kilograms of aluminium produced in one hour. (Al = 27, 1 Faraday = 96,500 coulombs) (3 marks)

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19. (a) Distinguish between endothermic and exothermic reaction. (1 mark)

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(b) Nitrogen reacts with oxygen to form nitrogen (II) oxide according to the following reaction

$N_{2(g)} + O_{2(g)} \rightarrow 2NO_{(g)}$ $\Delta H = +180$ kJmol^{-1}

Draw an energy level diagram for this reaction including the activation energy. (2 marks)

20. (a) When a compound T was heated, a brown gas and a residue which was yellow when hot and white when cold were formed. Identify the:

(i) Brown gas…….. (1 mark)

(ii) Residue…… (1 mark)

(b) Name a suitable drying agent for ammonia gas. (1 mark)

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21. Give the structural formula of the following organic compounds.
(a) 2-Methylbutane

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(b) Pent-2-ene

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(c) Ethylpropanoate

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22. When iron and steam are heated in a closed container, a dynamic equilibrium is reached.

$$3Fe_{(s)} + 4H_2O_{(g)} \rightleftharpoons Fe_3O_{(s)} + 4H_{2(g)}$$

(a) Define the dynamic equilibrium. (1 mark)

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(b) What is the effect on equilibrium if magnesium is added? Explain. (2 marks)

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23. State and explain the observations that would be made when burning magnesium is lowered into a gas jar of sulphur (IV) oxide. (3 marks)

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24. A mixture contains barium sulphate, calcium chloride and dry ice. Describe how the components can be separated. (3 marks)

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25. In the redox reaction below:
$2H^{+}_{(aq)} + Cr_2O_7^{2-}{}_{(aq)} + 3SO_{2(aq)} \rightarrow 2Cr^{3+}_{(aq)} + 3SO_4^{2-}{}_{(aq)} + H_2O_{(l)}$
Identify the reducing agent. Explain. (2 marks)

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26 (a) Explain why aluminium utensils do not corrode as easily as iron utensils although aluminium is higher than iron in the reactivity series. (1 mark)

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(b) State **two** uses of aluminium other than utensils making. (2 marks)

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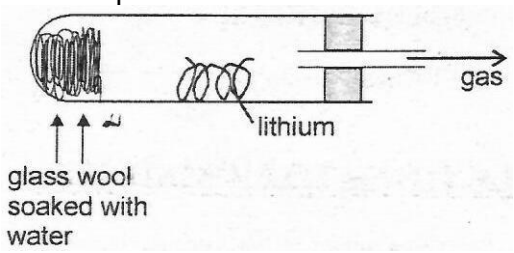
27. The diagram below represents a set up that was used to react lithium with steam. Study and answer the question that follows.



a) Write an equation for the reaction that takes place. (1 mark)

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b) Why is it not advisable to use potassium metal in place of lithium in the above set-up? (1 mark)

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c) The gas produced above is used for welding. Which other gas is combined with it? (1 mark)

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28. Using dots (.) and crosses (×) to represent valence electrons, show bonding in:

(a) Nitrogen trifluoride (N = 7, F = 9) (1 mark)

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(b) Sodium oxide (Na = 11, O = 8) (1 mark)

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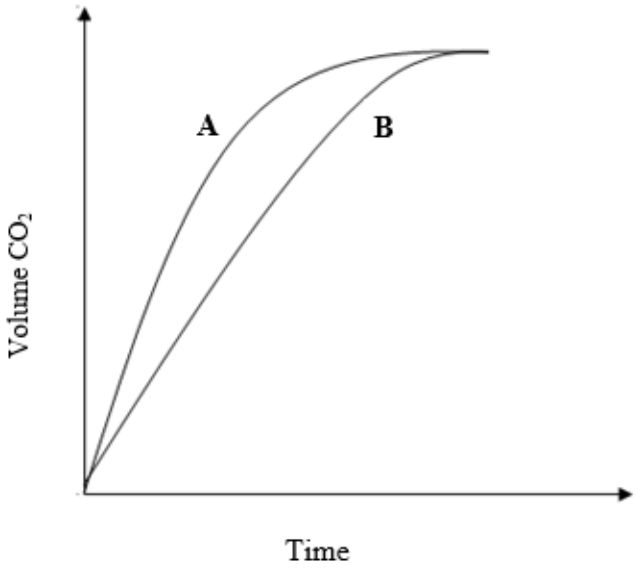
29. The graphs below were drawn by measuring the volume of hydrogen produced with time when excess zinc metal in different physical states were reacted with 50 cm^3 of 2 M hydrochloric acid.



(a) Which curve corresponds to the reactions involving powdered zinc? (1 mark)

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(b) Both curves eventually flatten out at the same level of hydrogen. Explain. (1 mark)

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PREDICTION 6

NAME: ……..……. INDEX NO: ……

233/1
CHEMISTRY
PAPER 1
TIME: 2 HOURS

KCSE PREDICTION 6

Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES

- *Write your name and index number in the spaces provided.*
- *Answer **all** questions in the spaces provided*
- *KNEC mathematical tables and silent electronic calculators **may** be used for calculations.*
- *All workings **must** be clearly shown where necessary.*
- *Candidates should check the question paper to ascertain all the pages are printed as indicated and no questions are missing.*

For Examiners Use Only

Questions	Maximum Score	Students Score
1-32	80	

This paper consists of 12 printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no pages are missing.

1. State the observations made when a piece of sodium metal is dropped into a beaker containing water. (2mks)

2. During a class experiment, students passed gas X over heated copper metal, the metal changed its colour to black.

   (a) Identify gas X. (1mk)

   (b) Name the black substance formed. (1mk)

3. Aluminium is extracted from its ore by electrolysis.

   (a) Name the main ore of Aluminium . (1mk)

   (b) The Aluminium ore in (a) above has a very high melting point.(2015^0C),though it is electrolyzed at a lower temperature of about 900^0 C. Explain how the low temperature is achieved. (1mk)

   (c) In the above process, graphite electrodes are used. What is the disadvantage of using this kind of electrodes (1mk)

4. A student added $50cm^3$ of 1.0M aqueous Sulphuric (VI) acid to $50cm^3$ of 2.0M Potassium Hydroxide and the temperature of the resulting solution rose by 4^0 C.

   (a) Define the term Molar heat of neutralization. (1mk)

   (b) Calculate the molar heat of neutralization
   (C=4.2KJKg^{-1} K^{-1} ,Density of solution=1g/cm^3) (2mks)

5. Use the table below to answer the question that follow:

Element	Atomic number

A	11
B	13
C	14
D	17
E	19

(a) Write an equation for the reaction between element A and water. (1mk)

(b) Explain the trend of atomic radii between elements A and D. (2mks)

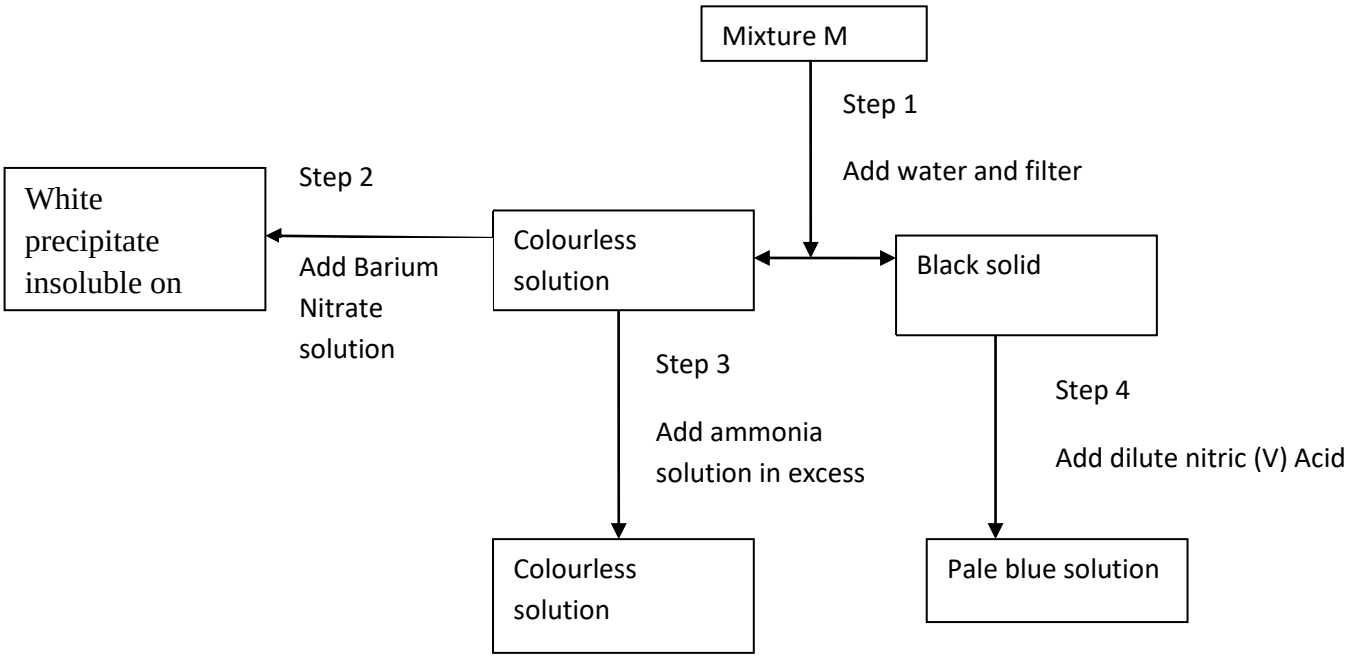
.

6. In terms of structure and bonding, explain why graphite is used as a lubricant. (2mks)

7. (a)State the Boyles Law. (1mk)

(b) A given mass of the gas occupies $20cm^3$ at 25^0 C and 670mmHg pressure. Find the volume it will occupy at 10^0 C and 335mmHg. (2mks)

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



(a) Name

(i) Cations present in mixture M. (1mk)

(ii) Anion present in thecolourless solution. (1mk)

(b) Write an equation to show how the white precipitate in step 3 dissolves. (1mk)

(c) Name the process outlined in step 4 above. (1mk)

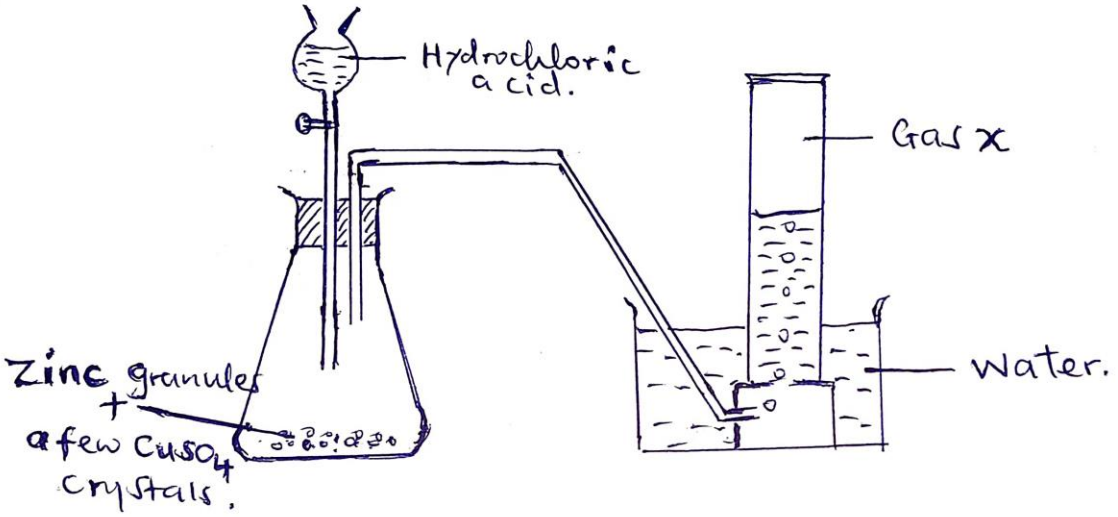
9.The solubility of potassium nitrate is 85g/100g of water at 50 ^{0} C and 32g/100g of water at 25 ^{0} C.

(a) Define the term solubility. (1mk)

(b) Calculate the mass of the crystals formed if a saturated solution of potassium nitrate in 50g of water at 50 ^{0} C is cooled to 25 ^{0} C. (2mks)

10. Magnesium Chloride dissolves in water to form a neutral solution while iron (III) chloride forms an acidic solution. Explain. (2mks)

11. The diagram below is a set up to prepare a certain gas X. Study it and use it to answer the questions that follow.



(a)Identify gas X. (1mk)

(b)Why is the gas collected over water? (1mk)

.

(c)Why are Copper (II) Sulphate crystals added to the flask where the reaction takes place?

12. (a)Give the systematic names of the following organic compounds. (2mks)

(i) $CH_3CH_2CH_2CH_2OH$

(ii) $CH_3CH_2COOCH_2CH_3$

(b)Explain why an organic compound with the formula C_4H_8burns with a more sooty flame than C_4H_{10}. (2mks)

.

13. When solid Zinc Carbonate was added to a solution of Hydrogen Chloride in methylbenzene there was no observable change. On addition of some water to the mixture there was effervescence. Explain the observation. (2mks)

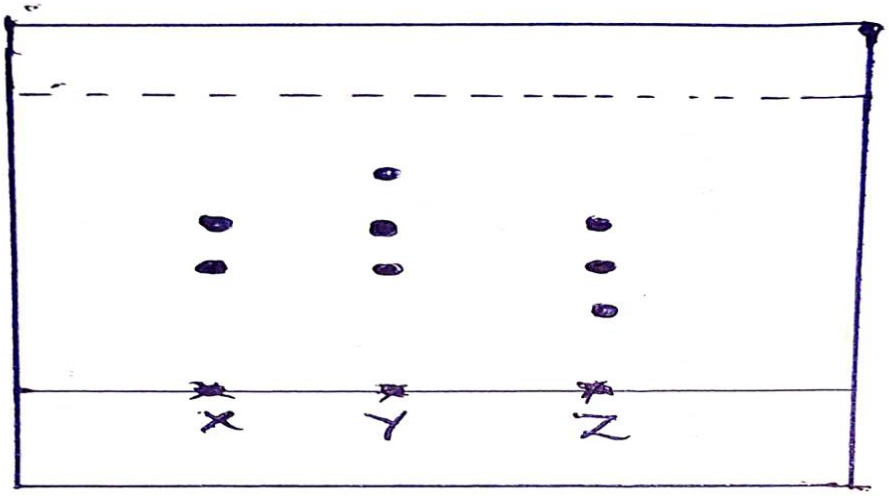
14. In titration experiment,25.0 cm^3 of sodium hydroxide containing 8.0 g per litre was required for complete neutralization of 0.245 g of a dibasic acid. Calculate the relative molecular mass of the acid. (3mks)

15. (a)100g of a radioactive isotope was reduced to 12.5g after 81 days. Calculate the half lifeof the radioisotope. (2mks)

` (b) $^{212}_{80}Y$ decays by beta emission. What is the mass number and the atomic number of the product after decay? (1 mk)

16.(a) Distinguish between ionization energy and electron affinity. ` (2mks)

17.The diagram below represents a paper chromatography for three brands of juice suspected to contain unwanted food additives.



From the results, it was found that unwanted additives are present in Y and Z only.

On the chromatogram;

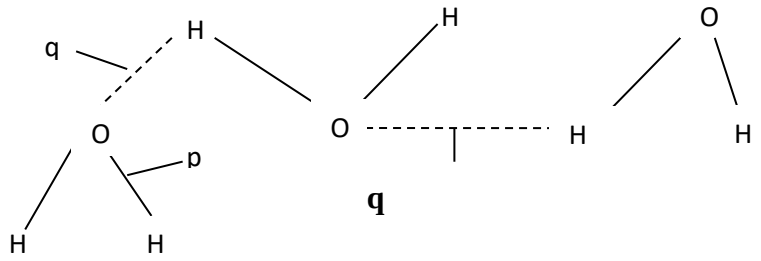
(a)Circle the spots which show unwanted food additives. (1mk)

(b)Name the solvent commonly used in paper chromatography. (1mk)

(c)State two applications of chromatography. (2mks)

18.(a)Show bonding in Aluminium Oxide. (1mk)

(b)Identify the type of bonds represented by p and q in the substances below.

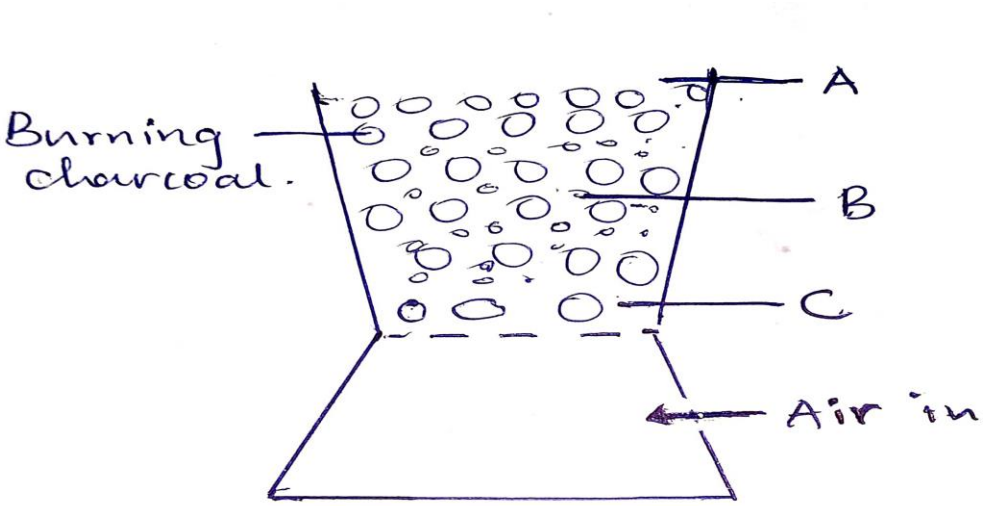


q

p- (½ mk)

q- (½ mk)

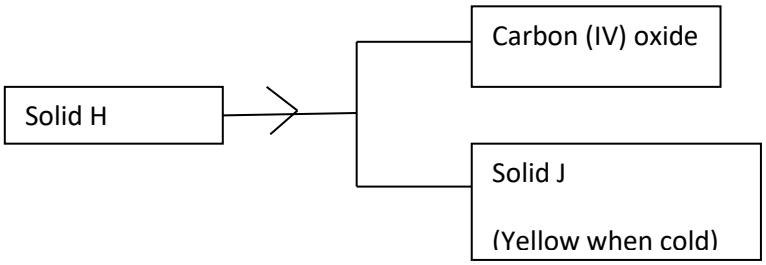
19.The following diagram represents a charcoal burner. Study it and answer the questions that follow:



Write the equations for the reactions at A,B and C regions. (3mks)

A -
B –
C -

20. Use the scheme below to answer the question that follow.



(a)Identify process N. (1mk)

(b)Identify the solids

H- (½ mk)

J- (½ mk)

21.Ammonia gas is prepared by Harber process according to the equation below:

$N_2(g)+3H_2(g) \longrightarrow 2NH_3(g)$ +Heat

State and explain the effect on equilibrium when the following conditions are applied.

(a)Pressure increased. (1mk)

(b)Temperature increased. (1mk)

(c)State Le Chatelier's principle. (1mk)

22. You are given the following half equations.

$I_2(s) + 2e^- \rightleftharpoons 2I^-(aq)$ $E^{\Theta}=+0.54V$

$Br_2(l) + 2e^- \rightleftharpoons 2Br^-(aq)$ $E^{\Theta}=+1.09V$

(a)Write an overall equation for the cell reaction. (1mk)

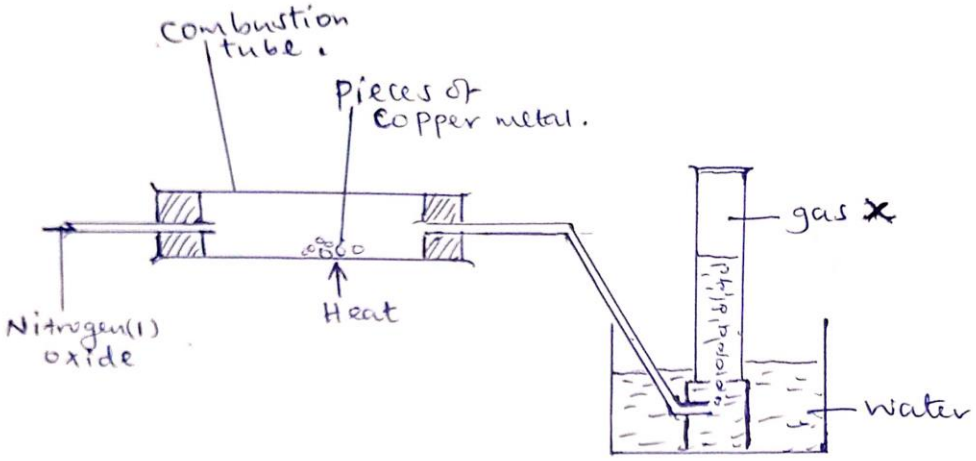
(b)Calculate the E^{Θ} value of the cell. (1mk)

(c)Name the oxidizing agent. (1mk)

23.When a current of 0.8Ampheres was passed for 44 minutes and 20 seconds through fused iodide of metal Z, 0.7167g of Z was deposited. Determine the charge of the ion of metal Z.

(1 Faraday=96500C,RAM of Z=65) (2mks)

24.The set up below shows how small pieces of copper are heated in nitrogen (I) Oxide.



(a)Write an equation for the reaction which occurs in the glass jar. (1mk)

(b)Give one use of the Nitrogen (I) Oxide. (1mk)

25.State what would be observed if concentrated Sulphuric (VI) Acid is added to:

(a)Sugar crystals. (1mk)

(b)Hydrated Copper (II) Sulphate crystals. (1mk)

(c)What type of reaction has taken place above. (1mk)

26.Explain why commercial indicators are preferred to flower extracts as acid base indicators. (2mks)

.

27.(a)Magnesium reacts with hydrochloric acid according to the following equation.

$Mg(s) + 2HCl(aq) \longrightarrow MgCl_2(aq) + H_2(g)$

Identify the reducing agent. Give a reason for your answer. (2mks)

(b)Iron sheets are dipped in molten Zinc to prevent rusting .Name this process. (1mk)

28.Explain why a balloon filled with helium gas deflates faster than a balloon of the same size filled with argon gas. (2mks)

29.Complete the table below. (2mks)

Solution	PH	Nature of Solution
H	1.0	
I		Neutral
J		Weak acid
K	13.0	

30.A farmer intended to plant cabbages in his farm. he first tested the PH of the soil and found it to be 3.0.If cabbages do well in alkaline soils, explain the advice that would be given to the farmer in order to realize a high yield. (2mks)

31.Name an appropriate apparatus:

(a)That is used to prepare standard solutions in the laboratory. (1mk)

(b) That is used in heating solid substances strongly. (1mk)

(c)That can be used to separate two immiscible liquids. (1mk)

32.Some plants have seeds that contain vegetable oil.

(a)State the reagent and apparatus used to extract the oil from the seeds. (1mk)

Reagent-

Apparatus-

(b)Explain how it could be confirmed that the liquid obtained from the seeds is oil? (1mk)

(c)State an application of the method of extracting oil above. (1mk)