

KCSE 2026 FINAL PREDICTION

CHEMISTRY

(PREDICTIONS TRIALS 1-10)

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Give your candidates the ultimate competitive edge with this masterfully engineered prediction series. Meticulously designed to replicate the exact format and content of the final KNEC papers, this comprehensive toolkit delivers high-yield, exam-focused practice. It is the definitive revision resource to sharpen understanding, skyrocket self-esteem, and guarantee top-tier grades!

The following are Questions to expect in KCSE 2026.

CONFIDENTIAL!

For Marking Schemes

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KCSE 2026 FINAL BLUEPRINT!

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 1**

233/1

CHEMISTRY**PAPER 1**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

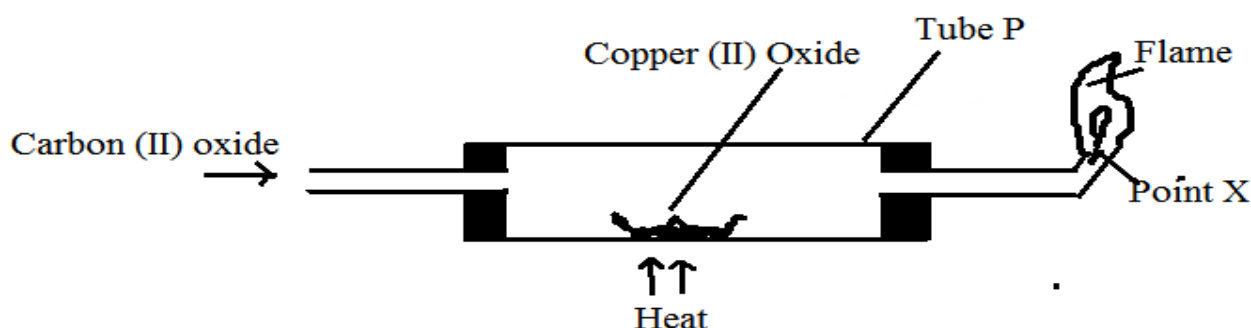
- Write your **name** and **index number** in the spaces provided above.
- **Sign** and write the date of examination in the spaces provided above.
- Answer **ALL** the questions.
- **Mathematical tables and electronic calculators may be used.**
- All working **MUST** be clearly shown where necessary.

FOR EXAMINERS USE ONLY

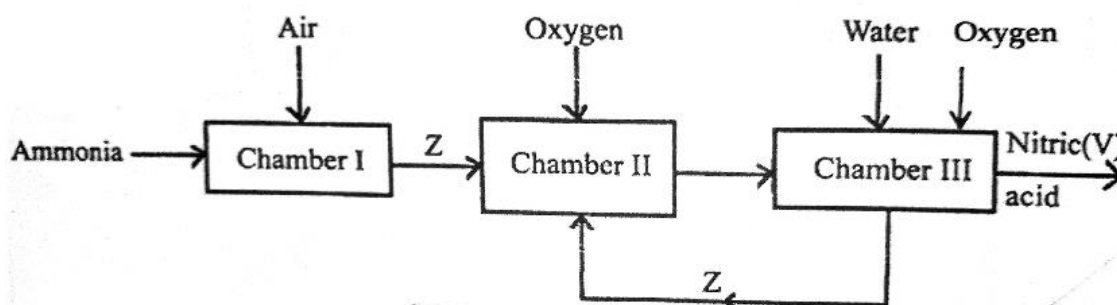
Questions	Maximum Score	Candidate's Score
1 – 27	80	

Answer ALL the questions.

1. Air is a mixture of different components. Identify;
 - i) A compound that turn lime water to a white precipitate [1 mk]
 - ii) A compound that changes cobalt(ii)chloride from blue to pink [1 mk]
 - iii) A diatomic gas that has triple bond [1 mk]
2. A mixture contains potassium chloride and lead(ii)sulphate. Describe how you would obtain crystals of potassium chloride from this mixture [3 mks]
3. Oxygen is prepared in the laboratory through catalytic decomposition of hydrogen peroxide.
 - a) Name the catalyst in this experiment [1 mk]
 - b) What mass of hydrogen peroxide would be needed to produce 120cm^3 of oxygen gas at r.t.p in this experiment? (Molar gas volume at RTP = 24000cm^3 , H = 1, O = 16) [3 mks]
4. Carbon(iv)oxide gas was passed over heated copper(ii)oxides shown in the diagram below.

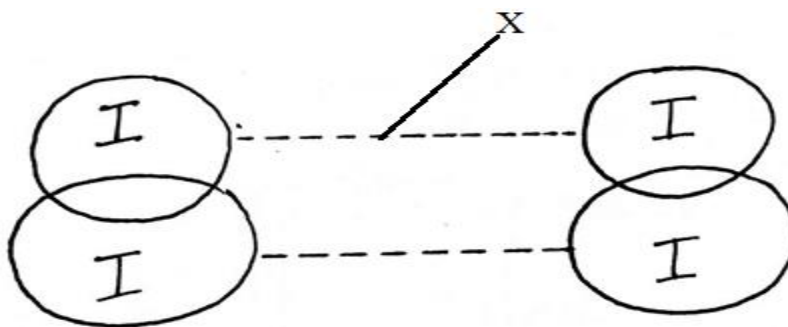


- a) State the observation made in the tube P [1 mk]
 - b) Write an equation for the reaction which took place in tube P [1 mk]
 - c) Name the gas burning at point X [1 mk]
5. The diagram below illustrates the steps involved in the industrial manufacture of of nitric(v)acid. Use it to answer the questions that follow.



- a) Identify the chamber in which a catalyst is used. [1 mk]
 - b) Name substance Z [1 mk]
 - c) Write an equation for the reaction that takes place in chamber III [1 mk]
6. Draw a well labelled setup for the laboratory preparation and collection of dry sample of hydrogen chloride gas [3 mks]
7. Account for the following observations made when a piece of sodium is placed in a trough half filled with water.
- a) Hissing sound [1 mk]

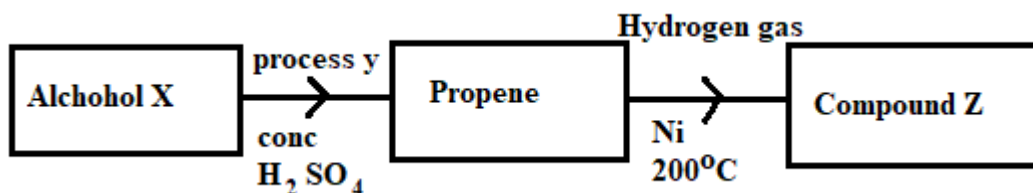
- b) Darts on the water surface [1 mk]
 c) Solution formed turns red litmus paper blue [1 mk]
 8. The diagram below shows the structure of iodine



- a) Name; [1 mk]
 i) Part X [1 mk]
 ii) Type of bond in the solid [1 mk]
 iii) Explain why iodine has very low melting point [1 mk]
 9. 20g of salt X dissolves in 80g of water to form a saturated solution at 45°C. calculate the solubility of salt X at 45°C [2 mks]
 10. When excess chlorine gas is bubbled through dilute sodium hydroxide solution, the resulting solution acts as bleaching agent.
 a) Write an equation for the reaction between chlorine gas and sodium hydroxide [1 mk]
 b) Explain how the resulting solution acts as a bleaching agent [2 mks]
 11. Element Z has initial mass of 80g. After 5 years the remaining mass was 5g.
 a) What is meant by the term half-life [1 mk]
 b) Calculate the half-life of element Z [2mks]
 12. Complete the table below [3 mks]

Metal	Aluminum	Lead	Sodium
Chief ore	Bauxite	_____	Rock salt
Chemical formulae	_____	_____	_____
Method of extraction	_____	reduction	_____

13. Use the reaction scheme below to answer the questions that follow.



- a) Draw the structure of alcohol X [1 mk]
 b) Name process Y [1 mk]
 c) Write the molecular formulae of the 5th member of the homologous series in which propene belongs [1 mk]

14. Calculate the enthalpy for the reaction:



[3 mks]

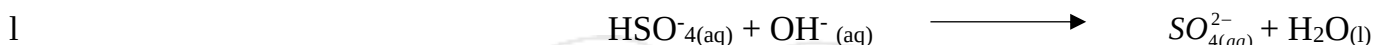
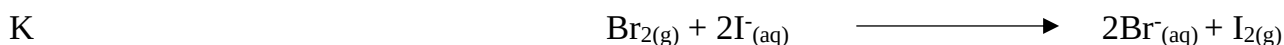
Give the following bond energies

C – C	347 kJ/mol
C = C	612 kJ/mol
C – H	413 kJ/mol
H – H	436 kJ/mol

15. Study the reactions below and answer the questions that follow.

Reaction

Equation



Which of these reactions indicate:

[3 mks]

- A precipitation reaction
- A displacement reaction
- Neutralization reaction

16. An atom of element A has mass number 39 and 19 protons. (A is not the actual symbol of the element)

a) Using crosses (x) to represent electrons, draw the atomic structure of element A [1 mk]

b) State the group and period to which element A belongs [1 mk]

Group

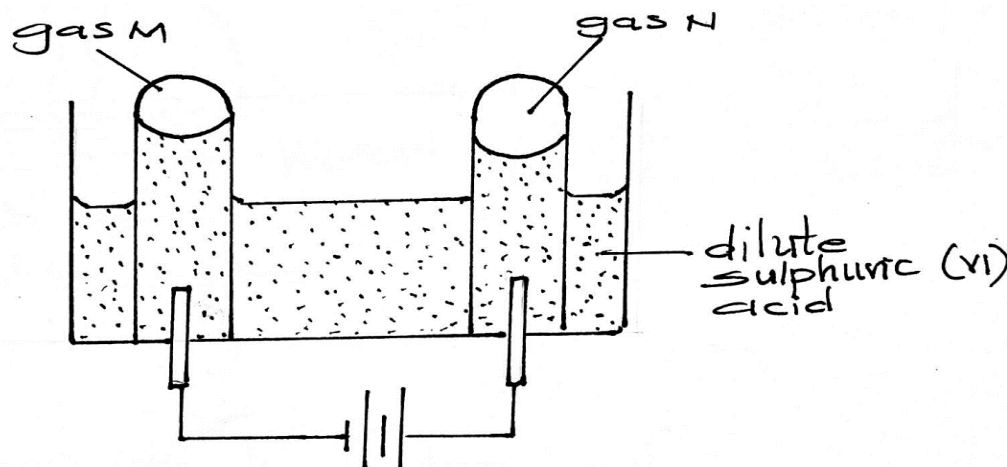
Period

c) Name the type of structure adopted by element A [1 mk]

17.a) State Graham's law of rate of diffusion of gasses [1 mk]

b) It takes 44 seconds for nitrogen(iv)oxide to diffuse through a porous pot. Calculate how long it will take an equal volume of chlorine gas to diffuse through the same porous pot under the same conditions. (N = 14, O = 16, Cl = 35.5) [2 mks]

18. The setup below represents electrolysis of dilute sulphuric (vi) acid.



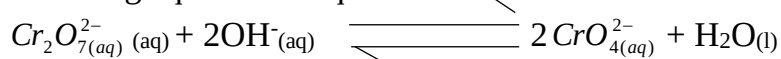
a) Name gas: [2mks]

M - _____

N - _____

b) At what electrode does oxidation take place? [1 mk]

19. Dichromate (vi) ions are orange in colour while chromate (vi) ions are yellow. Consider the following equation at equilibrium



State and explain the observation which would be made if a few drops of dilute sulphuric(vi)acid were added to the equilibrium mixture [2 mks]

20. An element has an electron configuration of 2.8.6

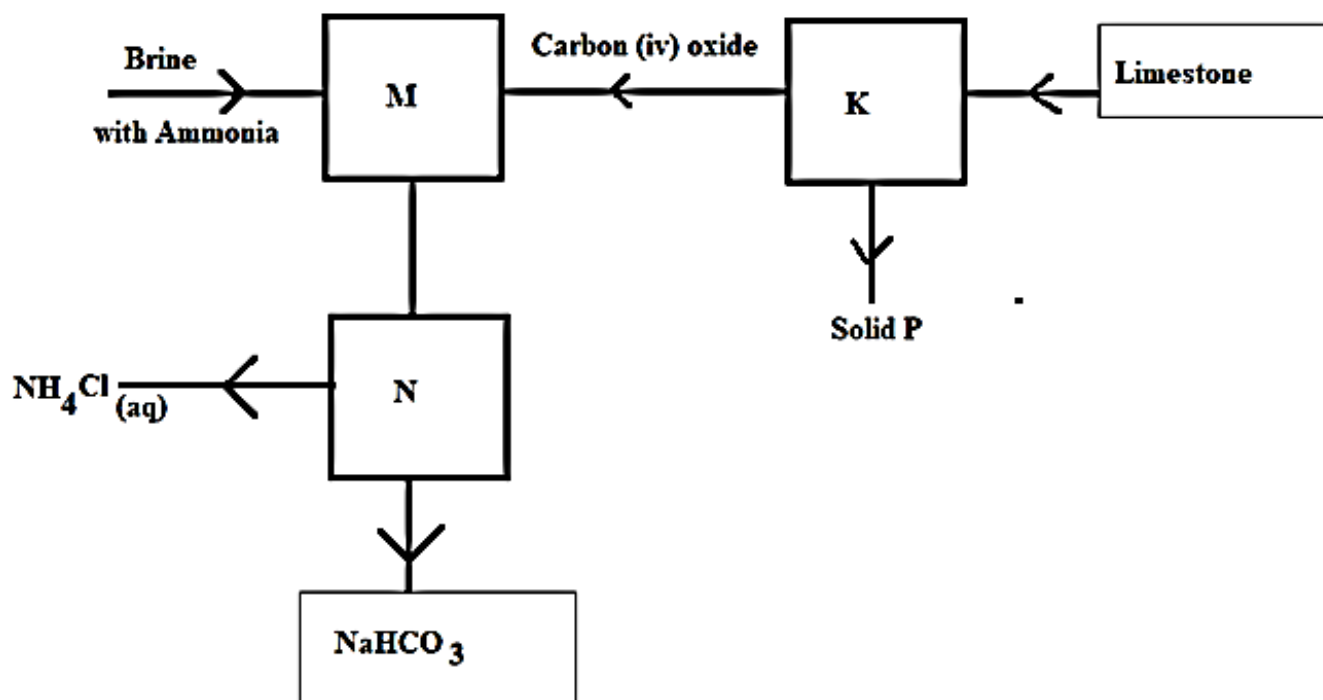
a) Name the element [1 mk]

b) This element forms a puckered ring. Draw the ring [1 mk]

c) Write the formulae of the puckered ring [1 mk]

21. The melting point of sodium oxide is 1193°C while that of sulphure(iv)oxide is -72°C. In terms of the structure and bonding, explain why there is a large difference in the melting points of the two oxides [2 mks]

22. The diagram below illustrates some steps involved in manufacturing sodium carbonate. Use it to answer the questions that follow



a) Name the industrial process illustrated by the above flowchart [1 mk]

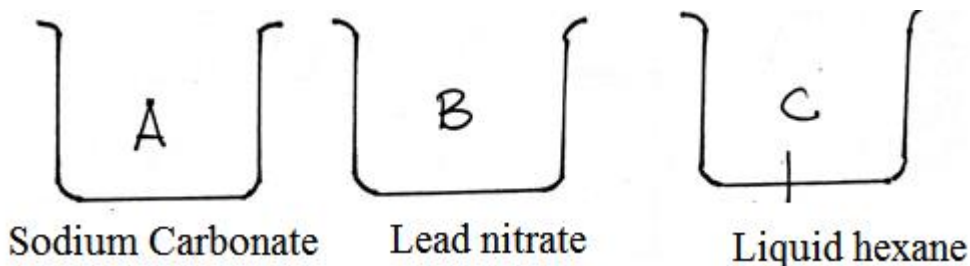
b) Write an equation for the reaction that takes place in chamber M [1 mk]

c) Name the process which takes place in chamber N [1 mk]

d) How is sodium carbonate obtained in this process [1 mk]

23. Explain why potassium is kept under paraffin while phosphorous is kept under water. [2 mks]

24. Dilute sulphuric (vi) acid was added to each of the three beakers containing the substances shown below



State the observation made in each beaker

[3 mks]

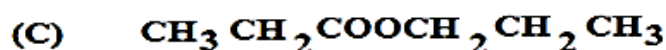
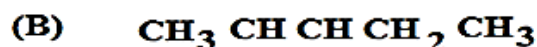
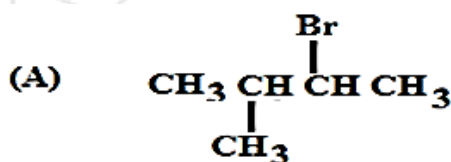
A - _____
 B - _____
 C - _____

25. Hydrogen chloride gas was separately dissolved in water and methylbenzene and the solutions labelled B and A respectively. A piece of magnesium ribbon was placed in each of the solutions. There was a lot of bubbles in solution A but no bubbling occurred in solution B. Explain the observations

[3 mks]

26. Give the IUPAC names of the following compounds

[3 mks]



A _____
 B _____
 C _____

27. A solution contains 40.32g per litre of compound XO₂H. 25cm³ of this solution was exactly neutralized by 30cm³ of 0.3M sulphuric(vi)acid. Determine the relative atomic mass of X(O = 16, H = 1)

[4 mks]

KCSE 2026 FINAL PREDICTIONS

CONFIDENTIAL EXAM 1

233/2

CHEMISTRY

PAPER 2

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO 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.
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For Examiner's Use Only:

QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
1	12	
2	10	
3	10	
4	11	
5	12	
6	13	
7	12	
TOTAL	80	

Element	Na	Mg	Al	Si	P	S	Cl	Ar
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ii. Sulphur: Oxide I	Oxide II
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Write the equation for the reaction when phosphorus reacts with limited chlorine gas **[1 marks]**

c) Identify the most electronegative element. Give a reason **[1 marks]**

d) State and explain the difference in the boiling point of sulphur and phosphorus [2 marks]

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

Element	Atomic number	M.P of element	M.P of chloride
G	11	98	801
H	12	650	715
J	14	1410	-70
K	16	113	-80
L	20	851	780

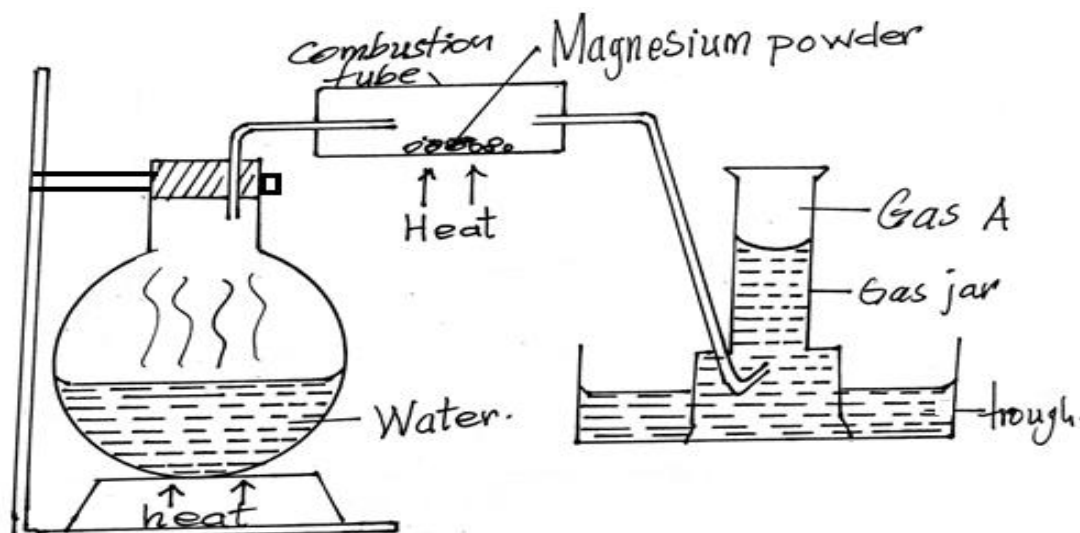
i) Write the formula of the compound formed when element H reacts with element K [1 mark]

ii) Use dot (.) and cross (x) to show bonding between G and K **[2 marks]**

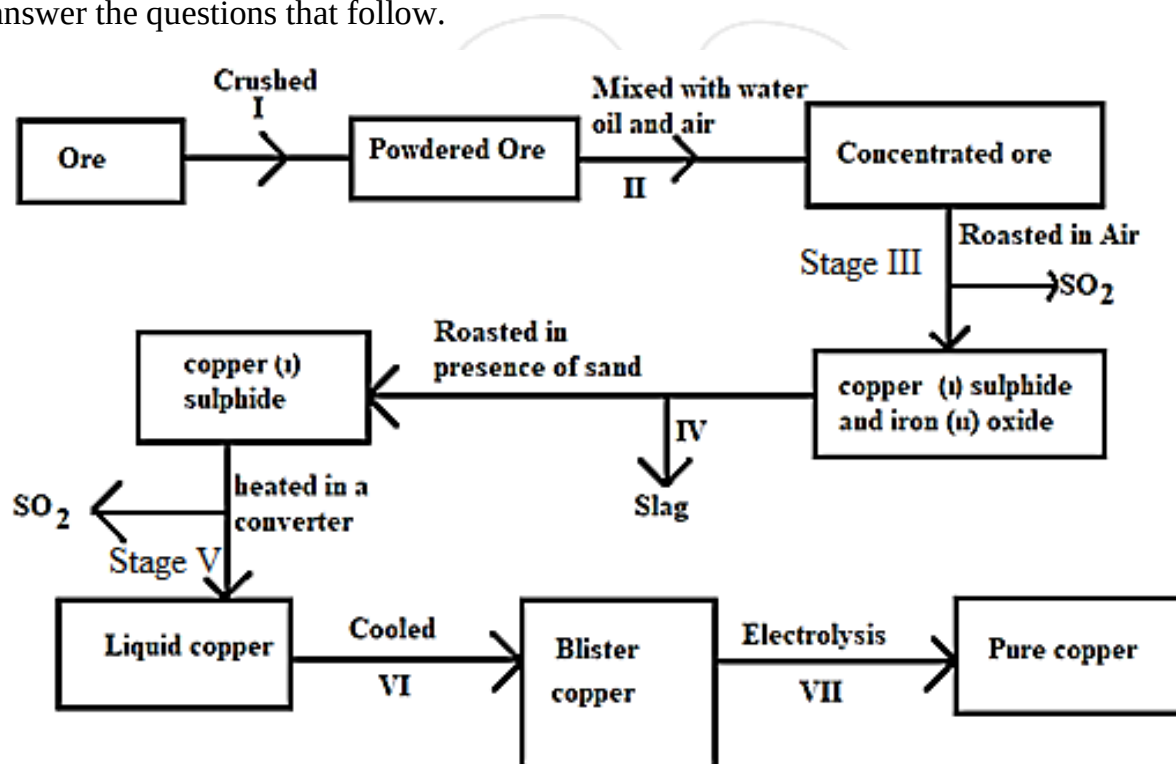
iii) What is the oxidation state of J in its chloride **[1 marks]**

iv) How does the melting point of fluoride of G compare with that of its chloride [2 marks]

2. Study the setup below and answer the questions that follow

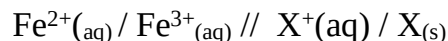


- a) Give two reasons why it is necessary to heat the water in the flask just before heating the magnesium powder [2 marks]
- b) Write a chemical equation for the reaction taking place in the combustion tube [1 mark]
- c) Give the test for gas A [1 mark]
- d) Give two uses of gas A [2marks]
- e) Given that 240cm³ of gas A was produced in the experiment, determine the mass of magnesium powder used.(molar gas volume = 24000cm³ at R.T.P, Mg = 24) [2 marks]
- f) What would be observed if magnesium powder was replaced with;
- i) Copper metal? [1 marks]
- ii) Potassium metal? [1 marks]
3. The diagram below is a flow chart for the extraction of copper from the chief ore. Study it and answer the questions that follow.



- a) Name two ores of copper metal [2 mrks]
- b) Name process II [1 mark]
- c) Give an equation for the reaction that occurs in stage III [1 mark]
- d) Explain what happens in stage IV [1 mark]
- e) Write half-cell equations occurring at the anode and cathode in stage VII
- Anode [1 mrks]
- Cathode [1 mrks]
- f) State one impurity in blister copper [1 mark]
- g) Draw a simple diagram showing the setup that is used in electrolytic purification of copper [2 mrks]

4. Consider the electrochemical cell represented by the cell notation below, when X is an unknown metal:



- a) The cell potential of the cell was found to be 0.03V

i) What does the single line (|) in the above cell notation represent? [1 mark]

ii) Write down the half reaction that takes place at the anode in the above cell [1 marks]

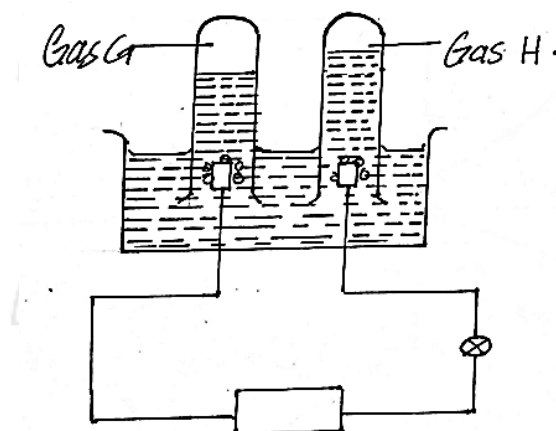
iii) Given that:

<u>Half reaction</u>	<u>E⁰(volts)</u>
$\text{Fe}^{3+}(\text{aq}) + \text{e}^{-} \longrightarrow \text{Fe}^{2+}(\text{aq})$	+0.77
$\text{Ag}^{+}(\text{aq}) + \text{e}^{-} \longrightarrow \text{Ag}_{(\text{s})}$	+0.80
$\text{Na}^{+}(\text{aq}) + \text{e}^{-} \longrightarrow \text{Na}_{(\text{s})}$	-2.87
$\text{K}^{+}(\text{aq}) + \text{e}^{-} \longrightarrow \text{K}_{(\text{s})}$	-2.92

Identify X with the aid of calculation [2 marks]

- b) The diagram below shows the apparatus that can be used to electrolyze dilute sulphuric acid.

Study it and answer the questions that follow.



- i) Identify the gases H and G

I. H [1 mark]

II. G [1 mark]

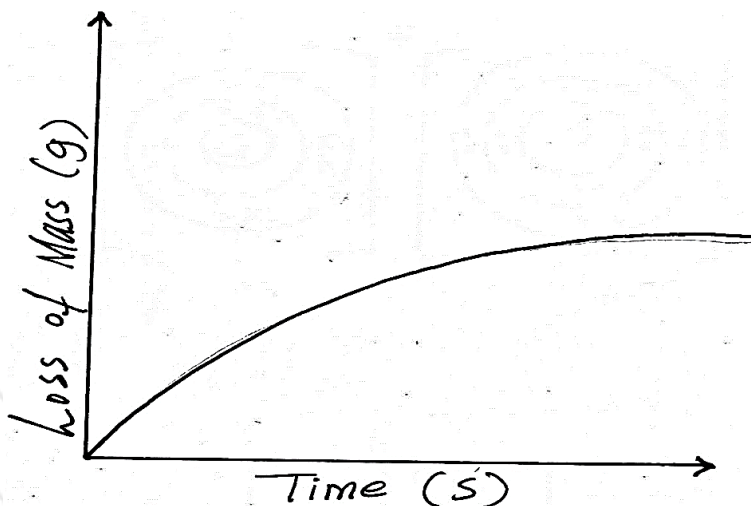
- ii) What happens to the concentration of the sulphuric acid during the process with time? Explain

[2marks]

iii) During electrolysis a current of 0.72A was passed through the electrolyte for 15 minutes.

Calculate the volume of gas G produced. (1 Faraday = 96500C, molar gas volume = 24dm³ at r.t.p) [3 marks]

5. a) The sketch below represents a graph obtained when zinc granules were reacted with excess 0.2M sulphuric (VI) acid in the presence of a catalyst in a conical flask placed on an electronic balance.



i) Write an equation for the reaction that took place [1 mark]

ii) Explain why there is loss in mass [1 mark]

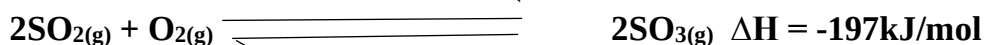
iii) Name the catalyst used [1 mark]

iv) Sketch on the same axes, the curves obtained when

I. Zinc powder was used under the same conditions [1 mark]

II. No catalyst was used [1 mark]

b) In the contact process, sulphur(iv)oxide is converted to sulphuric(vi)oxide in the catalytic chamber which a dynamic chemical equilibrium is reached.



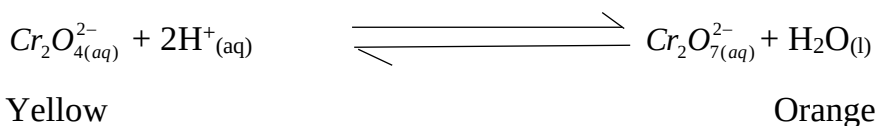
i) What is meant by dynamic equilibrium [1 mark]

ii) State and explain how each of the following would affect the position of equilibrium

a) Decrease in temperature [2 marks]

b) Decrease in pressure [2marks]

iii) Equilibrium exists between chromate and dichromate ions as shown below.



State and explain the observation made when aqueous sodium hydroxide is added to the above mixture. [2 marks]

6. Study the formulae below and answer the questions that follow

I. $\text{CH}_3\text{CH}_2\text{COOH}$

II. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$

a) i) Give the systematic name of each compound [2 marks]

I.

II.

ii) Write the molecular formula of the compounds [1 mark]

I.

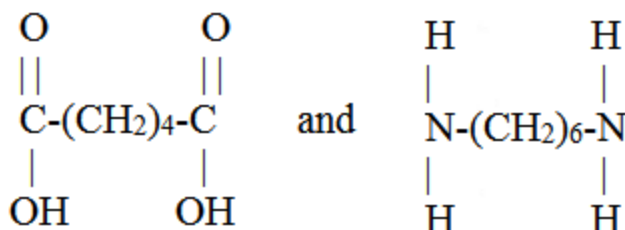
II.

iii) How does the boiling point of I compare to that of II. Explain [2 marks]

iv) A gas J is bubbled into concentrated sulphuric(vi)acid. Water is added to the mixture then boiled to yield compound II. Name gas J. [1 mark]

v) Draw the structural formula of the compound immediately after compound I in the homologous series [1 mark]

b) Study the structural formula of the two monomers below and answer the questions that follow.



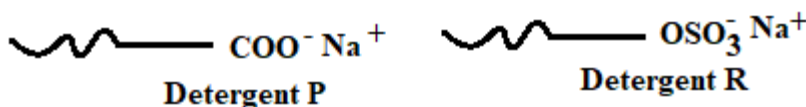
i) Name the type of polymerization these monomers would undergo to form a polymer [1 mark]

ii) Draw the structural formula to represent the polymer formed. [1 mark]

iii) What is the name of the polymer [1 mark]

iv) State the use of this polymer [1 mark]

c) Two cleaning agents are represented below

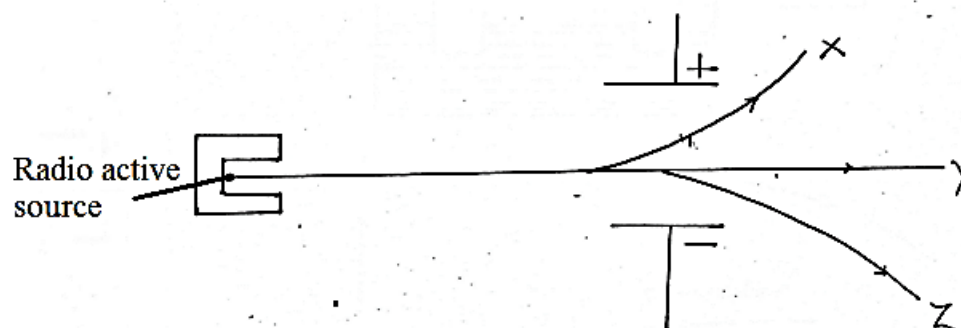


Select one of the detergent which would be suitable for washing in water containing magnesium chloride. Explain [2marks]

7. a) Define the term half-life [1 mark]
- b) The table below contains information from the measurements made of the radioactivity in counts per minute from a radioactive iodine – 128

Counts per minute	240	204	180	156	138	122	108
Time (min)	0	5	10	15	20	25	30

- i) Plot a graph of counts per minute against time [3 marks]
- ii) Use the graph to determine the half-life of iodine – 128 [1 mark]
- iii) What is the count rate after 22 minutes [1 mark]
- iv) After how many minutes were the counts rate 160 counts per minute [1 mark]
- c) Potassium has two isotopes $^{39}_{19}\text{K}$ and radio active $^{40}_{19}\text{K}$
- i) State how the two isotopes differ [1 mark]
- ii) The half life of $^{40}_{19}\text{K}$ is 1.3×10^9 years. Determine how long it would take for 4g of the isotope to decay to 1g [1 mark]
- iii) $^{39}_{19}\text{K}$ undergoes beta decay to form an isotope of calcium. Write the nuclear equation for this decay [1 mark]
- d) The figure below shows how a radioactive material emitted radiations from its source. Study it and answer the questions that follows as shown.



Identify the radiation that:

- i) Has no mass [1 mark]
- ii) Contains helium particles [1 mark]

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KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 2**

233/1

CHEMISTRY**PAPER 1**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

- Write your name and index number in the spaces provided above
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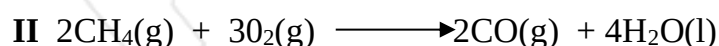
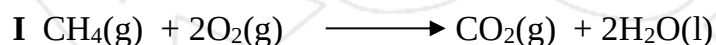
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QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1-29	80	

Answer all the questions

- Q1.** Distinguish between a thistle funnel and a dropping funnel (1mark)
- Q2. a)** Define an acid. (1 mark)
- b)** An ammeter was used to test electrical conductivity of sodium hydroxide and ammonia solution. State and explain the observation made. (2 marks)
- Q3. a)** What name is given to the process by which alcohol is formed from a carbohydrate? (1 mark)
- b)** Explain why the solubility of ethane in water is lower than that of ethanol. (1 mark)
- Q4.** An isotope of Uranium ^{234}U , decays by emission of an alpha particle to thorium Th-92
- a)** Write the equation for the nuclear reaction undergone by the isotope. (1 mark)
- b)** Explain why it is not safe to store radioactive substances in containers made from aluminum sheets. (1 mark)

Q5. a) Methane reacts with oxygen as shown by the equations I and II below:



Which one of the two reactions represents the complete combustion of methane? Explain. (2marks)

b) 80cm^3 of ethane reacted with 150cm^3 of oxygen forming carbon (IV) oxide and water. Calculate:

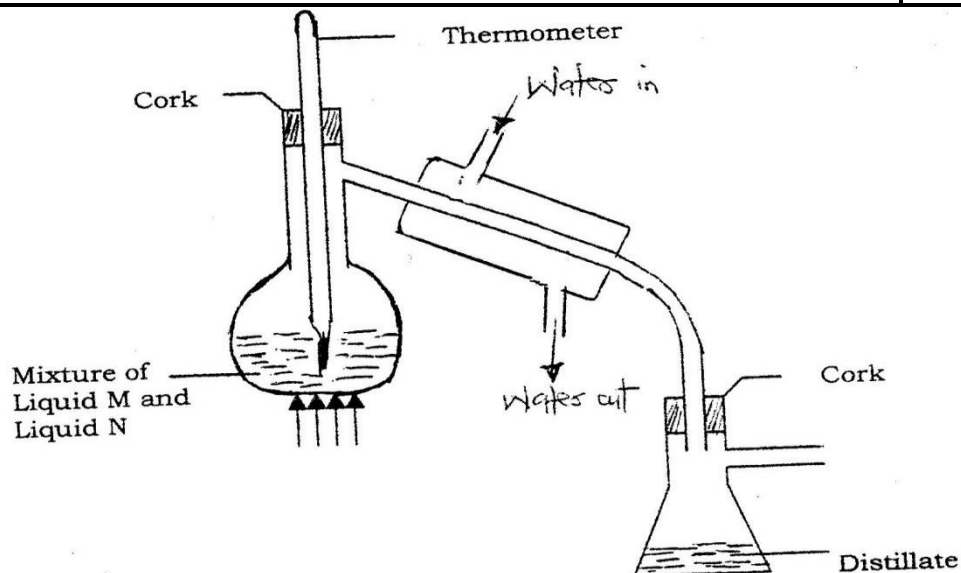
- (i) The volume of carbon (IV) oxide formed (1 mark)
- (ii) The residual air. (1 mark)

Q6. The table below gives the atomic numbers of elements **W**, **X**, **Y**, and **Z**. The letters do not represent the actual symbols of the elements.

Element	W	X	Y	Z
Atomic Number	9	10	11	12

- a)** Which one of the elements is least reactive? Explain. (1mark)
- b)i)** Which two elements would react most vigorously with each other? (1mark)
- ii)** Give the formula of the compound formed when the elements in b(i) react. (1mark)

Q7. In an experiment to separate a mixture of two organic liquids, liquid M (b.p 56°C) And liquid N (b.p. 118°C), a student set up the apparatus shown below.



a) Identify two mistakes in the set – up. (2mrks)

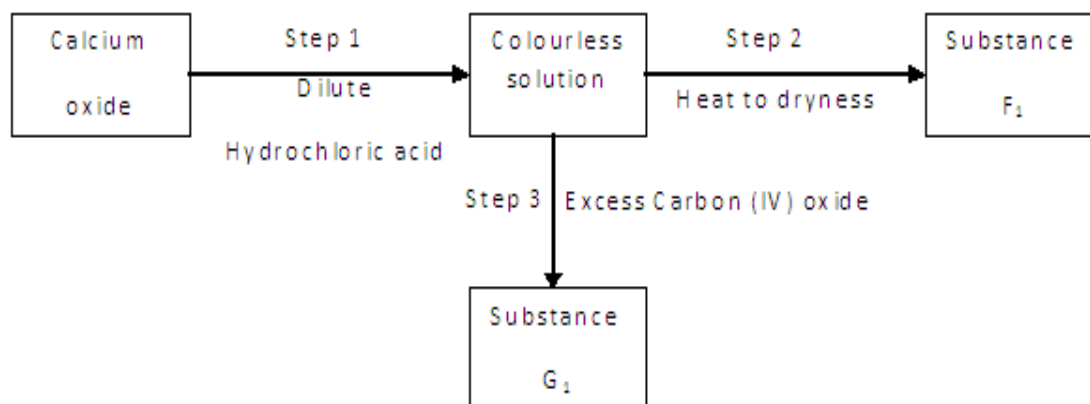
b) What method would the student use to test the purity of the distillates obtained? (1mark)

Q8. When lead (II) nitrate is heated, one of the products is a brown gas.

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

b) If 0.290dm^3 of the brown gas was produced, calculate the mass of the lead(II)nitrate that was heated. (R .F.M of lead (II) nitrate = 331; Molar gas volume = 24dm^3). (2mrks)

Q9.



a) Give the name of the process that takes place in step 1. (1mark)

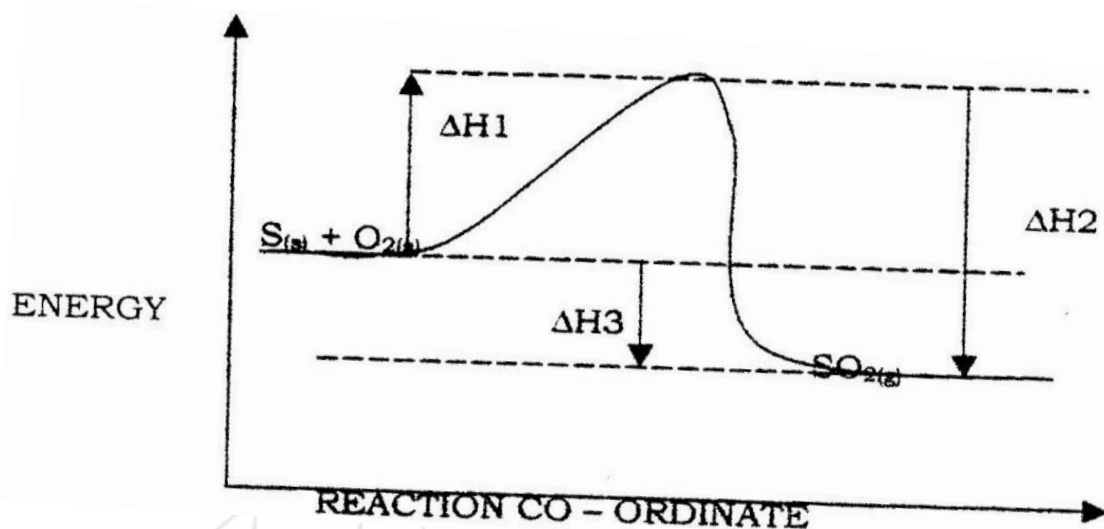
b) Give;

i) The name of substance G_1 (1mark)

ii) One use of substance F_1 (1 mark)

Q10. When extinguishing a fire caused by burning kerosene, carbon (IV) oxide is used in preference to water .Explain. (2 mrks)

Q11. Sulphur burns in air to form sulphur (IV) oxide. A simple energy level diagram for the reaction is given below. Study the diagram and answer the questions that follow.



a) What do ΔH_3 and ΔH_1 represent? (1 mark)

b) Write an expression, for ΔH_3 in terms of ΔH_1 and ΔH_2 . (1 mark)

Q12. Describe how a solid sample of zinc carbonate can be prepared starting with zinc oxide. (3 marks)

Q13. An element X has a relative atomic mass of 88. When a current of 0.5 ampere was passed through a fused chloride of X for 32 minutes 10 seconds, 0.44g of X was deposited.

(i) Determine the charge of element X (1 Faraday = 96500C) (2 marks)

(ii) Write the formula of the hydroxide of X. (1 mark)

Q14. A hydrocarbon slowly decolorizes bromine gas in the presence of sunlight but does not decolorize acidified potassium permanganate(VII).

Name and draw the structural formula of the fourth member of the series to which the hydrocarbon belongs. (2 marks)

Q15. Potassium sulphite solution was prepared and divided into two portions. The first portion gave a white precipitate when reacted with barium nitrate. On addition of dilute hydrochloric acid the white precipitate disappeared.

a) Write the formula of the compound which formed as the white precipitate. (1 mark)

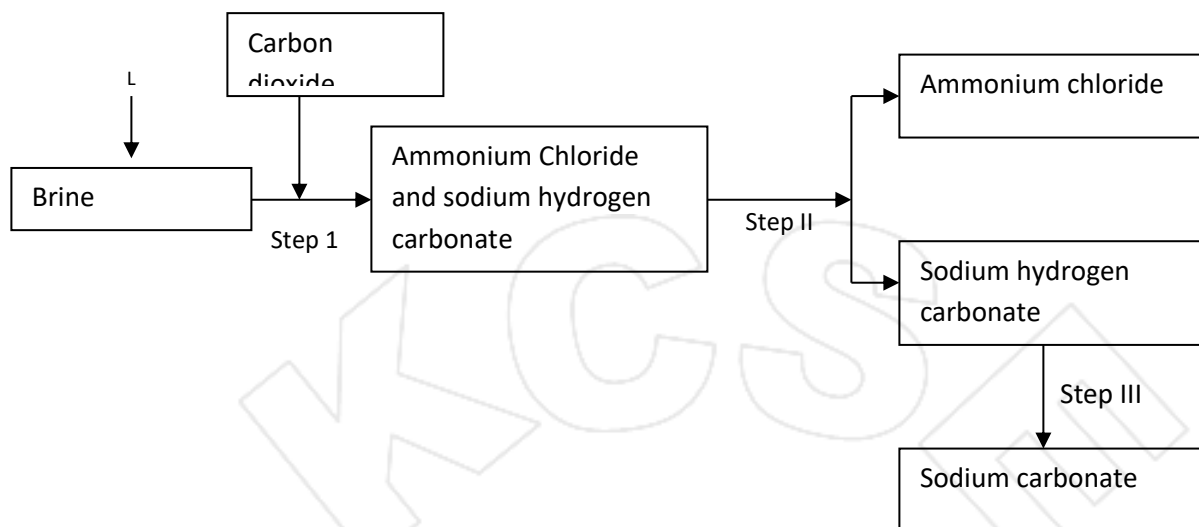
b) Write the equation for the reaction between dilute hydrochloric acid and the compound whose formula is written in (a) above. (1 mark)

c) What observation would be made if one drop of potassium dichromate

solution was added to the second portion followed by dilute sulphuric(VI) acid? **(1mark)**

Q16. A compound of carbon, hydrogen and oxygen contains 57.15% carbon, 4.76% hydrogen and the rest oxygen. If its relative molecular mass is 126, find its molecular formula. (C = 12, H = 1, O = 16) **(3 mks)**

Q17. The simplified flow chart shows some of the steps in the manufacture of sodium carbonate by the Solvay process



a) Identify substance L

(1mark)

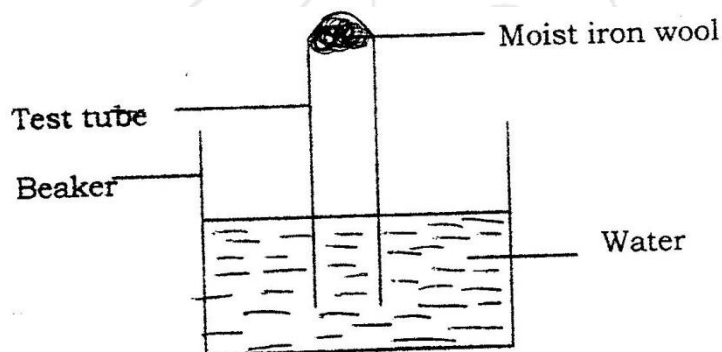
b) Name the process taking place in step II

(1mark)

c) Write an equation for the reaction which takes place in step III.

(1mark)

Q18. The set – up below was used to study some properties of air.



State and explain two observations that would be made at the end of the experiment. **(2 Marks)**

Q19.(a) A sample of water in a beaker was found to boil at 102°C at 1 atmospheric pressure.

Assume that the thermometer was not faulty explain this observation

(1mk)

(b) Study the information in the table below and answer the questions that follow.

Salt	Solubility g/100g of water	
	at 40°C	of 60°C
CuSO ₄	28	38
Pb(NO ₃) ₂	79	98

A mixture containing 35g of CuSO₄ and 78g of Pb(NO₃)₂ in 100g of water at 60°C was cooled to 40°C.

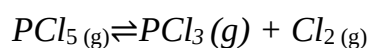
i) Which salt crystallised out? Give a reason.

(2 mrks)

ii) Calculate the mass of the salt that crystallized out.

(1 mark)

Q20. Consider the following reaction at equilibrium.

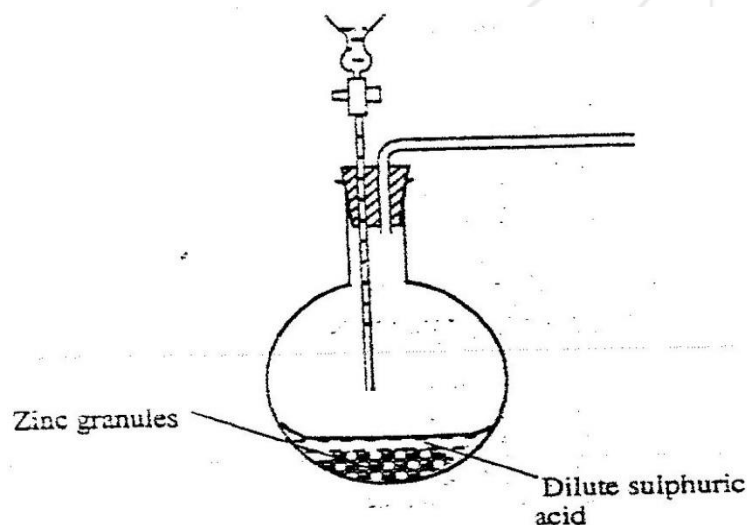


Complete the table below to show the effect of different factors on the position of equilibrium.

(3mks)

Factor	Effect on the equilibrium position
(i) Decrease pressure	
(ii) Removing chlorine	
(iii) Adding Helium gas to mixture	

Q21. The set – up below was used to prepare hydrogen gas



a) Complete the diagram to show how a dry sample of hydrogen gas can be collected (3mks)

b) Write an equation for the reaction, which takes place when hydrogen gas burns in air. (1mk)

22. In a certain reaction, 18.7cm³ of a dibasic acid required 25cm³ of 0.1M NaOH for complete neutralization.

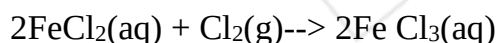
- (a) How many moles of Sodium hydroxide are contained in 25cm³? (1mk)
- (b) Calculate the molarity of the dibasic acid. (2mks)
- Q23** In an experiment to prepare nitrogen (I) oxide, ammonium nitrate was gently heated in a flask.
- a) Write the equation for the reaction that took place in the flask. (1 mark)
- b) State and explain how the gas was collected. (1 mark)
- c) A sample of the gas was tested with damp blue and red litmus papers. What observations were made? (1mark)

Q24. Under certain conditions, chlorine gas reacts with sodium hydroxide to form sodium hypochlorite.

- (a) Name the condition under which sodium hydroxide reacts with chlorine to form Sodium hypochlorite. (1 mark)
- (b) State two uses of sodium hypochlorite. (1 mark)

Q25. (a) Calculate the oxidation state of chromium in the ion Cr₂ O₄²⁻. (1 mark)

- (b) Using oxidation numbers, determine from the equation below the species which undergoes oxidation and reduction.



Oxidation - (1 mark)

Reduction - (1 mark)

Q26. The table below gives some properties of three elements in group (VII) of the periodic table.

Study it and answer the questions that follow:

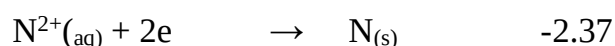
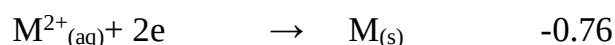
Element	Atomic No.	Melting Point (°C)	Boiling Point (°C)
Chlorine	17	101	-34.7
Bromine	35	-7	58.8
Iodine	53	114	184

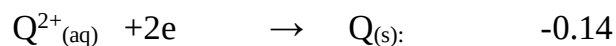
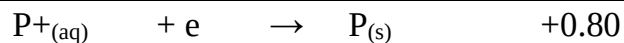
- a) Which element is in liquid form at room temperature? Give a reason. (2 mrks)
- b) Explain why the boiling point of iodine is much higher than that of chlorine. (2 mrks)

Q27. Study the standard reduction potential given and answer the questions that follow.

(The letters are not the actual symbols of the elements).

E⁰ (volts)

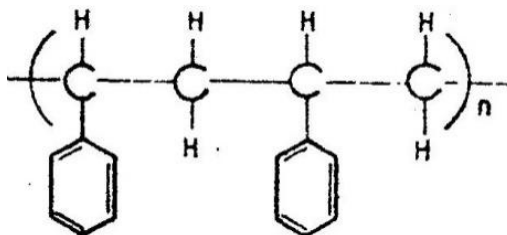




a) The standard reduction potential for $Fe^{2+}_{(aq)}$ is -0.44 volts. Select the element which would best protect iron from rusting. **(1 mark)**

b) Calculate the E° value for the cell represented as $M_{(s)} / M^{2+}_{(aq)} // P^{+}_{(aq)} / P_{(s)}$. **(1mark)**

Q28. The formula given below represents a portion of a polymer



Give:

a) The name of the polymer. **(1mark)**

b) Draw the monomer. **(1mark)**

c) One disadvantage of continued use of this polymer. **(1mark)**

Q29. A sealed glass tube containing air at s.t.p was immersed in water at $100^{\circ}C$. Assuming that there was no increase in the volume of the glass tube due to the expansion of the glass, calculate the pressure of the inside tube. (standard pressure = 760mmHg,) **(2mrks)**

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 2**

233/2

CHEMISTRY**PAPER 2**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS**

1. Write your name and index number in the space provided
2. Sign and write the date of examination in the space provided above
3. Answer all questions in the space provided after each question
4. Mathematical tables and electronic calculators may be used
5. All working must be clearly shown where necessary

FOR EXAMINERS ONLY

QUESTIONS	CANDIDATE'S SCORE

Answer all questions in the space provided

1. The grid below forms part of the periodic table. Study it and answer the questions that follow.

The letters do not represent the actual symbols of the elements.

P				T	V	W	Y	M
	Q		S	U		X		
	R						Z	

a) Write the general name given to the elements to which Y and Z belong. (1mk)

b) An element N has an atomic number of 15. Write down its electronic arrangement and hence fix it in its right position on the grid above. (2mks)

Electronic arrangement _____

c) Compare the size of the atom of R and that of its ion. Explain your answer. (2mks)

d) Give the formula of the compound formed between

i. P and W _____ ½ mk

ii. T and Y _____ ½ mk

e) Compare the melting points of element Q and S. Explain (2mks)

f) State the least reactive element in the grid. Give a reason for your answer (2mks)

Element _____

Reason _____

g) Give two advantages that element S has over element Q in making electric cables (2mks)

h) Draw (a) dot (.) and cross (x) diagram to represent the bonding in compound formed between T and Y (2mks)

2. Study the condensed formulae below and answer the questions that follow

(a) I $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_2\text{CHCH}_2$

II $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{OH}$

i. Draw the structural formula of each of the compounds I and II (2mks)

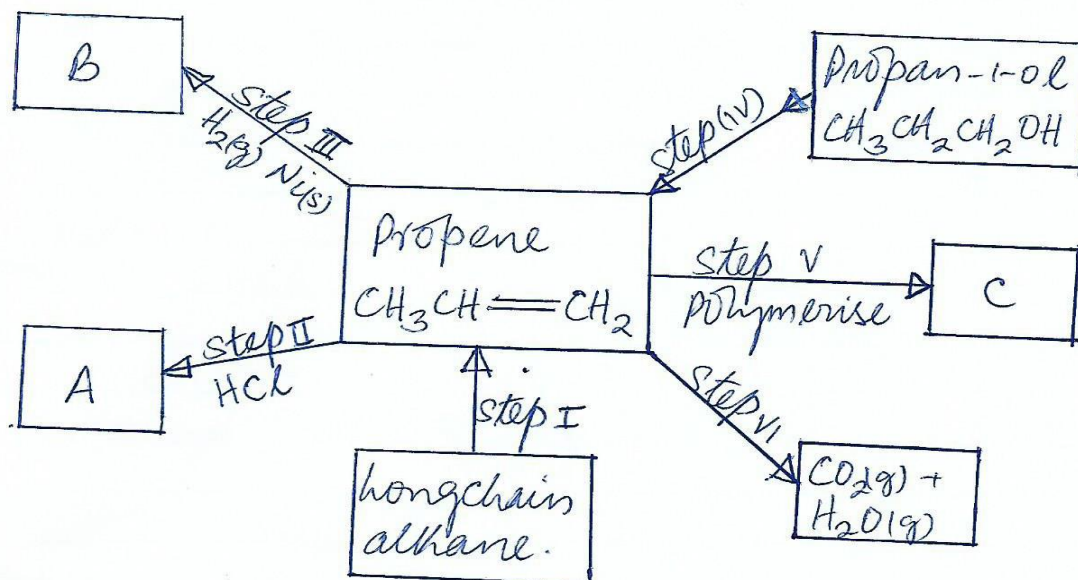
ii. Give the systematic name of each of the compounds represented by the formulae above (2mks)

I _____

II _____

iii. To which homologous series does the compound represented by I belong (1mk)

(b) The flow chart below shows some reactions starting with a long chain alkane. Study it and answer the questions that follows.



i. Name substance

(3mks)

A _____

B _____

C _____

ii. What is the name given to the process represented by

Step I _____ ½ mk

Step III _____ ½ mk

Step IV _____ ½ mk

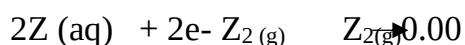
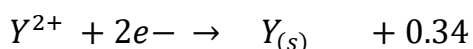
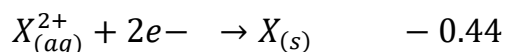
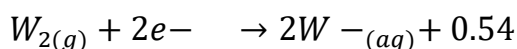
Step VI _____ ½ mk

iii. Write down the chemical equation represented by the reaction in step VI

(1mk)

3. (a) The following table shows the standard reduction potentials for four half cells. Study it and answer the questions that follow. The letters do not represent the actual symbols of the elements

E θ volts

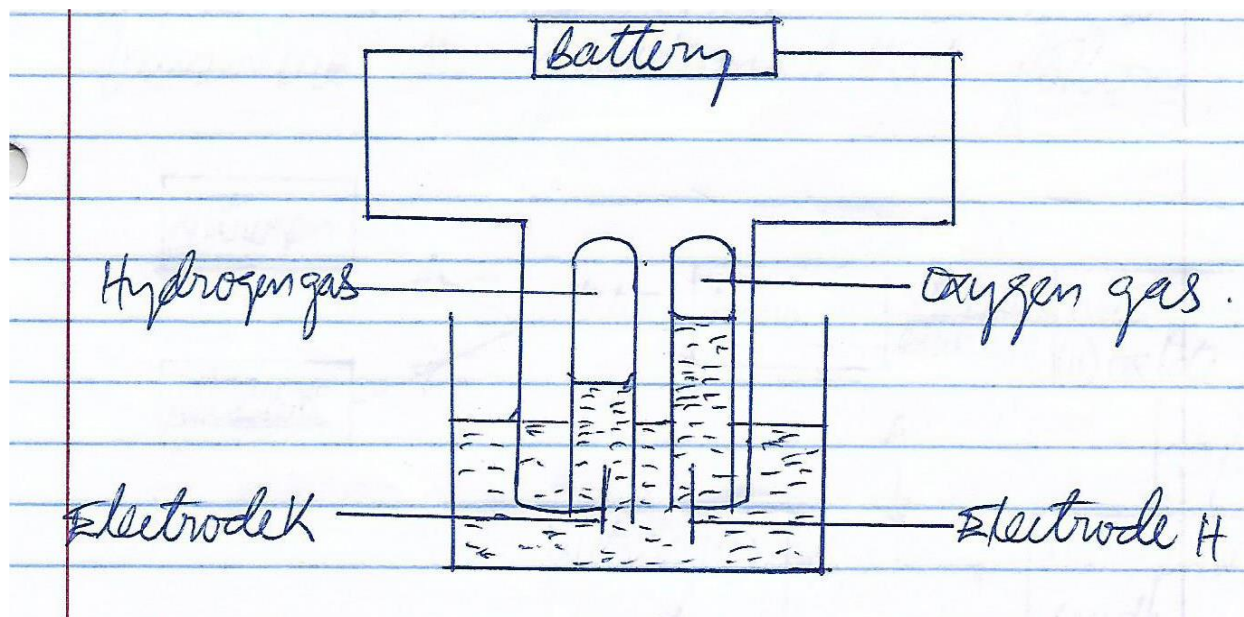


i. Explain why the Z half- cell has 0.00 voltage

(1mk)

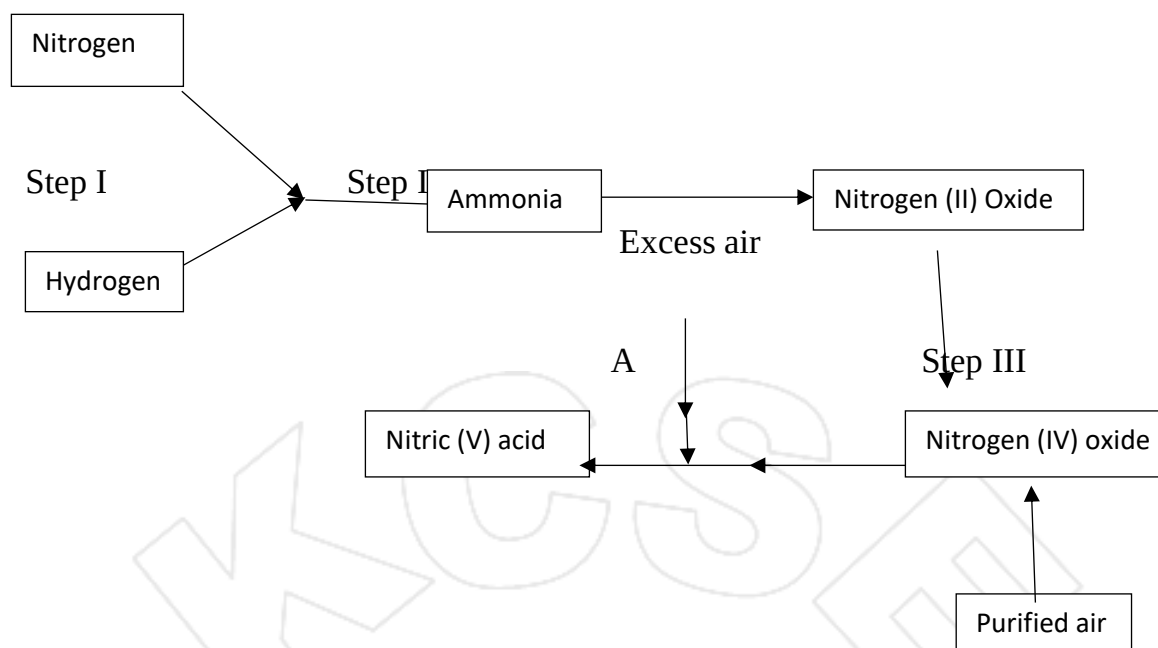
- ii. Identify the strongest reducing agent (1mk)
- iii. Write the equation for the reaction which takes place when solid X is added to the solution containing Y^{2+} ions (1mk)
- iv. Which two half-cells above would provide the highest voltage if connected? (1mk)
- v. Calculate the voltage generated by the half-cell you have mentioned in (IV) above (2mks)

(b) The following diagram shows the electrolysis of water that is slightly acidic study it and answer the questions that follows.



- i. Identify Electrode K (1mk)
- ii. Why was it necessary to acidify the water? (1mk)
- iii. Explain why the water could not be acidified using hydrochloric acid if the desired products were oxygen and hydrogen (1mk)
- iv. During the electrolysis of aqueous copper (II) sulphate 48,250 coulombs of electricity were used. Calculate the mass of copper that was deposited at the cathode (2mks)
($F=96500$ coulombs $Cu=63.5$)

4. The diagram below represent two industrial processes; one leading to the manufacture of ammonia and the second leading to the manufacture of Nitric acid. Study it and answer the questions that follow.



- a) Describe one large scale source of
- Nitrogen (1mk)
 - Hydrogen (1mk)
- b) Name the catalyst required in
- Step II _____
 - Write the chemical equation for the reaction that takes place between ammonia and oxygen in the presence of the catalyst you have named in b (i) above (1mk)
- c) Ammonia reacts with nitric acid to form substance P.
- write the chemical equation for the formation of substance P (1mk)
 - Give one possible use of substance P (1mk)
- d) Give the general name given to the process represented by Step I (1mk)
- e) Nitrogen and hydrogen reacts according to the following equation at 450°C and 200 atmospheres



- State and explain how the yield of ammonia would be affected if the pressure is reduced (2mks)

- ii. Name one use of nitric acid apart from making substance P named in (c) above (1mk)
- f) Name substance A and write an equation to show how it reacts with nitrogen (IV) oxide to form nitric (V) acid
- Substance A _____
- Equation _____
5. (a) Draw a diagram in the space provided below to show how the heat of combustion of ethanol can be measured experimentally (3mks)
- (b) In an experiment to measure the heat of combustion of ethanol the following data was collected.
- | | |
|---------------------------------------|--------------------|
| Volume of water | 450cm ³ |
| Initial temperature of water | 25°C |
| Final temperature of water | 46.5°C |
| Mass of ethanol + lamp before heating | 125.5g |
| Mass of ethanol + lamp after heating | 124.0g |
- i. calculate:
- I. Heat evolved during the experiment (Density of water =1g/cm³. Specific heat capacity of water =4.2KJ Kg⁻¹K⁻¹) (2mks)
- II. Molar heat of combustion of ethanol (C=12, O=16, H=1) (2mks)
- ii. The molar heat of combustion obtained from an experiment like the one above is usually lower than the theoretical value. Explain (2mks)
- (c) The molar heat of combustion of hydrogen is given as -286KJmol⁻¹
- i. Write the thermochemical equation for the reaction above (1 ½ mk)
- ii. Draw an energy level diagram for the reaction in c(i) above (2mks)
- d) (i) What is a fuel? (1mk)
- (ii) Name one environmental effect of using carbon and some of its compounds as fuels(½mk)

Mixture M

(ii) Filtration

Solid N

Solution

Add Ba²⁺/H⁺

White precipitate Q

Step II Heat

Add NaOH until in excess

Red brown solid when hot
yellow when cold . Gas that
forms white precipitate with
calcium hydroxide given off

~~Add ammonia solution until in excess~~

White precipitate which
dissolves in excess

White precipitate which
dissolves in excess

i. Name the possible identity of

Solid N _____ **(1mk)**

Solid P _____ **(1mk)**

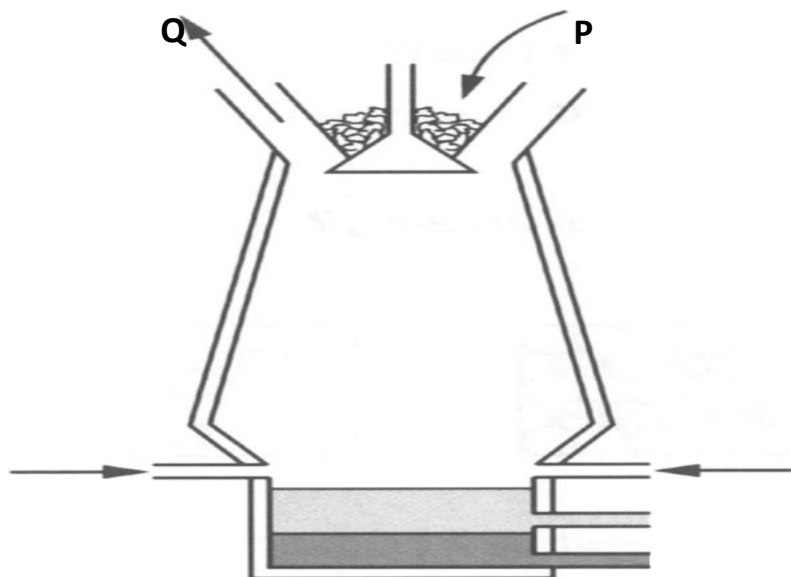
ii. Write the formula of the identity of white precipitate Q

iii. Describe the test that can be carried out to test for the presence of the cation in solid N and give the possible observations if the test is positive. Fill this information in the table below.

Test	Observation
1. (1mk)	 (1mk)
2. (1mk)	 (1mk)

(b) Starting with Copper (II) Oxide, explain a step by step method that can be used to prepare crystals of copper (II) sulphate (3m)

7. The diagram below shows a blast furnace that is used in the extraction of iron



- a) State the composition of mixture P (2mk)
- b) Write down the use of the following in the process above.
- Limestone (1mk)
 - Coke (1mk)
- c) Name substance Q and write chemical equations to show how it is formed
- Name _____ (1mk)
- Chemical equations (2mks)
- d) Write down a chemical equation to show how iron is formed in the above set-up. (1mk)
- e) Name one use of iron (1mk)

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 3**

233/1

CHEMISTRY**PAPER 1**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

Kenya Certificate of Secondary Education.

233/1

CHEMISTRY

PAPER 1

(THEORY)

INSTRUCTIONS TO CANDIDATES

- a) Write your name and index number in the spaces provided above
- b) Answer all the questions in the spaces provided in the question paper
- c) Mathematical tables and silent electronic calculators may be used
- d) All working must be clearly shown where necessary.

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1-28		

Answer all the questions in the spaces provided

1. Element A and B with atomic numbers 12 and 17 respectively react together

a) Write the electronic configurations of each

A (½ mk)

B (½ mk)

b) Write the formula of a the compound formed between A and B (1mk)

2. The table below shows the PH values of solutions A, B, C and D

SOLUTION	PH
A	2.0
B	7.0
C	10.0
D	14.0

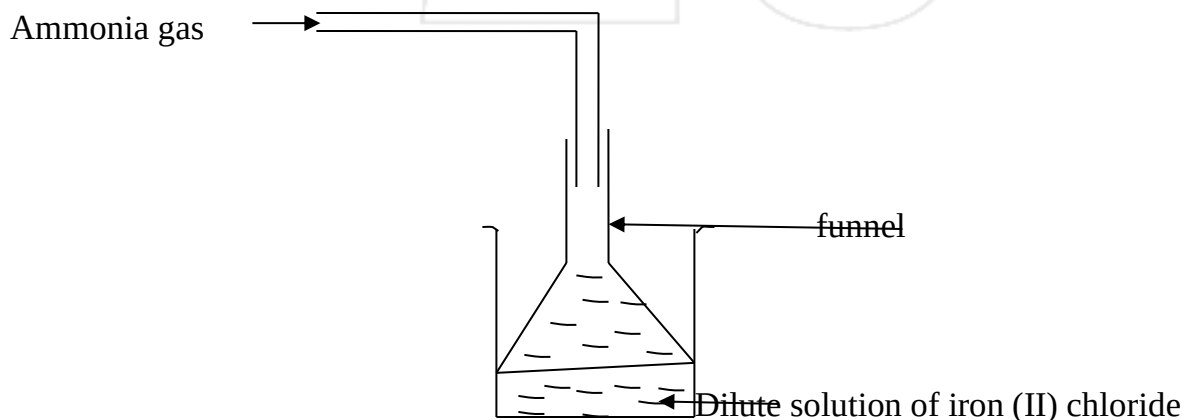
a) Which solution is likely to be that of ammonia solution (1mk)

b) Select a solution in which a sample of aluminium oxide is likely to react. Give a reason for your answer (2mks)

3. A hydrocarbon was found to contain 92.3% carbon, and the remaining is hydrogen. If its molecular mass is 78, determine its molecular formula (C =12, H=1) (3mks)

4. In an experiment, sulphur (IV) oxide was bubbled into water followed by chlorine gas. The resulting solution gave a white precipitate when mixed with Barium chloride. Explain these observations. (3mks)

5. Below is a set up of apparatus used to react ammonia gas with iron(II) chloride



a) State the observation made in the beaker (1mk)

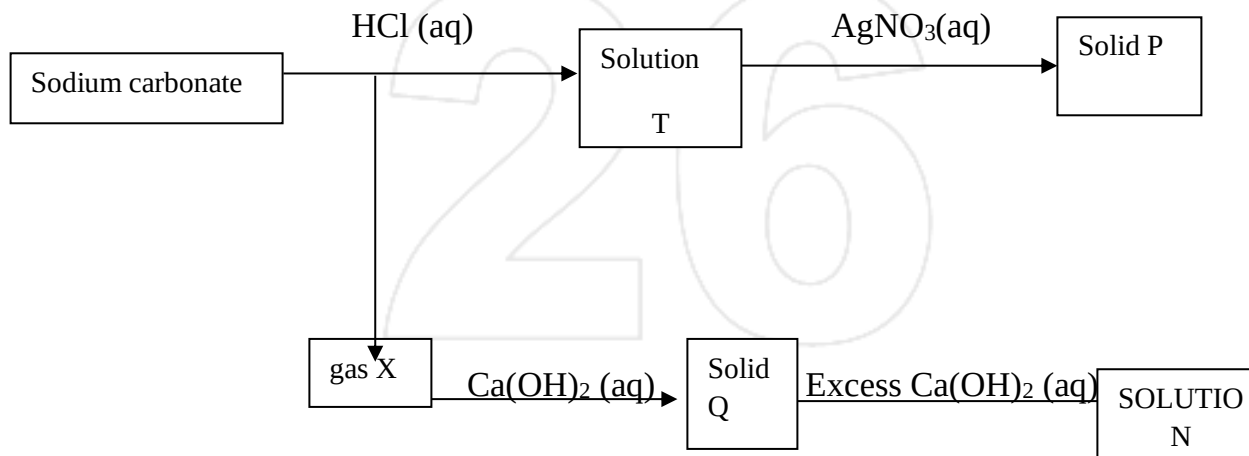
b) State the reason for using a funnel to deliver the ammonia into the beaker (1mk)

c) Write an ionic equation for the reaction that takes place (1mk)

6. a) State Graham's law of diffusion (1mk)
- b) 200cm^3 of methane diffused through a porous pot in 40secs. Calculate the time taken for the same volume of hydrogen chloride gas to diffuse under the same conditions ($H = 1, C=12, Cl = 35.5$) (2mks)
7. In an experiment, soap solution was added to three separate samples of water. The table below shows volumes of soap solution required to form lather with 100cm^3 of which sample of water before and after boiling.

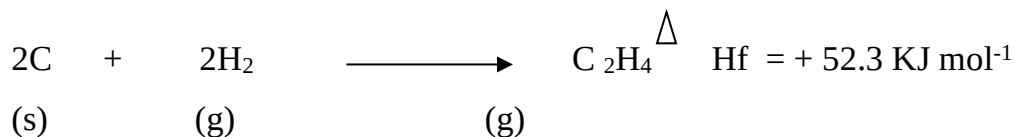
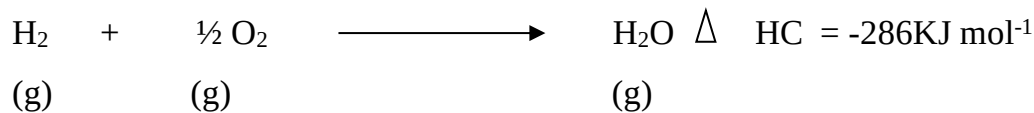
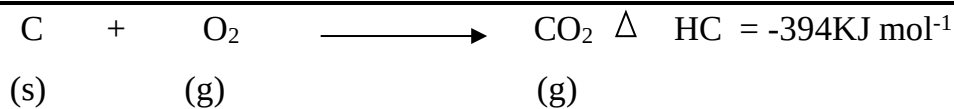
	SAMPLE I	SAMPLE II	SAMPLE III
Volume of soap before water is boiled (cm^3)	25.0	5.0	10.0
Volume of soap after water is boiled	25.0	5.0	5.0

- i. Which water sample is likely to be soft? Explain (1mk)
- ii. Explain the change in the volume of soap solution used in sample III (2mks)
8. Study the flow chart below and use it to answer the questions that follow



- a) Identify using chemical formula substances L,P,Q and X
- P (½ mk)
- Q (½ mk)
- X..... (½ mk)
- b) write an ionic equation for the reaction between T and silver nitrate solution (1mk)

9. The following thermo-chemical equations show the combustion of carbon and hydrogen. The heat of formation of ethane is also given.



Using the above information calculate the heat of combustion of ethane (3mks)

10. Starting with nitric (v) acid, distilled water, lead (II) carbonate and sodium sulphate crystals.

Describe how you can prepare solid lead (II) Sulphate (3mks)

11. a) State the observation made when chlorine gas is bubbled through aqueous potassium iodide (1mk)

b) When chlorine water is left under sunlight its bleaching property is lost. Explain (1mk)

c) Work out the oxidation state of chromium in $\text{Cr}_2\text{O}_7^{2-}$ (1mk)

12. A solution of hydrogen chloride in methyl benzene does not react with carbonates. However a solution of hydrogen chloride in water produces a vigorous effervescence with carbonates

Explain the above observation (2mks)

13. Chlorine has two isotopes with atomic mass 35 and x occurring in the ratio 3:1 respectively.

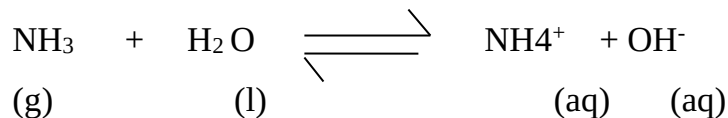
The relative atomic (R.M.A) of chlorine is 35.5. Determine the value of x. (3mks)

14. Hydrogen sulphide was passed through aqueous lead nitrate

a) State and explain the observation that was made (2mks)

b) Write an ionic equation for the above reaction (1mk)

15. Ammonia gas in solution dissociates according to the equation below



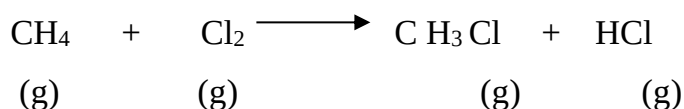
a) Identify the acidic species in the above equation (1mk)

b) What is the effect on equilibrium if sodium hydroxide is added to the mixture (1mk)

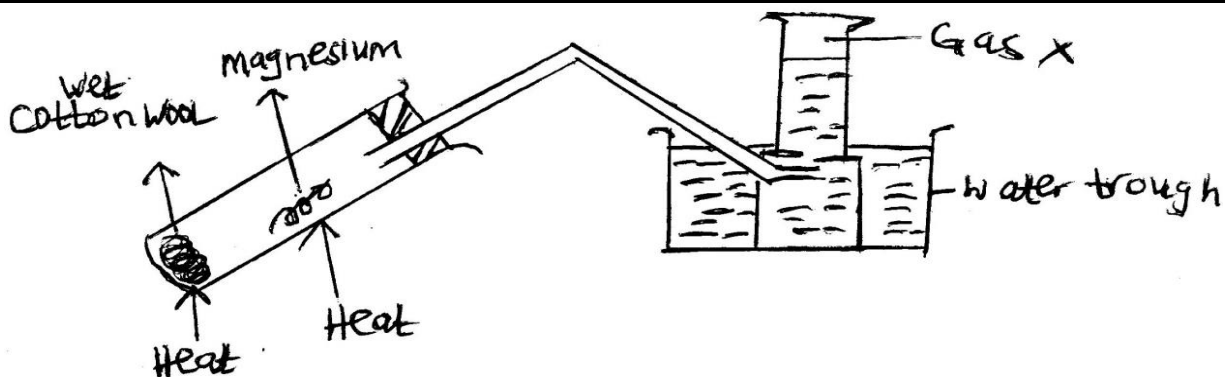
16. Solubility of Potassium chloride at 100°C is 39.8g/100g of water and at 80°C is 35.9/100g of water. If a saturated solution of Potassium chloride dissolved in 70g of water at 100°C is cooled to 80°C, Calculate the mass of potassium chloride which will be deposited (3mks)
17. When excess carbon (II) oxide gas was passed over heated lead (II) oxide in a combustion tube, lead(II) oxide was reduced.
- a) Write an equation for the reaction which took place (1mk)
- b) What observation was made in the combustion tube when the reaction was complete (1mk)
- c) Name another gas which could be used to reduce lead (II) Oxide (1mk)
18. 8 g of methanol require 178 KJ to vaporize completely. Calculate the heat required to vaporize one mole of methanol completely (C = 12.0, H =1.0, O =16.0) (2mks)
19. Given a sample of concentrated sulphuric acid was left in an open beaker in a room for two days, the volume was found to have increased slightly.
- a) What property of concentrate sulphuric acid is shown by the above reaction (1mk)
- b) State one use of concentrated sulphuric acid that depends on the above property (1mk)
- c) State another use of sulphuric acid. (1mk)
20. Study the information given in the table below and answer the questions below the table.

BOND	BOND ENERGY KJ mol ⁻¹
C-H	414
Cl-Cl	244
C-Cl	326
H-Cl	431

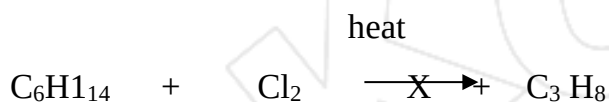
Calculate the enthalpy change for the reaction (3mks)



21. The set up below shows a reaction between magnesium ribbon and steam.



- a) Identify gas X (1mk)
- b) Write an equation for the reaction between the magnesium ribbon and steam (1mk)
- c) Name two other metals that react with steam. (1mk)
22. The molecular formula of a hydrocarbon is C_6H_{14} . The hydrocarbon can be converted into two other hydrocarbons as shown below



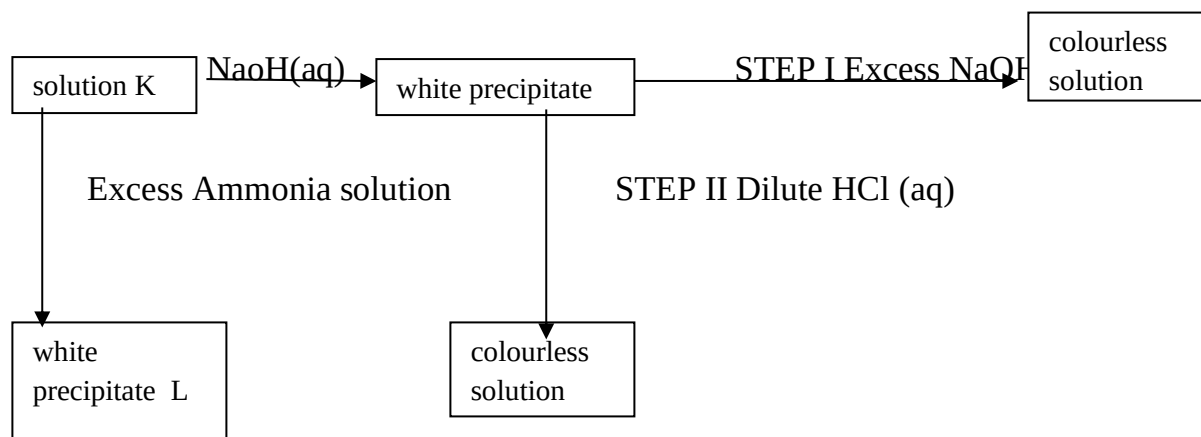
- a) What name is given to the above process (1mk)
- b) Draw the possible structure of X (1mk)
- c) State the observations made if a few drops of bromine water are added to a sample of X (1mk)
23. The table below shows some properties of some elements in period 3 of the periodic table

ELEMENT	SODIUM	MAGNESIUM	ALUMINIUM
Melting point	97.8	650	660
Atomic radii (nm)	0.152	0.136	0.125

Explain the trend of

- a) Melting points from sodium to aluminium (1 ½ mks)
- b) Atomic size of atoms from sodium to aluminium (1 ½ mks)
24. Red hot carbon was found to remove oxygen from the oxides of metals A, B, C but not from the oxide of D. metal C removes oxygen from the oxide of metal A but not from the oxide of metal A but not from the oxide of metal B. Arrange the metals A, B, C, D in increasing order of their reactivity (2mks)

25. Study the flow chart below and use it to answer the questions that follow.



a) Write the formula of the metal ion in solution K (1mk)

b) Name the white precipitate L (1mk)

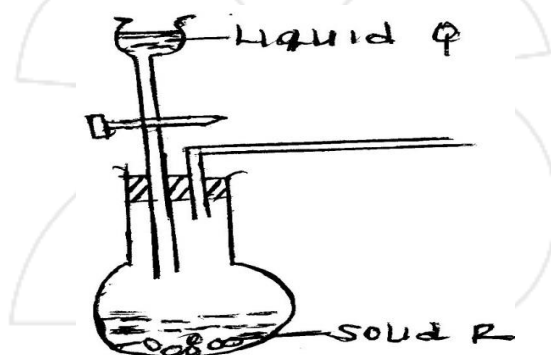
c) What property of the white precipitate is illustrated in steps I and II (1mk)

26. 25cm^3 of 0.12M Potassium hydroxide was neutralized by 30.0cm^3 of a solution of a dibasic acid (H_2X) containing 3.15 g per 500cm^3 . Calculate

a) The molarity of the acid solution (2mks)

b) The relative formula mass of the acid (1mk)

27. Oxygen can be prepared in the laboratory using the set up below



a) Name liquid Q and solid R

Q (1 mk)

R (1 mk)

b) Complete the set up to show how the oxygen gas produced is collected (1mk)

c) Write an equation to show how oxygen is obtained from liquid Q and solid R (1mk)

28. The atomic numbers of element W and X are 14 and 17 respectively. W and X are not the actual symbols of the elements) illustrate the type of bonding present in the compound formed when the two react using dots (.) and crosses (x) (3mks)

KCSE 2026 FINAL PREDICTIONS

CONFIDENTIAL EXAM 3

233/2

CHEMISTRY

PAPER 2

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO CANDIDATES

- Write your name, admission number, date and school in the spaces provided.
- Answer **all** the questions in the spaces provided.
- All working **must** be clearly shown where necessary.
- Scientific calculators may be used.

FOR EXAMINERS' USE ONLY

Question	Maximum Score	Student's Score
1	12	
2	10	
3	10	
4	11	
5	10	
6	9	
7	7	
8	11	
TOTAL	80	

Answer **all** the questions in the spaces provided.

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

Element	Atomic number	Relative atomic mass	Melting point ($^{\circ}\text{C}$)
Aluminium	13	37.0	
Calcium	20	40.0	850
Carbon		12.0	3730
Hydrogen		1.0	-259
Magnesium	12	24.3	650
Neon	10		-249
Phosphorus	15	31.0	44.2 (white)
Phosphorus	15	31	590 (red)
Sodium		23	

(a) Complete the table by filling in the missing atomic numbers and atomic mass. **(2 marks)**

(b) Write the electron arrangement for the following ions. **(2 marks)**



(c) What is the melting point of hydrogen in Kelvin? **(1 mark)**

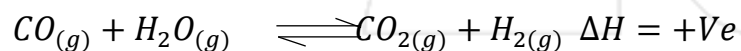
(d) Which of the allotropes of phosphorous has a higher density? Explain. **(2 marks)**

(e) The mass numbers of three isotopes of magnesium are 24, 25 and 26. What is the mass number of the abundant isotope of magnesium? Explain. **(2 marks)**

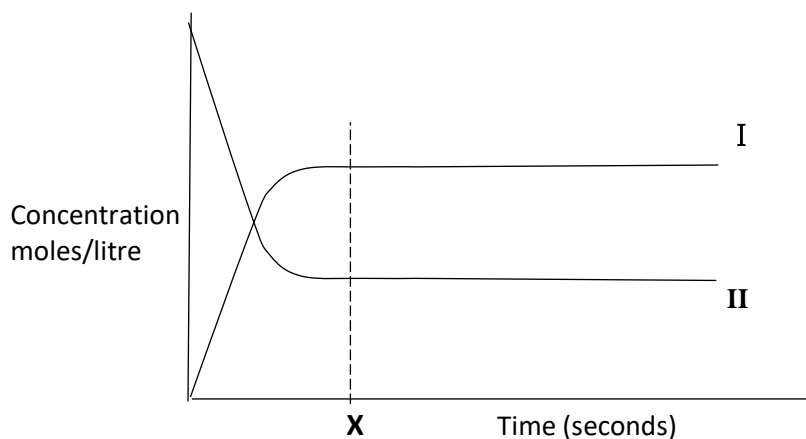
(f) Give the formula of the compound formed between calcium and carbon. **(1 mark)**

(g) Explain the difference in the melting points of magnesium and sodium. **(2 marks)**

2. Hydrogen gas can be obtained by reacting carbon (II) oxide and steam as shown below.



The curve below was obtained during the process.



- (a) Which curve represents the change in the concentration of hydrogen, give a reason. (2 mks)
- (b) Give a reason for the shapes of curve at point X. (1 mk)
- (c) State and explain the effect on equilibrium when concentrated potassium hydroxide solution is added on equilibrium above. (2 marks)
- (d) Explain the effects of increasing temperature of the system above on the yields of hydrogen. (2 marks)
- (e) The table below shows the volume of oxygen produced with increase in time during a reaction of 2g Manganese (IV) oxide and 50cm³ hydrogen peroxide at 25⁰C.

Time sec.	0	10	20	30	40	50	60	70	80
Volume (O ₂) cm ³	0	60	90	105	112	116	120	120	120

- (i) Calculate the rate of reaction between 20th and 40th second. (1 mark)
- (ii) Explain why volume of O₂ produced does not exceed 120cm³. (1 mark)
- (iii) Explain the effect of using 4g of manganese (IV) oxide on total volume of oxygen produced. (1 mark)

3. Use the table below to answer the questions that follow.

Substance	Formula
A	CH ₃ (CH ₂) ₂ OH
B	C ₂ H ₅ COOH
C	CH ₃ CHCH ₂
D	CH ₃ CH ₂ CH ₃
E	CH ₃ CCH

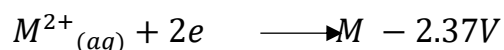
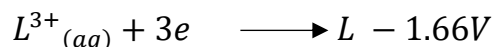
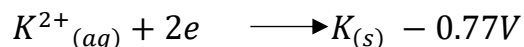
- (a) Explain how one would differentiate between substance D and E in the laboratory. (2 marks)
- (b) Write an equation to show the reaction that will take place when substance A is heated in presence of concentrated sulphuric VI acid at temperature of 170⁰C. (1 mark)
- (c) What is the name of the process involved when substance D reacts with chlorine? Give the condition required for the process.
- Process - (1 mark)
- Condition - (1 mark)
- (d) Select **two** substances from the table that could be reacted to form a pleasant smelling substance.
- (i) Substances - (1 mark)
- (ii) Conditions – (1 mark)

(e) Substance **C** is subjected to high temperatures and pressure to form a solid substance.

(i) Name the solid substance formed. **(1 mark)**

(ii) Explain the effect of using the substance formed above for a long time. **(2 marks)**

4. The standard electrode potentials of metals **J**, **K**, **L** and **M** are as shown below. Use it to answer the questions. (The letters are not the actual chemical symbols).



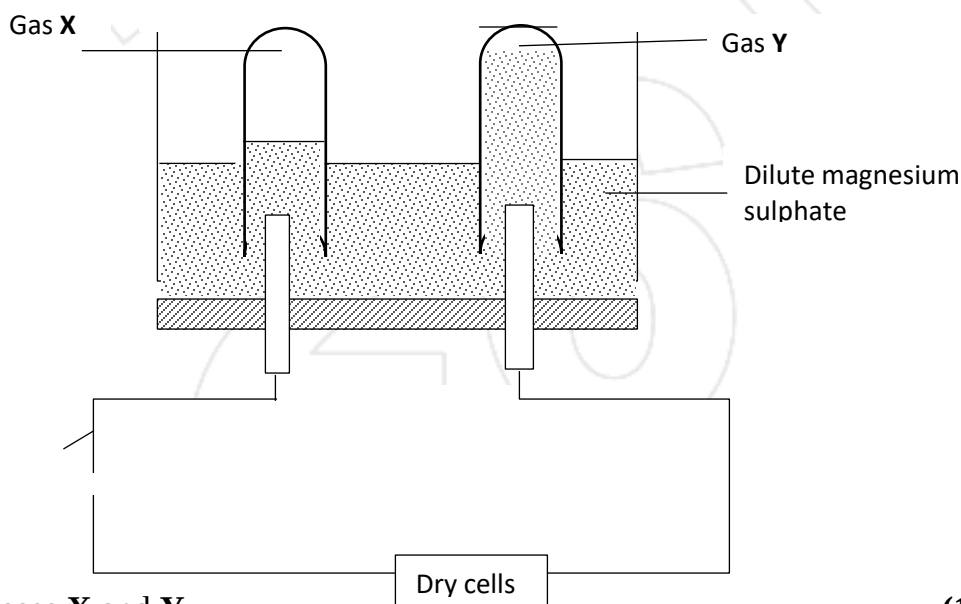
(i) Select **two** metals whose half cells will yield the highest e.m.f. when connected. **(1 mark)**

(ii) Write the cell diagram for the cell formed in (i) above. **(1 mark)**

(iii) Calculate the initial e.m.f of the cell formed. **(1 mark)**

(iv) **State one** use of salt bridge in electrochemical cells. **(1 mark)**

(v) The set-up below shows electrolysis of dilute solution of magnesium sulphate.



(i) Identify the gases **X** and **Y**. **(1 mark)**

(ii) On the diagram, label the electrode that is the anode. **(½ mark)**

(iii) A current of 1.5A was passed through the solution for 50 minutes. Calculate the volume of the gas produced at the cathode.

(M.G.V. r.t.p. = 24000cm³, IF = 96500c). **(3 marks)**

(iv) State the effect of electrolysis of magnesium sulphate on the concentration of the electrolyte.

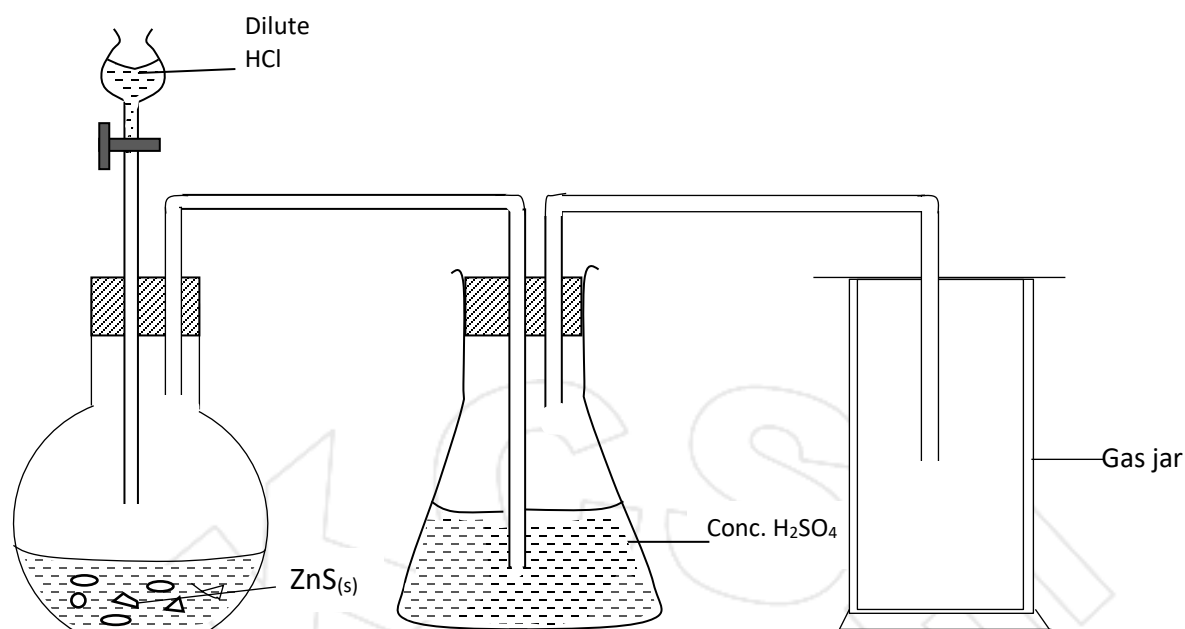
(½ mark)

(v) Give any **one** application of electrolysis.

(1 mark)

5. (a) The following set-up was used by a Form 3 student to prepare and collect dry hydrogen sulphide gas.

(3 marks)



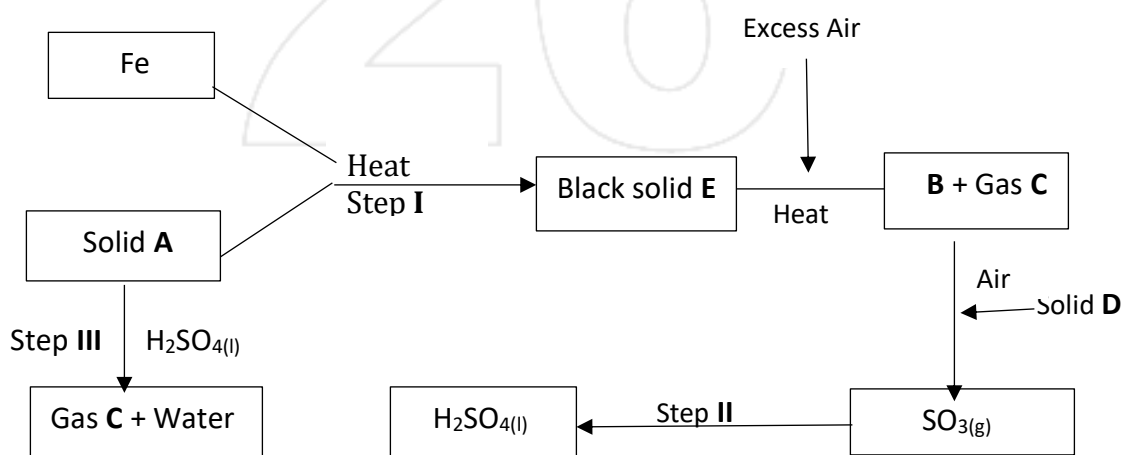
(i) At the end of the experiment, the student realized that no gas was collected. Give a reason.

(1 mark)

(ii) Write an equation for the reaction when excess hydrogen sulphide gas is passed through sodium hydroxide solution.

(1 mark)

(b) Study the flow chart below to answer the questions that follow.



(i) Name;

(3 marks)

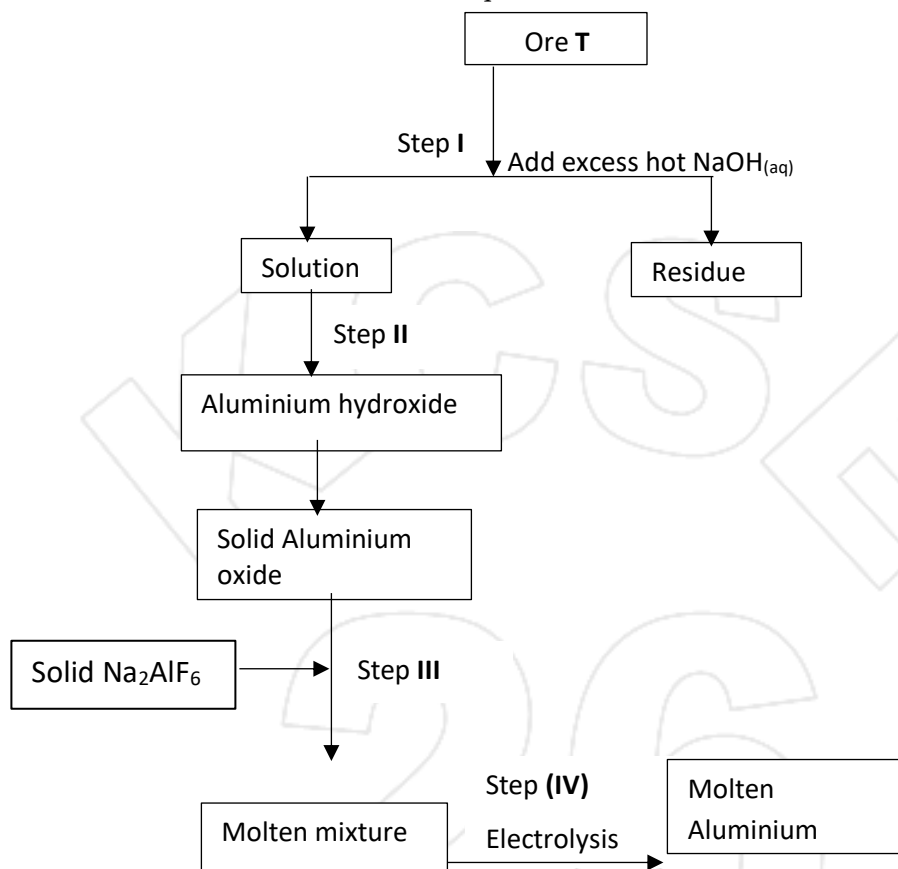
I. Solid A

II. Solid D

III. Substance B

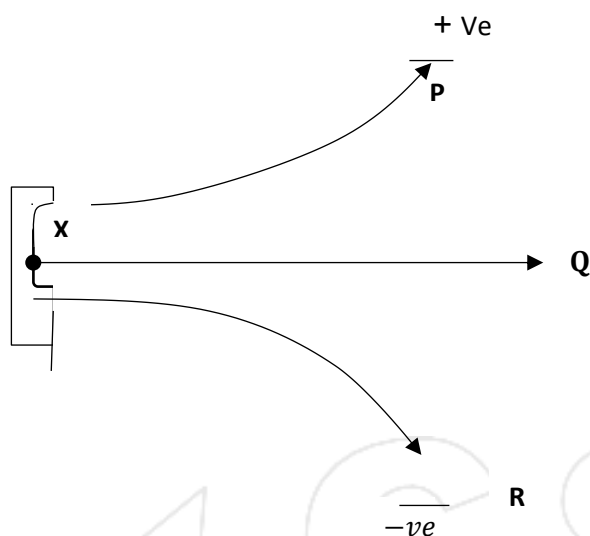
- (ii) Write equations for the two consecutive reactions that must take place in step II before sulphuric (VI) acid is formed. (2 marks)
- (iii) State the property of solid A that enables it to react with H_2SO_4 in step III. (1 mark)
- (iv) State any **two** uses of sulphuric (VI) acid. (2 marks)

6. I. Study the flow chart below and answer questions that follow.



- (a) Name ore T. (1 mark)
- (b) Explain why the ore is dissolved in excess $\text{NaOH}_{(\text{aq})}$. (1 mark)
- (c) Name compound present in:- (1 mark)
- (i) Solution
- (ii) Residue
- (d) Name the process that takes place in step II. ($\frac{1}{2}$ mark)
- (e) Why are sodium and fluoride ions not discharged in step IV? ($\frac{1}{2}$ mark)
- (f) Write the equation for reaction in step IV. (1 mark)
- (g) Why should the anode be replaced from time to time? (1 mark)
- (h) State any **two** uses of aluminium. (1 mark)

II. The figure below shows the behavior of emissions by radioactive isotope X. Use it to answer questions that follow.



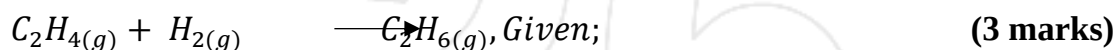
(a) Explain why isotope X emits radiation. (½ mark)

(b) Name radiations P, Q and R. (1 ½ marks)

7. (a) State Hess's law. (1 mark)

(b) Calculate the enthalpy of formation of ethane given that the molar enthalpies of combustion of carbon, hydrogen and ethane are -394kJ, -286kJ and -1560kJ respectively. (3 marks)

(c) Calculate the enthalpy change for the relation.



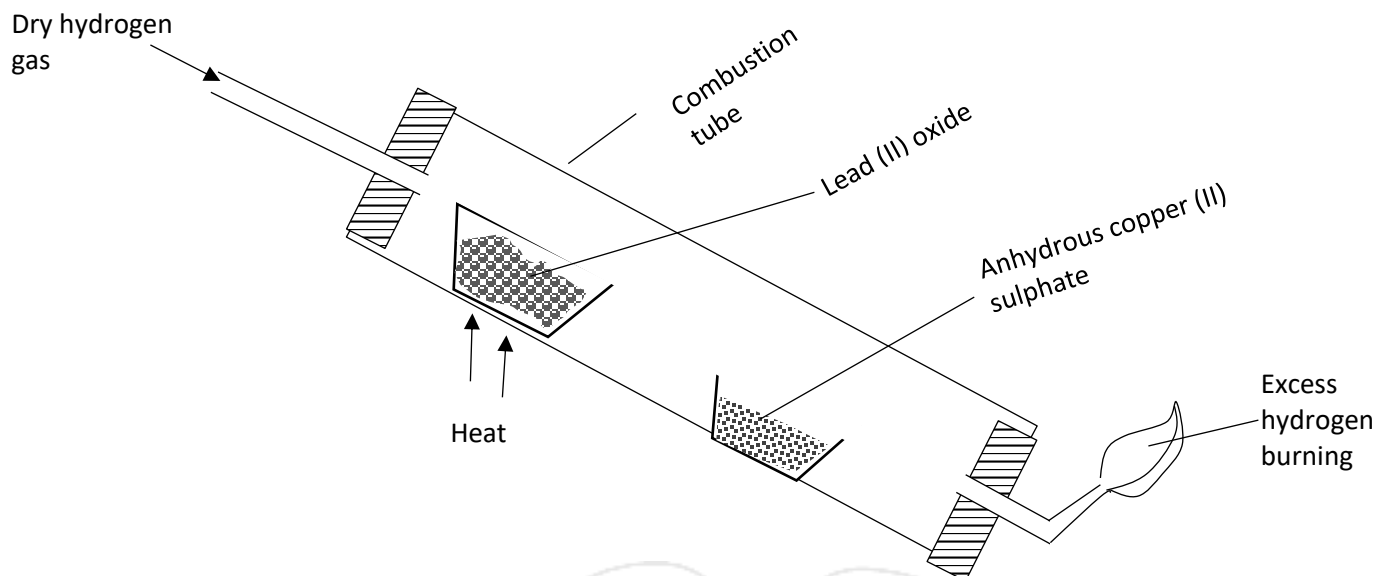
$$C - C = 347 \text{ kJ/mole}$$

$$C = C = 612 \text{ kJ/mole}$$

$$C - H = 413 \text{ kJ/mole}$$

$$H - H = 436 \text{ kJ/mole}$$

8. The experiment below was used to investigate the effect of dry hydrogen gas on hot Lead (II) oxide. Use it to answer the questions that follow.



- (a) (i) What was observed in the combustion tube at the end of the experiment? **(1 mark)**
- (ii) Why should the tube be slanting? **(1 mark)**
- (iii) State any **two** precautions to be observed when doing this experiment. **(2 marks)**
- (b) (i) If 2.07g of lead (II) oxide was reduced by certain amount of hydrogen gas during experiment. Calculate the mass of hydrogen gas that reduced 2.07g of lead (II) oxide. (Pb = 207, O = 32, H = 1) **(3 marks)**
- (ii) Calculate the mass of the residue in the combustion tube. **(2 marks)**
- (iii) Calculate the volume of hydrogen gas used at r.t.p. (MGV = 24L) **(2 marks)**

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 4**

233/1

CHEMISTRY**PAPER 1**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES:**

- Write your **name** and **index number** in the spaces provided above.
- Sign and write the **DATE** of examination in the spaces provided above.
- Answer **All** the questions in the spaces provided below each question.
- Mathematical tables and electronic calculators may be used
- All working **MUST** be clearly shown where necessary.

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1-30	80	

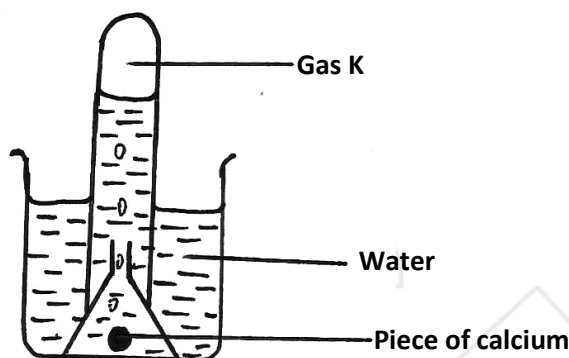
- 1.(a) Aluminium is used in making cooking vessels and overhead cables. State the property of aluminium that makes it suitable for the two uses separately.

Cooking vessels..... (½mk)

Overhead cables (½mk)

- (b) Explain why it is not advisable to clean surfaces of cooking vessels made of aluminium using wood –ash solution (2mks)

2. The set-up below was used to prepare and collect gas L, produced by the reaction between water and calcium metal

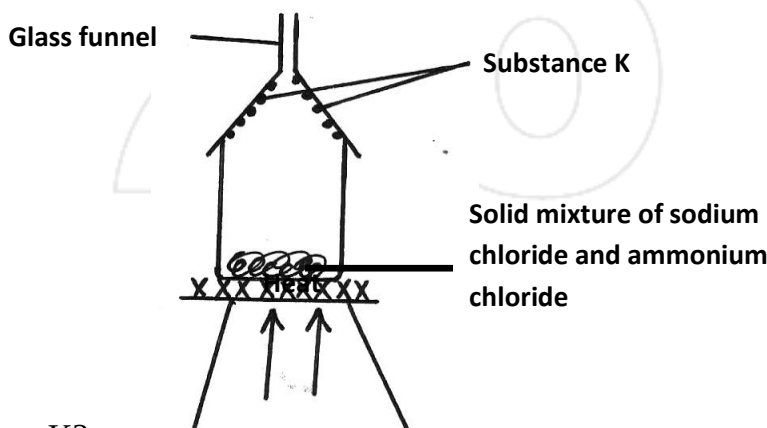


- (a) Name gas K (1mk)

- (b) At the end of the experiments, the solution in the beaker was found to have a PH of about 11, explain (2mks)

- (c) Write a balanced chemical equation for the reaction that occurs (1mk)

3. The following set-up shows the heating of a mixture of equal amounts of sodium chloride and ammonium chloride

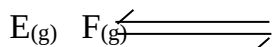


- (a) What is substance K? (1mk)

- (b) What is the process by which substance K is formed? (1mk)

4. Differentiate between the terms atomic number and mass number (2mks)

5. Study the equilibrium between gases



(i) Sketch a graph of the variation of the concentration of substance F with time, on the grid below



(ii) Explain the shape of the curve (2mks)

6. Explain why very little carbon (IV) Oxide gas is evolved when dilute Sulphuric (VI) acid is added to Lead (II) carbonate (2mks)

7. A crystal of Copper (II) Sulphate was placed in a beaker of water. The beaker was left standing for two days without shaking. State and explain the observations that were made (2mks)

8. Study the information in the table below and answer the questions that follows

Ions	Electron arrangement	Ionic radius
A ⁺	2.8	0.95
B ⁺	2.8.8	0.1333
C ²⁺	2.8	0.065

Explain why the ionic radius of

(a) B⁺ is greater than A⁺ (1mk)

(b) C²⁺ is smaller than of A⁺ (2mks)

9. (a) State Graham's law of diffusion (1mk)

(b) Gas D takes 110 seconds to diffuse through a porous partition. Gas D has a relative molecular mass of 34. How long will it take for the same amount of ammonia gas to diffuse under identical conditions? (H=1, N=14) (2mks)

10. When reacting sulphur (VI) Oxide and Hydrogen Sulphides some traces of water vapour is required for the reaction to occur.

(a) State the role of water vapour (1mk)

(b) Write an equation for the reaction that occurs (1mk)

(c) Identify the reducing agent in the reaction in (b) above (1mk)

11. State and explain observation made when Conc. Sulphuric (VI) acid was added to sugar crystals (2mks)

12. Name the class to which the following cleansing agents belongs

(i) $\text{R-COO}^-\text{Na}^+$ **A** (½mk)

(ii) $\text{R}-\text{C}_6\text{H}_{11}\text{O}-\text{SO}_3^-\text{Na}^+$ **B** (½mk)

(iii) Which cleansing agent is suitable for use in hard water? (½mk)

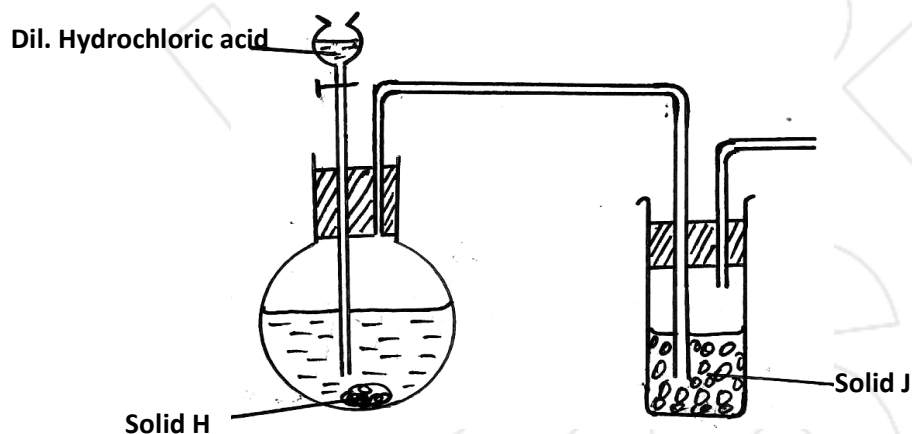
(iv) Which cleansing agent above is not environmentally friendly? (½mk)

13. (i) Nitrogen (I) Oxide supports combustion of burning charcoal. Write an equation to show this reaction (1mk)

(ii) Ammonium nitrate can be heated to give off Nitrogen (I) oxide. However a mixture of NH_4Cl and NaNO_3 is preferred. Explain (1mk)

(iii) State the physical test of Nitrogen (I) Oxide (1mk)

14. The set-up below was used to prepare dry sample of hydrogen Sulphide gas



(a)(i) Complete the diagram to show how the gas was collected (2mks)

(ii) Identify the following

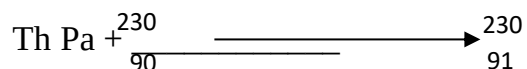
I: Solid H (1mk)

II: Solid J (1mk)

(b) Write an equation for the reaction that occurred in the flask between solid H and dilute hydrochloric acid (1mk)

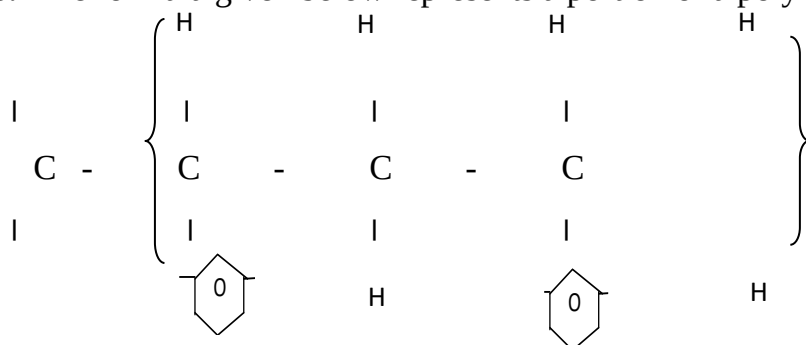
15. (a) Distinguish between nuclear fusion and fission (2mks)

(b) Complete the nuclear equation below



(c) Give one application of radioactivity in agriculture (1mk)

16. The formula given below represents a portion of a polymer



(a) Give the name of the Polymer (1mk)

(b) Draw the structure of the monomer used to manufacture the Polymer (1mk)

17. Hydrogen chloride gas can be used to carry out fountain experiment. State the property of hydrogen chloride that make it suitable for this experiment (1mk)

18. 0.92g of ethanol were found to burn in excess air producing a temperature rise of 32.5°C in 200cm³ of water (C=12.0, H=1.0, O=16.0) Density of water is 1g/cm³, specific heat capacity of water is 4.2KJ Kg⁻¹ K⁻¹

(a) Write the equation for the combustion of ethanol (1mk)

(b) Determine the molar heat of combustion of ethanol (2mks)

19. Iron is extracted from its ore by blast furnace from its ore by blast furnace process.

(a) Name one ore from which iron is extracted (1mk)

(b) One of the impurities in iron is removed in the form of Calcium silicate. Write equations for the reaction in which calcium silicate is produced (2mks)

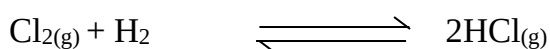
20. Calculate the amount of Zinc in grams that would remain if 1.96g of the metal were reacted with 100cm³ of 0.2M hydrochloric acid. (Zn=65.0, H=1.0, Cl=35.5) (3mks)

21. (a) Starting with solid Magnesium Oxide, describe how a solid sample of Magnesium hydroxide can be prepared (2mks)

(b) Give one use of Magnesium hydroxide (1mk)

22. An oxide of element F has the formula F₂O₅. Determine the oxidation state of F in the compound (1mk)

23. A dynamic equilibrium is established when hydrogen and chlorine reacts as shown below



(a) What is meant by the term dynamic equilibrium? (1mk)

(b) State and explain the effect of increasing pressure on the position of the equilibrium shown in (a) above (2mks)

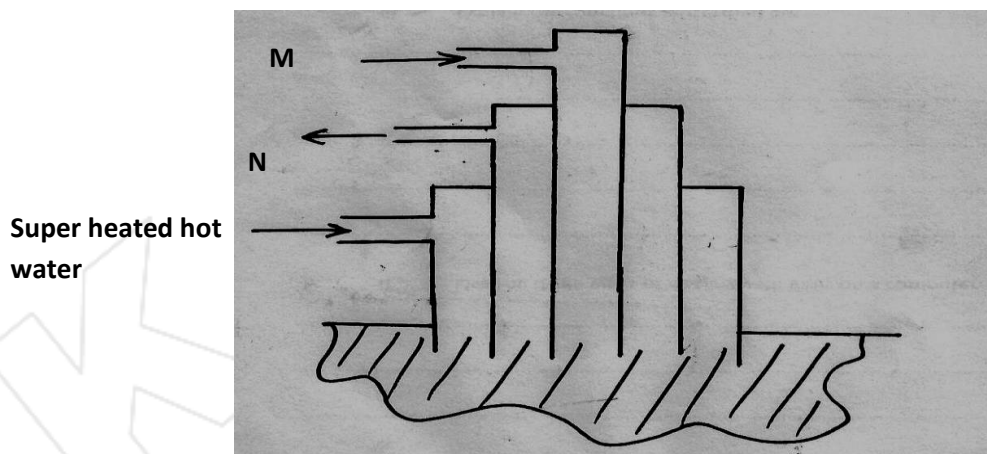
24. An element X has a relative atomic mass of 44. When a current of 0.5 A was passed through the molten chloride of X for 32 minutes and 10 seconds, 0.22g of X were deposited at the cathode

Determine the charge on an ion of X (1F=96,500c) (3mks)

25. (a) Differentiate between catalytic and thermal cracking of long chain organic compounds (2mks)

(b) State the disadvantage of C.F.C based compounds (1mk)

26. The figure below shows a simple extraction process of Sulphur



(a) Give the name of the process shown in the diagram above (1mk)

(b) What is the use of the superheated hot water? (1mk)

(c) State two physical properties of Sulphur that make it possible to be extracted using water (2mks)

27. (a) Define molar latent heat of vaporization of a substance (1mk)

(b) The Molar latent heat of vaporization of water at 100°C is 41.1kJ/mol. Calculate the heat change when 1.0g of water at 100°C is converted into vapour at 100°C (H=1, O=16) (2mks)

28. Metals Q and T had their half-cells connected to a Zinc half-cell and the following reduction potentials were obtained from each metal

Metal half-cell	Reduction potential (volts)
$Q^{2+}_{(aq)} / Q(s)$	-1.37v
$T^{+}_{(aq)} / T(s)$	-0.83v

(a) What name is given to the Zinc half-cell in these circumstances, and state its reduction Potential (1mk)

(b) Metals Q and T were connected to form an electrochemical full cell

(i) Write the equations for the half-cell reactions that occur at the Q and T electrodes (1mk)

I. At electrode Q:

II. At electrode T:

(ii) Calculate the e.m.f of the electrochemical full cell in b(i) above (1mk)

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 4**

233/2

CHEMISTRY**PAPER 2**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

- Write your name and Index number in spaces provided above.
- Sign and write the date of examination in the spaces provided above
- Answer all the questions in the spaces provided above.

FOR EXAMINERS USE ONLY

Question	Maximum score	Candidates score
1	12	
2	11	
3	09	
4	12	
5	11	
6	12	
7	13	
Total score	80	

1. The table below shows elements with their atomic numbers, mass numbers and their melting points. Study it and answer the questions that follow. Letters do not represent the actual symbols of the elements

Element	B	C	D	E	F	G	H	I	J	K
Atomic number	7	8	19	15	2	9	6	16	12	11
Atomic mass	14	16	39	31	4	19	12	32	24	23
Melting point	-	-	637	44	-272	-223	vary	113	669	980

- (a) Select two elements with oxidation state -2 (1mk)
- (b) Which element represents
- (i) the most powerful oxidizing agent? (1mk)
- (ii) the most powerful reducing agent? (1mk)
- (c) Which element has the highest ionization energy? Explain (1mk)
- (d) Select two elements, when reacted form a compound that conducts electricity in molten and aqueous state (1mk)
- (e) Select two elements when reacted form a compound that dissolves in water to form acidic solution (1mk)
- (f) Using dot (•) and cross (x), draw the diagram that shows the bond between B and J (2mks)
- (g) Explain why the melting point of K is higher than that of D (2mks)
2. Pure Calcium Carbonate weighing 7.50g was placed in a flask with 50cm³ of dilute hydrochloric acid. The flask was kept at constant temperature and the carbon (IV) oxide evolved was collected in a graduated vessel. The volume of carbon (IV) Oxide was recorded every 20 minutes intervals (some of calcium carbonate remained undissolved at the end of the experiment. The results of the experiment are given in the table; study it and answer the questions that follows

Time from at the start of reaction/min	Volume of Carbon (IV) Oxide formed at stp /cm ³
20	655
40	910
60	1065
80	1100
100	1120
120	1120

- (i) On the grid provided, plot the graph of the volume of Carbon (IV) Oxide against time (4mks)
- (ii) From the graph determine the volume of the gas collected after 43 seconds (1mk)
- (iii) Determine the rate of reaction at the 25th minute (2mks)
- (iv) What mass of calcium carbonate will react with the acid after 100 seconds (3mks)
- (II) When dilute hydrochloric acid is added to a yellow solution of Pottassium Chromate (VI)

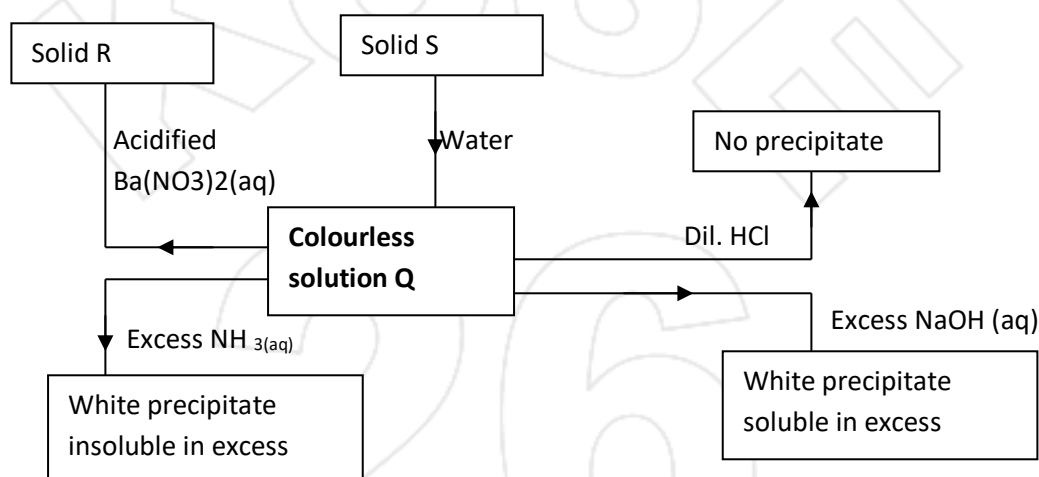
$$\underset{\text{Yellow}}{2\text{K}_2\text{CrO}_{4(\text{aq})} + 2\text{HCl}_{(\text{aq})}} \rightleftharpoons \underset{\text{Orange}}{\text{K}_2\text{Cr}_2\text{O}_{7(\text{aq})} + \text{H}_2\text{O}_{(\text{l})}}$$

(i) What would you observe, if dilute Sodium hydroxide solution was added to the Orange solution? Explain (2mks)

(Molar gas volume at s.t.p= 22.4dm^3) (2mks)

(b)(i) A fixed mass of a gas occupies 4dm^3 at 227°C and 152mmHg pressure. At what pressure will the volume of the same mass of gas be 2dm^3 if the temperature is lowered to -23°C **(3mks)**

(c) (i) Study the scheme diagram below and answer the questions that follow

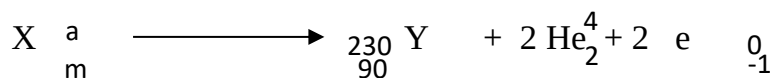


Solution Q.....

Solid R.....

(2mks)

(d) The following is a nuclear equation (*X and Y are not actual symbols*)



(a) Determine the value of a and m

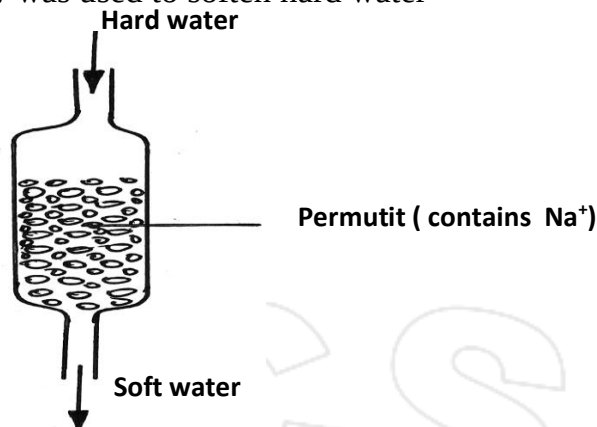
(b) Compare the atomic size of R and L

2mks)

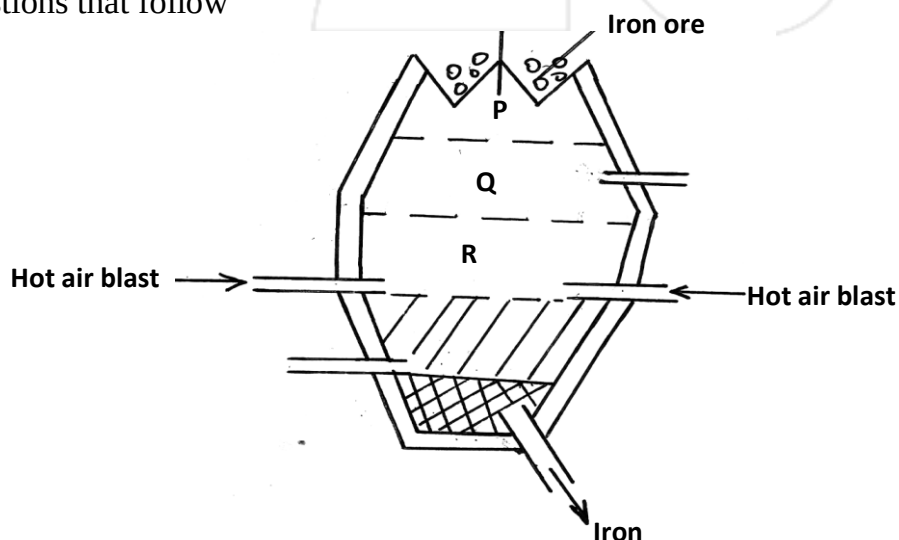
4. (I) When hydrogen gas was passed over heated Iron (III) oxide was heated. However, when Iron (III) oxide was heated with carbon, a reaction occurred resulting in the formation of solid product Z. When solid Z was dissolved in dilute Sulphuric (VI) acid, gas Y was evolved.

(a) Explain why carbon reacted with Iron (III) Oxide while hydrogen did not? **(1mk)**

- (b) Identify gas Y (1mk)
- (c) (i) Write an equation for the reaction between Iron (III) Oxide and Carbon (1mk)
- (ii) Calculate amount of solid Z formed in grams, if 1.5g of Iron (III) oxide was used
(Fe=55.8,O=16) (3mks)
- (II) The calcium below was used to soften hard water



- (i) Explain how the hard water was softened as it passed through the column (2mks)
- (ii) After some time the material in the column is not able to soften hard water. How can the material be activated (2mks)
- (iii) Give **one** advantage of using hard water for domestic purposes (1mk)
- (iv) Some Copper turnings were added to dilute Nitric (V) acid at 40°C
- (a) State **one** observation made (1mk)
- (b) State and explanation observation you will make if the reaction temperature is increased to 55°C (2mks)
5. The diagram below shows the blast furnace for the extraction of iron. Study it and answer the questions that follow



- (i) Identify the ore from which Iron is extracted from (1mk)

(ii) Which roles does the following material perform in extraction of iron

(a) Coke (1mk)

(b) Carbon (II) Oxide (1mk)

(iii) Write down the equation for the two chemical changes that takes place in zone P (2mks)

(iv) What is the temperature range in zone R? and what the importance of the temperature for extraction of Iron metal (1mk)

(v) What is the composition of slag? (2mks)

(vi) List any **two** physical properties of iron metal (2mks)

(II) A student was provided with 50cm³ of HCl in a 250cm³ volumetric flask (acid in excess). When the reaction stopped he filled the volumetric flask to the 250cm³ mark up with distilled water. 25cm³ of this solution requires 2cm³ of 0.1M NaOH for complete neutralization

(a) Write the equation for the reaction taking place between XCO₃ and HCl (1mk)

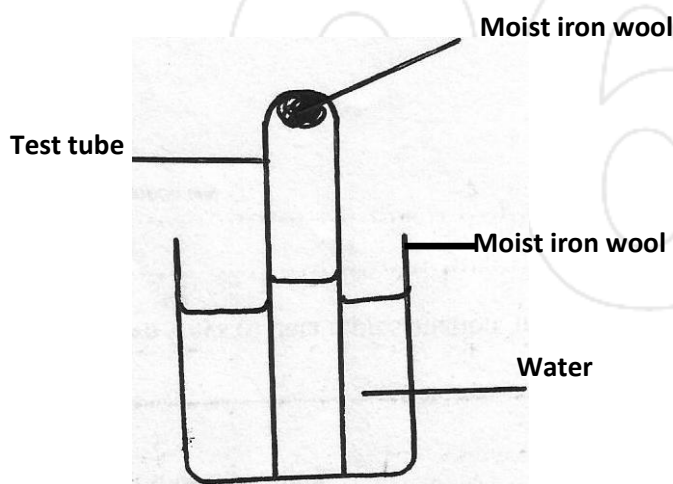
(b)(i) Calculate the number of moles of the acid in 250cm³ of solution (2mks)

(ii) How many moles of the acid reacted with XCO₃? (2mks)

(iii) Calculate the molecular mass of the XCO₃ (3mks)

(d) What is the percentage of X by mass is XCO₃? (1mk)

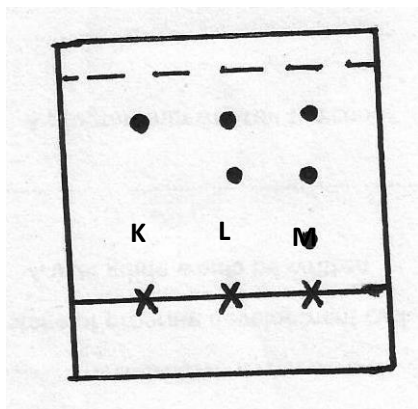
6. The set-up below was used to study some properties of air



(i) State and explain two observation that would be made at the end of the experiment (3mks)

(ii) Write the chemical equation for the chemical change that will take place (1mk)

(II) The diagram below represents a paper chromatogram from three brands of juices suspected to contain burned food colour



The results showed the presence of burned food colorings' in L and M only. On the same diagram

(a) Circle the spots which show the burned food colorings' (1mk)

(b) Show solvent front (1mk)

(III) (i) Name another gas which is used together with Oxygen in welding (1mk)

(ii) Oxygen and Sulphur belong to group (VI) of the periodic table. Explain why there is big difference in their melting point (melting points of Oxygen is -216°C while that of sulphur is 44°C) (2mks)

(iv) Explain how a solid mixture of sodium sulphate can be separated from lead (I) sulphate if the two are mixed together (3mks)

7. The table below shows some properties of some organic compounds. Use it to answer the questions that follows;

(i)

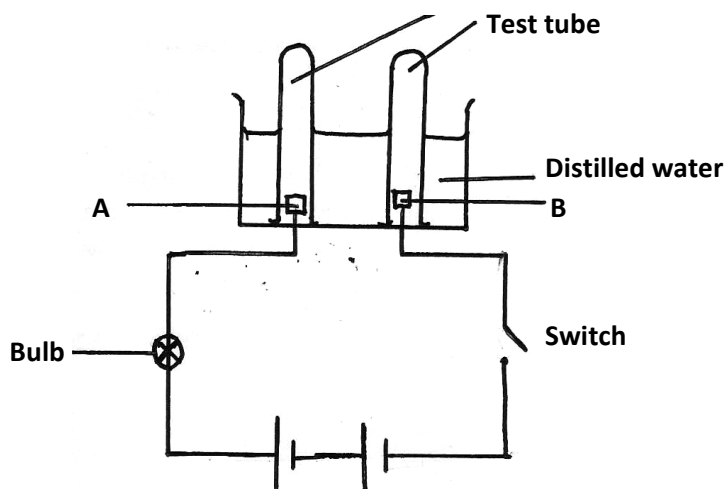
Compound	Molecular	Mpt $^{\circ}\text{C}$	Bpt $^{\circ}\text{C}$
P	$\text{C}_2\text{H}_4\text{O}_2$	16.6	118
Q	C_3H_6	185	-47.7
R	$\text{C}_3\text{H}_8\text{O}$	-127	97.2
S	C_5H_{12}	-130	36
T	C_5H_8	-90	39.3

Which of the compounds above is a gas at 25°C ? Explain (2mks)

(ii) Describe chemical test that would distinguish between T and S (2mks)

(iii) Compounds R and P reacted to form compound K. Give the name of K and state the group of compounds to which it belongs (2mks)

(II) Study the diagram below and answer the questions that follow;



- (a) State, which electrode is the cathode and which one is anode (1mk)
- (b) Explain why no observation was made when the switch was closed (1mk)
- (c) Small amount of concentrated sulphuric (VI) acid was added to the distilled water and the Switch closed. (i) State and explain observation made (2mks)
- (ii) Using equations show the reactions that took place at each electrode given that A and B are inert electrodes (2mks)
- (iii) Write down overall cell equation for the reaction (2mks)

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 5**

233/1

CHEMISTRY**PAPER 1**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

1. Answer *ALL* questions in the spaces provided
2. Mathematical tables and electronic calculators may be used.
3. All working *MUST* be shown clearly where necessary.

FOR EXAMINERS USE ONLY

MAXIMUM SCORE	CANDIDATE'S SCORE
80	

Answer ALL questions in the spaces provided

1. Study the information given below and use it to answer the questions that follow;

Red dye is more soluble than green dye, green is more soluble than yellow whereas blue dye is the least soluble.

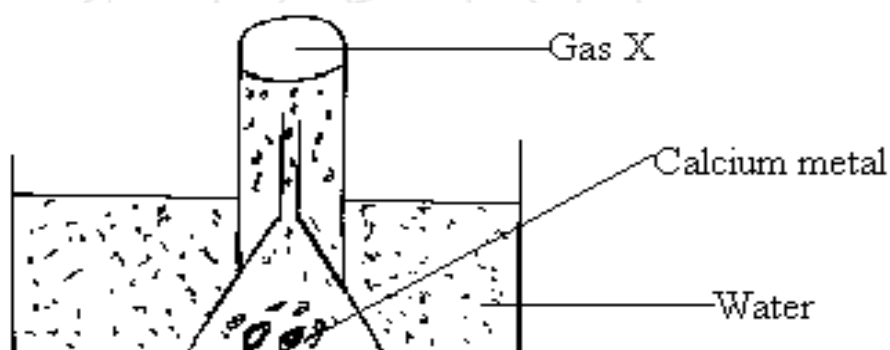
i) Represent the three dyes on a round paper chromatography. **(2marks)**

ii) Name one industrial application of chromatography. **(1mark)**

2. a) What is a fuel? **(1mark)**

b) Calculate the heat value of ethanol if its molar enthalpy of combustion is $-1360 \text{ kJ mol}^{-1}$
(C=12.0, O=16.0, H=1.0) **(2marks)**

3. Study the set up below and use it to answer the questions that follow.



a) What physical property of calcium metal is demonstrated in the diagram above? **(1mark)**

b) What would be observed if water was replaced with dilute Sulphuric (VI) acid? **(2marks)**

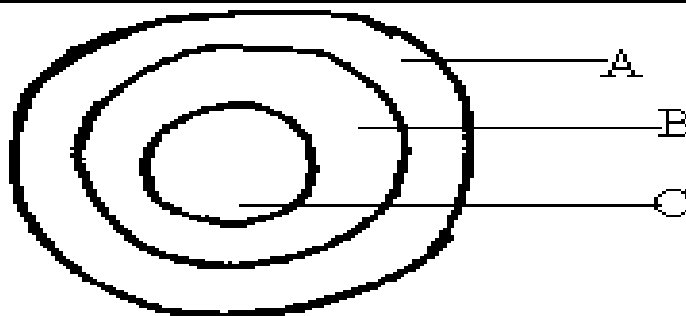
4. A hydrocarbon decolorizes chlorine gas in presence of ultra violet light but does not decolorize acidified potassium manganate (VII) solution.

i) Name the homologous series to which the hydrocarbon belongs. **(1mark)**

ii) Draw the structural formula and name the fourth member of the homologous series to which the hydrocarbon belongs? **(2marks)**

5. Explain why a solution of hydrogen chloride in water turns blue litmus paper red but a solution of hydrogen chloride in methylbenzene has no effect on litmus papers. **(2marks)**

6. The diagram below represents a cross section of the apparatus used to extract sulphur from its deposits. Study it and answer the questions that follow.



a) State the role of the substance that is passed through;

i)A.(1mark)

ii)C (1mark)

b)Give one reason why the method shown in the diagram is suitable for extraction of sulphur.
(1mark)

7. Explain how you would obtain magnesium carbonate from a mixture of magnesium carbonate and sodium carbonate. (2mark)

8. 20g of potassium carbonate were dissolved in 50cm³ of water in a conical flask. Lemon juice was then added drop wise while shaking until there was no further observable change.

a) Explain the observation that was made in the conical flask when the reaction was in progress. (1mark)

b) What observation would be made if lemon juice had been added to copper turnings in a conical flask?Give a reason. (2marks)

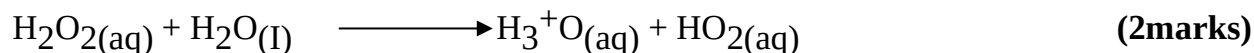
9. Explain why a burning magnesium continues to burn in a gas jar full of carbon (IV) oxide while a burning candle would be extinguished. (2marks)

10.8.4g of carbon (IV) oxide and 3.42g of water are formed when a hydrocarbon is burnt completely in oxygen. Determine the empirical formula of the hydrocarbon.(H=1.0; C=12.0; O=16.0) (3marks)

11. The melting point of nitrogen is -196⁰C while that of sodium is 98⁰C, in terms of structure and bonding explain the differences in the melting points of nitrogen and sodium.(2marks)

12.a)What is an amphoteric substance? (1mark)

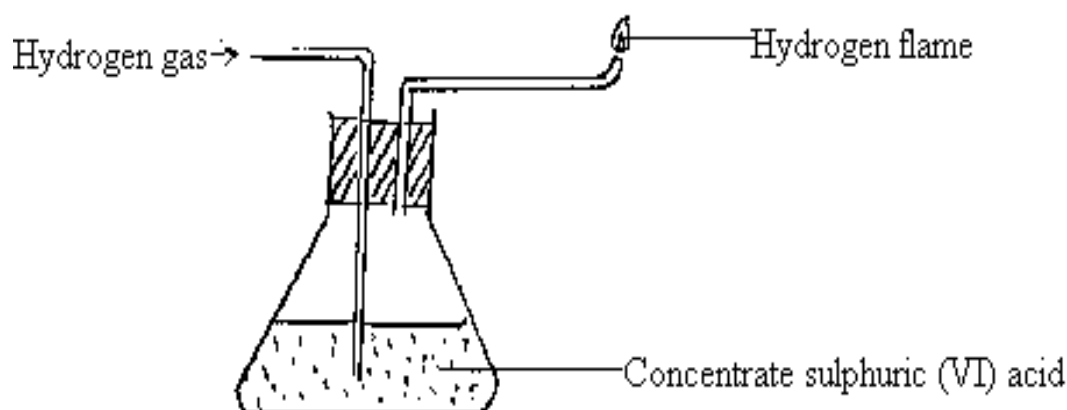
b)Identify the reagent that acts as a base in the equation below. Give a reason for your answer.



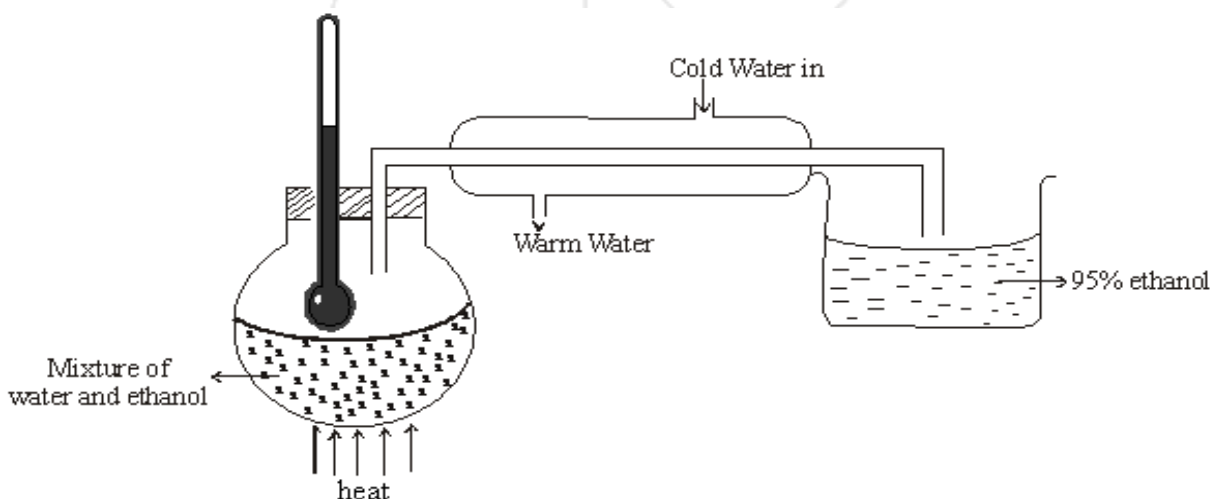
13. In the industrial manufacture of ammonia gas by Harber process, Nitrogen and hydrogen gases are reacted together.

a)State any two conditions necessary for ammonia to be formed in the Harber process. (1mk)

- b) Nitrogen and hydrogen must be purified before they are reacted. Give a reason.(1mark)
- c) Other than manufacture of fertilizers state one use of ammonia. (1mark)
14. Describe how you would prepare crystals of potassium sulphate starting with 100cm³ of 0.5M potassium hydroxide. (3marks)
15. Distinguish between atomic mass and relative atomic mass. (2marks)
16. Study the diagram below and answer the questions that follow:



- a) Name one chemical property of hydrogen being demonstrated in the set-up above.
- i) Chemical property. (1mark)
- ii) Write a chemical equation for the reaction taking place. (1mark)
- b) Name any other substance that can be used in place of concentrated sulphuric (VI) acid. (1mark)
- c) Give a reason why it is necessary to burn the hydrogen gas as shown in the set-up.(1mark)
17. The diagram below shows a simple distillation to separate water and ethanol.



- a) State one of the conditions for the above process to take place. (1mark)

b) Ethanol collected is 95% pure. Secondary distillation is carried out in which calcium metal is placed in ethanol to react with water. Give a reason why the following cannot be used. **(2marks)**

- i. Sodium
- ii. Copper

18. A solution of potassium chloride was added to a solution containing a lot of lead (II) nitrate. A precipitate that weighed 5.56g was formed. Find the amount of potassium chloride in the solution **(3marks)**

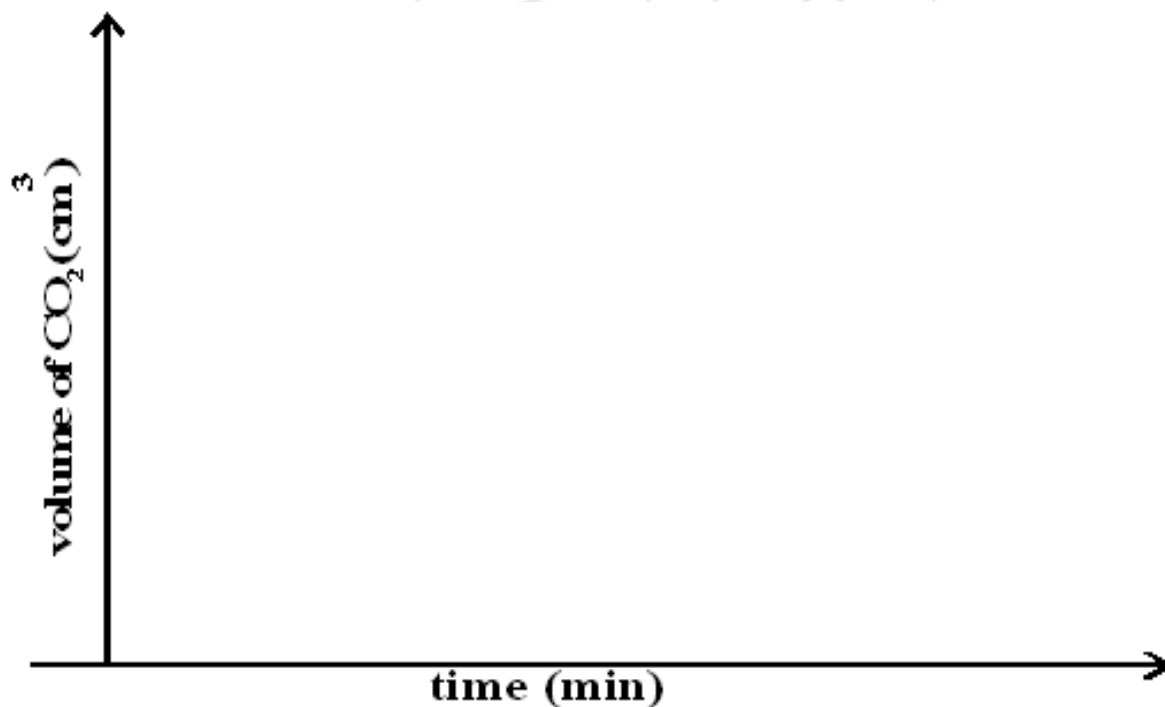
1. 1.9g of Magnesium chloride was dissolved in water. Silver nitrate solution was added till excess. Calculate the mass of silver nitrate that was added for complete reaction.

(MgCl₂ = 95, N=14, O=16, Ag = 108) **(3marks)**

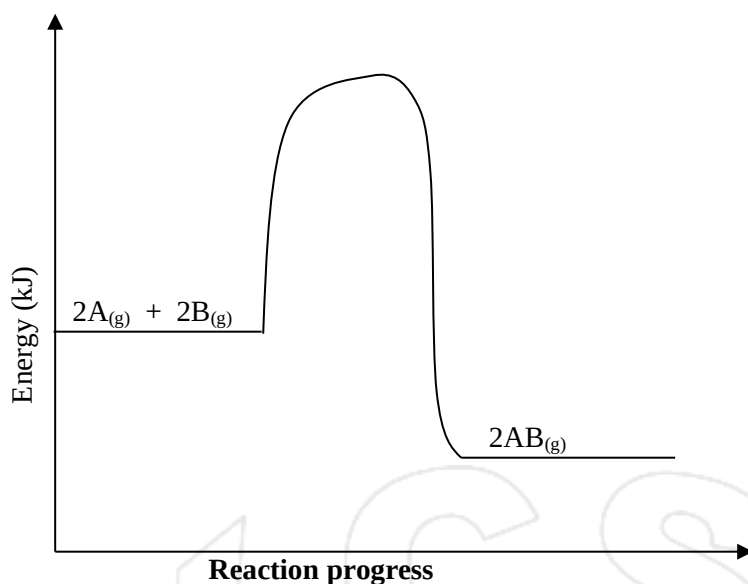
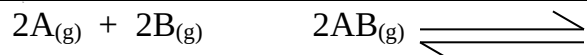
20. In an experiment 40cm³ of 0.5M nitric acid was reacted with excess Sodium Carbonate and the volume of Carbon (IV) Oxide produced recorded with time. In another experiment, the same volume and concentration of ethanoic acid was reacted with excess Sodium Carbonate and the volume of Carbon (IV) Oxide produced recorded with time.

a) Why was Sodium Carbonate used in excess? **(1marks)**

b) On the graph below sketch and label the curves of the volumes of Carbon (IV) Oxide produced against time. **(2marks)**



21. The figure below is an energy level diagram for the reaction.



Explain how the following conditions would affect the yield of AB.

(i) Increase in pressure. (2marks)

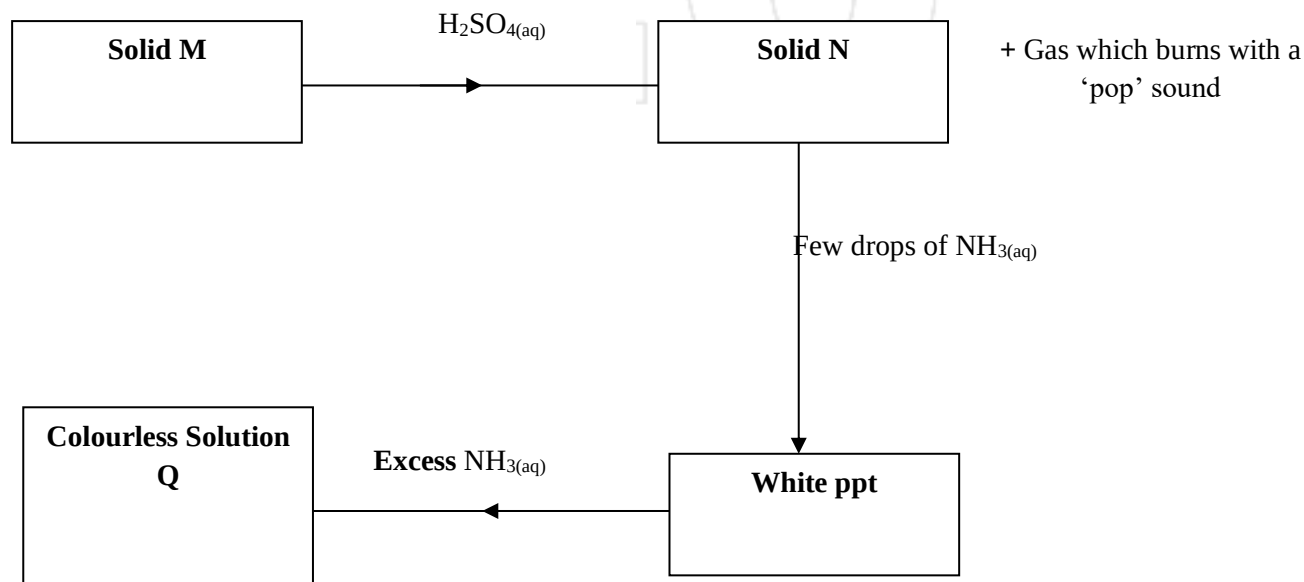
(ii) Decrease in temperature. (2marks)

22. A white solid K was heated. It produced a brown gas **A** and another gas **B** which relights a glowing splint. The residue left was yellow even after cooling.

a) Identify gases **A** and **B**. (2marks)

b) Write a balanced chemical equation for the decomposition of solid K. (1mark)

23. The scheme below shows some reaction sequence starting with solid M.



a) Name solid M. (1mark)

b) Write the formula of a complex ion present in solution Q. (1mark)

c) Write an ionic equation of the reaction between barium nitrate and solution N. (1mark)

24. (a) What is meant by a saturated solution? (1mark)

(b) In an experiment to determine the solubility of solid Y in water at 30°C the following results were obtained.

Mass of evaporating dish = 26.2g

Mass of evaporating + saturated solution = 42.4g

Mass of evaporating dish + dry solid Y = 30.4g

Using the information, determine the solubility of solid Y at 30°C. (2marks)

25. Compare the electrical conductivity of dilute Sulphuric (VI) acid and concentrated Sulphuric (VI) acid. Explain your answer. (2marks)

26. Draw a well labelled diagram of a setup used to prepare and collect dry Sulphur IV oxide. (3marks)

27. The molar heat of formation of carbon (II) oxide is -105kJmol^{-1} , molar heat of combustion of carbon is -393kJmol^{-1} . By using an energy cycle diagram, determine the molar heat of combustion of carbon (II) oxide (3marks)

28. In an experiment, a small amount of charcoal was added into a test tube and 5cm^3 of concentrated nitric (V) acid added, then warmed.

(i) State the observation that was made. (1mark)

(ii) Explain the observation made in (i) above. (1mark)

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

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 5**

233/2

CHEMISTRY**PAPER 2**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

1. Write your name and admission number in the spaces provided above.
2. Sign and write the date of the examination in space provided.
3. Answer ALL the questions in the spaces provided in the question paper.
4. All working MUST be clearly shown where necessary.
5. Mathematical tables and silent electronic calculators may be used.

FOR EXAMINER'S USE ONLY

QUESTION	CANDIDATE'S SCORE
1	
2	
3	
4	
5	
6	
7	
TOTAL SCORE	

Answer ALL the questions in the spaces provided

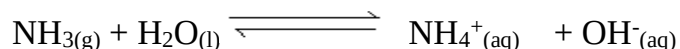
1. (a) Define the following terms:

i) Strong bases (1mk)

ii) Amphoterism (1mk)

iii) Solubility (1mk)

b) Using the equation below, identify the species that acts as the base in the forward reaction. Give a reason. (2mks)



c) A solution of ammonia gas in water causes a greater deflection of the ammeter while a solution of ammonia gas in methylbenzene does not cause deflection. Explain this observation. (1mk)

d) Write a well-balanced chemical equation for the reaction between sodium hydroxide solution and zinc oxide. (1mk)

e) Explain how hard water is softened by ion exchange method. (2mks)

f) The table below gives the solubilities of sodium chloride and sodium sulphate at 0°C and 40°C.

Substance	Solubility in g/100g of water	
	0 °C	40 °C
Sodium chloride	55	75
Sodium sulphate	10	12

When an aqueous mixture containing 60g of sodium chloride and 7g of sodium sulphate in 100g of water at 80 °C was cooled to 0 °C, some crystals were observed.

i) Identify the crystals and determine the mass of the crystals formed. (2mks)

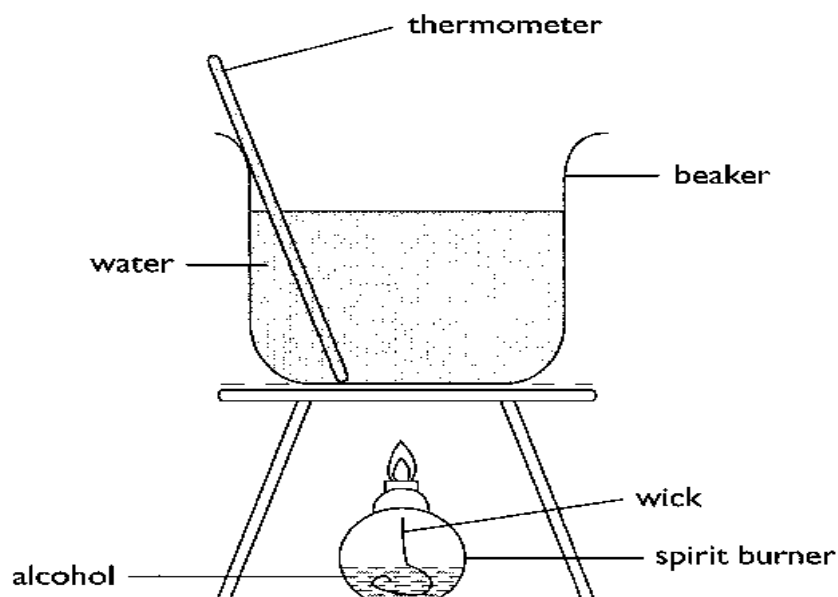
ii) Name the method used to obtain the crystals. (1mk)

2. a) Define

i) Molar heat of combustion. (1mk)

ii) Heating value of a fuel. (1mk)

b) In an experiment to determine the heat of combustion of ethanol. $\text{CH}_3\text{CH}_2\text{OH}$, a student set up apparatus as shown in the diagram below. Study the set up and the data and answer the questions that follow.



Volume of water	=	100cm ³
Final temperature of water	=	36.0 ⁰ c
Initial temperature of water	=	22.0 ⁰ c
Final mass of lamp an ethanol	=	84.75g
Initial mass of lamp and ethanol	=	85.10g
Density of water	=	1 g/cm ³ (Specific heat capacity of water = 4.2kJKg ⁻¹ K ⁻¹)

i) Calculate:

I) Number of moles of ethanol used in this experiment. (C=12, O=16, H=1) (1 mk)

II) The amount of heat given out in this experiment. (2mks)

III) The heat of combustion per mole of ethanol. (1 mk)

ii) Write a thermochemical equation for the combustion of ethanol. (1 mk)

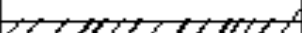
iii) Explain how the molar heat of combustion for ethanol obtained above differs with the theoretical value. (2mks)

iv) State one precaution that should be adhered to when carrying out this experiment. (1mk)

v) In this experiment an assumption that links ethanol and water is made. State the assumption. (1 m)

vi) Draw an energy level diagram for the combustion of ethanol. (2mks)

3. The figure below represents a section of the periodic table. Study it and answer the questions that follow. Note that the letters do not represent the actual symbols of the elements.

A								D		
B					G	J		F	H	E
C								I		

(a) Consider elements H and I.

(i) Explain why the atomic radius of element H is smaller than its ionic (1mk)

(ii) When element H was dissolved in water and blue litmus papers dipped, the colour of the litmus paper changed from blue to red to white. Explain. (2mks)

(iii) Explain what is likely to be observed when element H is bubbled through a solution containing the ions of element I. (2mks)

(b) Compare the atomic radius of elements G and J. Explain the difference. (2mks)

(c) Use dot and cross diagram to show bonding in a compound of B and H. (1mk)

(d) G chloride has an unexpected bond type and structure. State the type of bond and the structure.

Bond type (1mk)

Structure (1mk)

(e) A piece of blue litmus paper is placed in a solution of B chloride and a solution of G chloride. Explain what would be observed in each case.

(i) B chloride solution (1mk)

(ii) G chloride solution (1mk)

4. In an experiment to study the rate of reaction, 2.5g of copper (II) sulphate crystals were added to a given mass of zinc granules and 100cm³ dilute hydrochloric acid at 27°C. The volume of hydrogen released was measured at 10 second intervals. The results obtained are tabulated below.

Time (seconds)	0	10	20	30	40	50	60	70	80	90
Volume (cm ³)	0	60	85	105	114	116	118	122	122	122

a) Why were the following not used in the reaction?

i) Nitric (V) acid (1mk)

ii) Iron powder (1mk)

b) On the grid below plot a graph of volume of gas against time and label it X (3mks)

i) Use the graph to calculate the rate of reaction at t=25seconds (2mks)

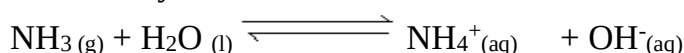
ii) Explain why the volume of gas produced does not exceed 122cm³ (1mk)

iii) Sketch graph Y on the same grid to show the results if the experiment is repeated at 20°C. (1mk)

iv) How does the catalyst used (copper (II) sulphate) speed up the reaction? (1mk)

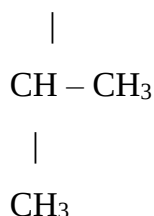
c) i) State Le'Chatelier's principle. (1mk)

ii) What is the effect on the position of equilibrium when dilute hydrochloric acid is added to the closed system of the reaction below (1mk)



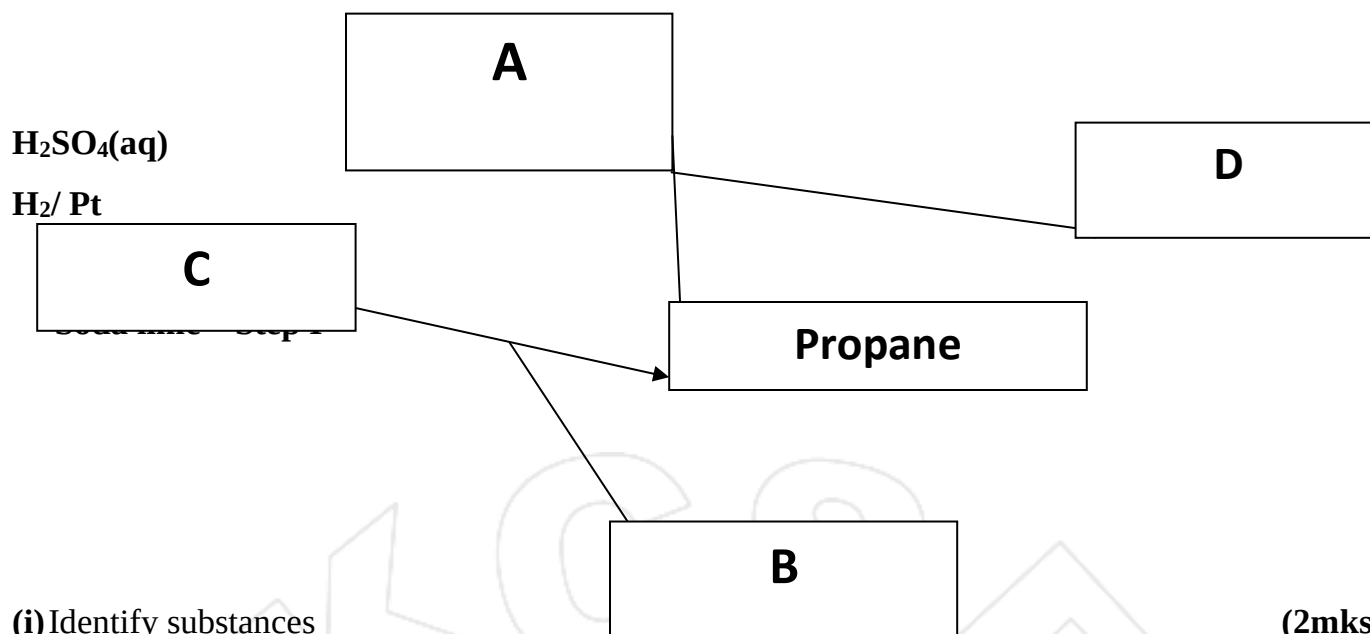
5. (a) Give the IUPAC names of the following organic compounds. (2 mks)

(i) CH₃ – CH₂ – CH – CH₃



(ii) CH₃ – C ≡ C – CH₃

(b) Study the flow chart below and answer the questions that follow:



(i) Identify substances

(2mks)

A
B
C
D

(ii) State how substance A and propane could be distinguished chemically. (1 mk)

(iii) Give the components of soda lime in step I (2mks)

(iv) What is the industrial application of the process that converts substance A to propane? (1mk)

(c) In the laboratory propene can be prepared using propanol, broken porcelain and sodium hydroxide. State the use of broken porcelain and sodium hydroxide solution

Broken porcelain (1mk)

Sodium hydroxide solution (1mk)

6. a) Draw a fully labeled diagram of the apparatus you would use to electrolyse an electrolyte in the aqueous state. (3mks)

b) Explain why crystals of sodium chloride are non-conductors of electricity but when melted they conduct electric current more readily. (2mk)

c) Answer the following questions in relation to the electrolysis of molten lead (II) iodide.

i) State what happens to molten lead (II) iodide when an electric current is passed through it.

(1mk)

ii) At what electrode is a metal formed? Write an equation to show how the metal is formed.

(2mks)

iii) Why is it necessary to carry out this experiment in a fume chamber? (1mk)

iv) What is a binary electrolyte? (1mk)

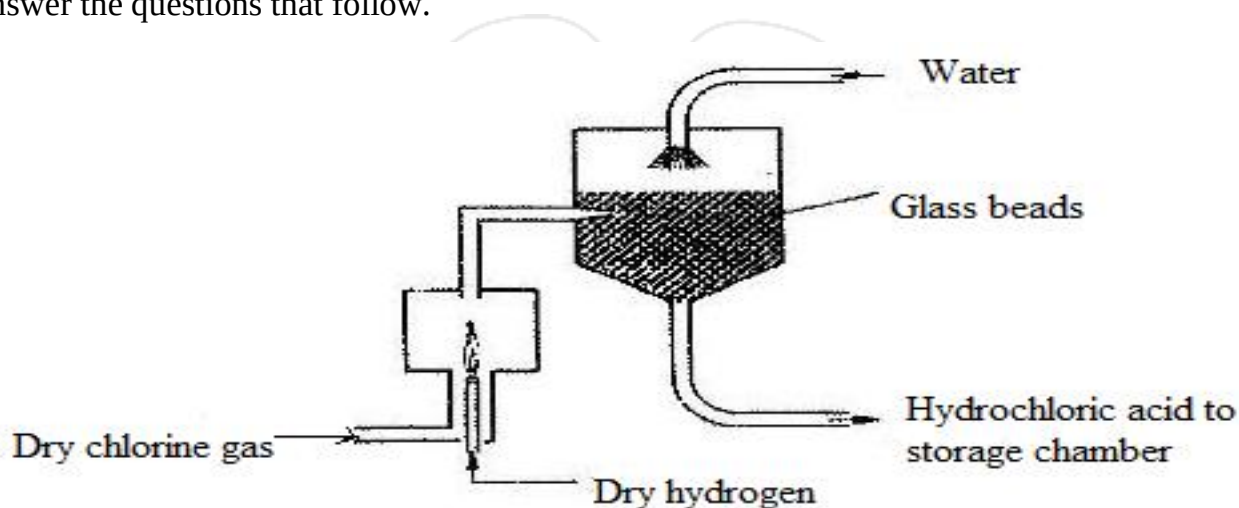
c) Give the application of electrolysis in

i) Chemical manufacturing industry (1mk)

ii) Metal extraction industries (1mk)

iii) Jewellery e.g. necklaces manufacturing industries (1mk)

7. The diagram below represents the industrial manufacture of hydrochloric acid. Study it and answer the questions that follow.



a) Name the main source of hydrogen in this process. (1mk)

b) The reaction between chlorine and hydrogen can be very explosive. How can this be avoided? (1mk)

c) What is the role of glass beads in the absorption chamber? (1mk)

d) Explain why the storage chamber for hydrochloric acid is made up of steel lined with rubber. (1mk)

e) The acid obtained is 35% pure. Calculate its molarity, given that at 25°C, the density of the acid is 1.08g/cm³ (H=1, Cl=35.5) (3mks)

f) Explain why hydrochloric acid is not used to acidify potassium manganate (VII) solution. (1mk)

KCSE 2026 FINAL PREDICTIONS

CONFIDENTIAL EXAM 6

233/1

CHEMISTRY

PAPER 1

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES

- Write your **name** and **Admission number** in the spaces provided.
- Answer **all** the questions in the spaces provided.
- Mathematical tables and electronic calculators may be used
- All working **MUST** be clearly shown where necessary.

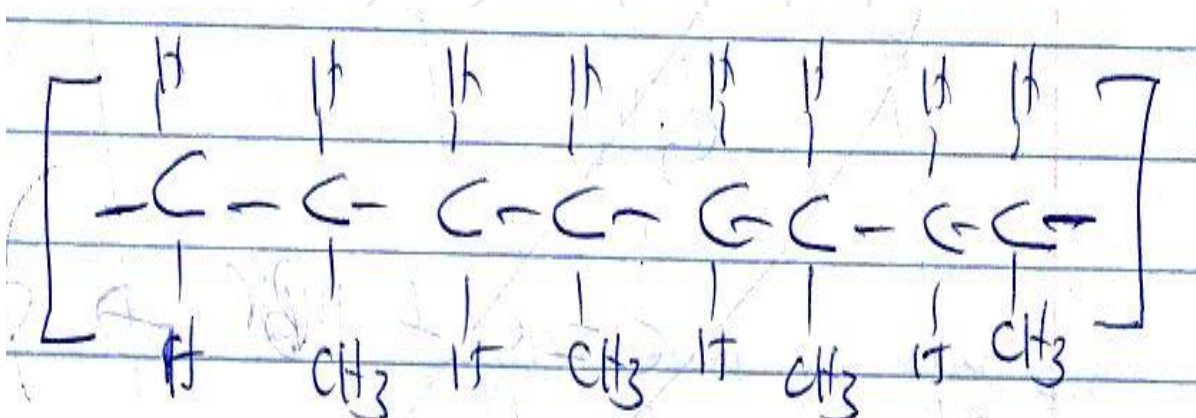
For Examiner's Use Only:

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1-25	80 MARKS	

Answer **all** the questions in the spaces provided.

- 1[a]** State Boyle's law [1mk]
- [b]** At 400°C, 850cm³ of a gas exert a pressure of 560mmHg. What volume of the same gas would exert a pressure of 640mmHg at the same temperature? [3mks]
- 2.** When burning magnesium is lowered into a gas jar containing nitrogen (I) oxide, it continues to burn forming a white solid
- [a]** Name the white solid [1mk]
- [b]** Write a chemical equation of the reaction that occurred [1mk]
- 3.** Carbon {IV} oxide is one of the gases used in fire extinguishers
- [a]** State any other possible use of carbon {IV} oxide [1mk]
- [b]** Name any two reagents that can be reacted together to generate carbon {IV} oxide [2mks]
- 4.** Rusting is a process that causes massive destruction of iron structures
- [a]** State one condition that accelerates rusting [1mk]
- [b]** State one advantage of rusting [1mk]
- 5.** At 60°C, 38 grams of lead{II} nitrate saturate 56cm³ of water. Determine the solubility of lead {II} nitrate at this temperature [2mks]
- 6.** Explain why molten sodium chloride conducts electricity, but solid sodium chloride does not [2mks]

7. A polymer can be represented as



- [a]** Name and draw the structure of the monomer [2mks]
- [b]** What type of polymerization occurs in the above case? [1mk]
- [c]** Given that the molecular mass of the polymer is 25620, how many units of the monomer make the polymer [2mks]

8. A reaction can be represented as;



Given the bond energies of C-H, C=C, C-C, C-Br, and H-Br as 20kJ/mol, 580KJ/mole, 446KJ/mole, 438KJ/mole and 396kJ/mole respectively. Determine the heat of formation of

$\text{C}_2\text{H}_5\text{Br}$ [3mks]

9[a] Define the term, dynamic equilibrium [1mks]

[b] A reaction at equilibrium can be represented as



Yellow

orange

State and explain the observation made when;

[i] NaOH is added to the equilibrium mixture [2mks]

[ii] HCl is added to the equilibrium mixture [2mks]

10. During the electrolysis of dilute copper {II} chloride using carbon electrodes, a current of 1.5A was passed through the solution for 2 hours and 30 minutes

[a] Write the ionic equation of the reaction that occurred at the cathode [1mk]

[b] Given R.A.M of copper = 64 and 1F = 96500C, calculate the change in mass of the cathode [3mks]

11.[a] Define the term half-life [1mk]

[b] Name two particles likely to be emitted when a radioactive nuclide undergoes radioactivity [2mks]

[c] The half-life of a radioactive nuclide is 3 hours. Given that its initial mass is 288g, determine the remaining mass after 12 hours. [2mks]

12. The reduction potentials of elements M and N are;



Using the above reduction potentials, predict whether a reaction would occur between

$\text{N}^+[\text{aq}]$ and $\text{M}[\text{s}]$ [3mks]

13. An hydrocarbon can be represented as: C_2H_2

[a] Name the hydrocarbon [1mk]

[b] State two reagents that can be reacted together to generate the hydrocarbon [2mks]

[c] Identify the group of hydrocarbons into which C_2H_2 belongs to [1mk]

14.[a] Name two allotropes of sulphur [2mks]

[b] In an experiment to investigate a certain property of sulphur, Maina added few drops of conc HNO_3 to sulphur in a test tube and warmed the mixture

[i] State one observation made [1mk]

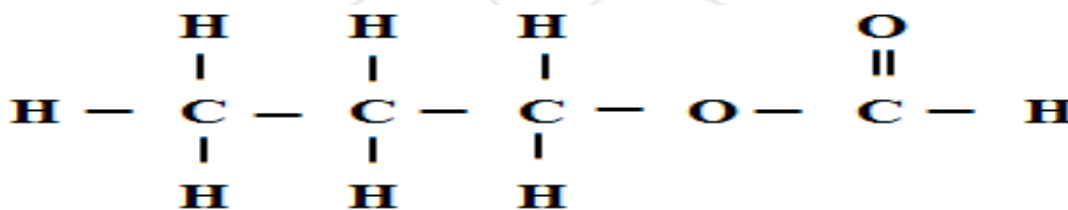
[ii] Write a chemical equation of the reaction that occurred [1mk]

15. Chlorine is commonly used in the manufacture of $Ca(OCl)_2$

[i] State one use of the above compound of chlorine [1mk]

[ii] Write a chemical equation leading to the production of $Ca(OCl)_2$ [1mk]

16. A compound can be represented as



[a] What name is given to the above class of compounds [1mk]

[b] Name two reagents that can be reacted together to generate the above compound [2mks]

[c] State two conditions necessary for the reaction leading to formation of the above compound to occur [2mks]

17. Using dots and crosses, show bonding in carbon{II} oxide [2mks]

18. When 20g of a compound containing carbon, hydrogen and oxygen was burnt in the air, 29.3g of carbon{IV} oxide and 11.7g of water were produced. Determine its empirical formulae. {C=12, H=1, O=16} [3mks]

19. Few drops of hydrochloric acid were added into a test tube containing lead {II} Nitrate solution

{a} State one observation made [1mk]

{b} Write an ionic equation of the reaction that occurred in the test tube [1mk]

20. In the industrial manufacture of Ammonia one of the raw materials is nitrogen gas

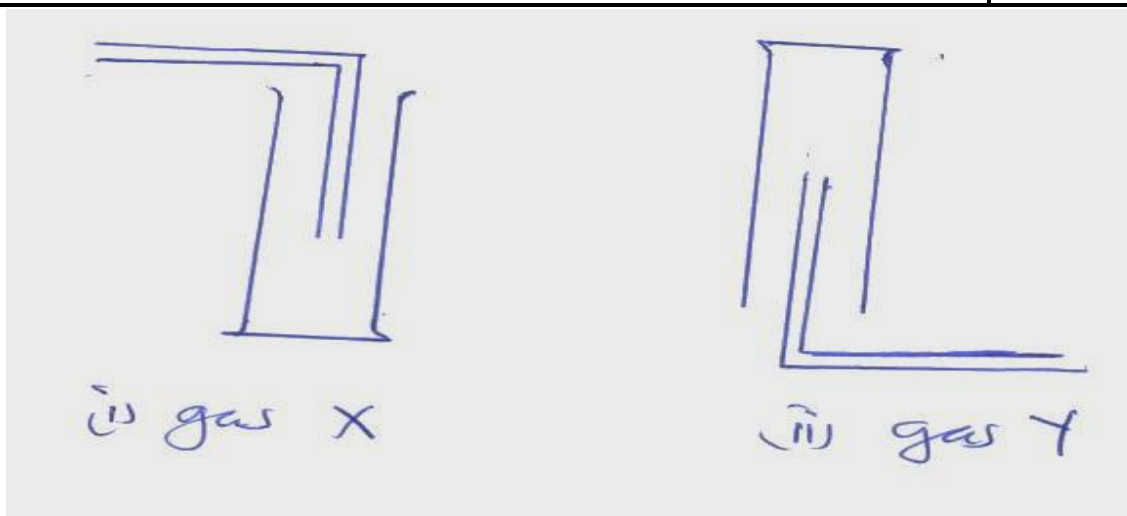
{a} Name one other raw material [1mk]

{b} Name two possible sources of the raw material you have named in {a} above [2mks]

{c} Name two substances that can be used as catalyst in this process [2mks]

{d} State one use of ammonia [1mk]

21. Gas X and Y can be collected as shown below



- [a] Name the method used to collect gas Y [1mk]
- [b] How do densities of gas X and gas Y compare? [1mk]
- [c] Give an example of a gas that can be collected using the same method as gas Y [1mk]
22. Element W has two isotopes W – 36 and W-40 which occur in the ratio $x:4$. Given that R.A.M of W is 37.25, find the value of x [2mks]
23. Describe an experiment that can be used to determine whether a given sample of a liquid is pure [2mks]
24. A given mass of gas T diffuses through a porous plug in 48 seconds while a similar mass of gas R diffuse in 70 seconds. Given that the density of gas T is 0.6g/cm^3 , find the density of gas R [2mks]
25. The electron configuration of elements A, B, C, D and E are as given below

Element	Electron configuration
A	2, 8, 1
B	2, 8
C	2, 7
D	2, 8, 6
E	2, 8, 3

- {a} Which element has the highest electrical conductivity [1mk]
- {b} Which letter represents the most reactive metal [1mk]
- {c} Which letter represents the most reactive non-metal [1mk]

KCSE 2026 FINAL PREDICTIONS

CONFIDENTIAL EXAM 6

233/2

CHEMISTRY

PAPER 2

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES:

- Write your **name** and **admission 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

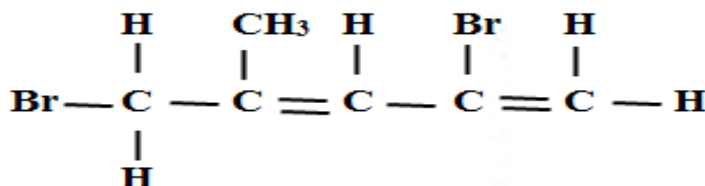
Question	Maximum score	Candidate's score
1	14	
2	12	
3	11	
4	12	
5	9	
6	12	
7	10	
Total	80	

Answer **all** the questions in the spaces provided

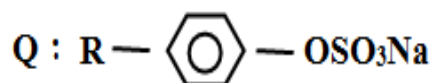
1. The grid below shows a section of the periodic table, the letters are not the actual chemical symbol.

K	L			M		N	P
	Q			R	S	T	V
W							

- a) Name the family into which element P belongs to (1mk)
- b) Which two elements forms the most soluble carbonates (2mks)
- c) With a reason, identify elements in period 3 with the largest atomic radius (2mks)
- d) Write the formula of the compound formed between Q and M (1mk)
- e) State two uses of element R and for each use, state property of element R that makes its possible for the use
- (i) Use (1mk)
Property (1mk)
- (ii) Use (1mk)
Property (1mk)
- f) Using dots and cross, show bonding in the compound formed between R and oxygen (2mks)
- g) In terms of structure and bonding explain why the oxides of element T has relatively low boiling points (2mks)
- 2.(a) Name the following compounds (3mks)
- (i) $\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$
- (ii)



- b) Two types of detergents P and Q can be represented as



(i) Identify each type of the detergent

(2mks)

P.....

Q.....

(ii) Which of the two detergents is the best to use with hard water? Give a reason

(2mks)

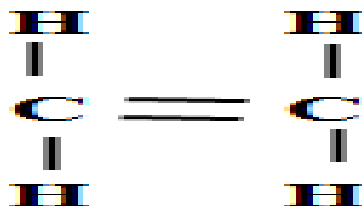
(iii) State one advantage of detergent P

(1mk)

(iv) State one disadvantage of detergent Q

(1mk)

(c) An hydrocarbon can be represented as follows



(i) Identify the hydrocarbon

(1mk)

(ii) Name two reagents that can react together to generate the hydrocarbon

(2mks)

3. (a) Name two apparatuses that can be used for determining mass in a laboratory

(2mks)

(b) One of the flames produced by Bunsen burner is the luminous flame

i) Explain why this flame is very bright

(1mk)

ii) State two disadvantages of the luminous flame

(2mks)

(c) Air is usually one of the substances that is considered as a mixture

(i) Identify the two most abundant components of air

(2mks)

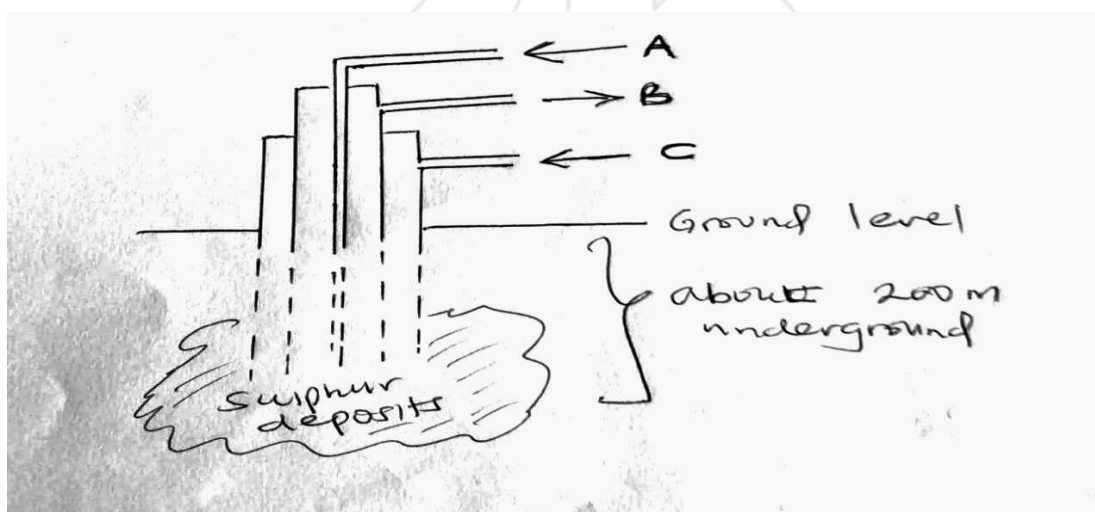
(ii) Give two reasons why the air is considered as a mixture

(2mks)

(iii) One of the components of air is carbon (iv) oxide. Describe an experiment that can be used to prove the presence of carbon (iv) oxide in the air

(2mks)

4.(a) The diagram below shows the process used to obtain Sulphur from underground deposits



i) Name the above process used to obtain sulphur from the underground deposits

(1mk)

ii) Name the substance passed through pipe

A

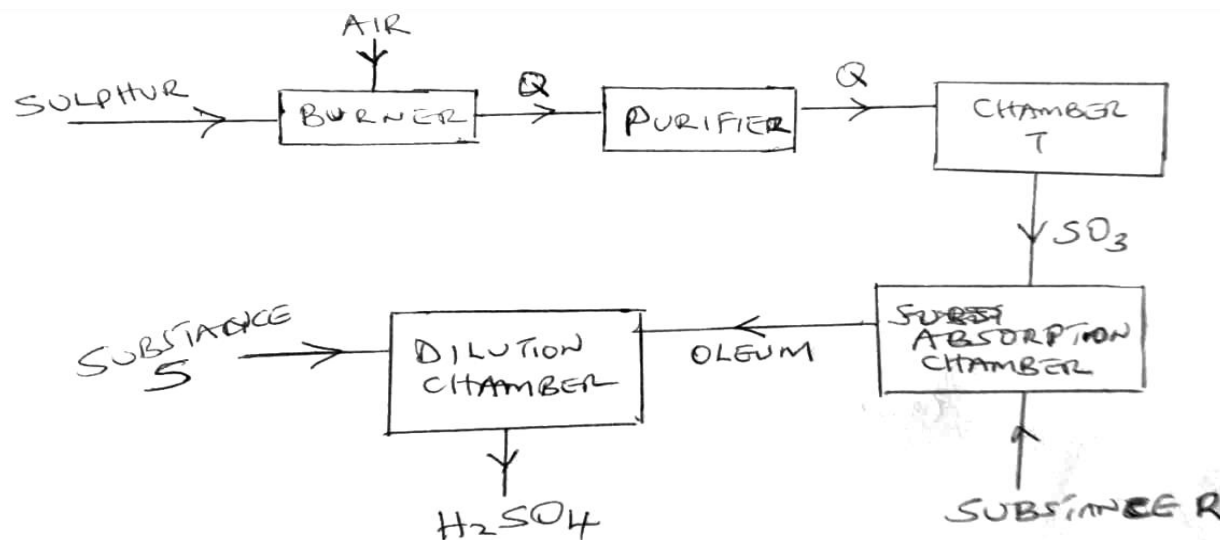
(1mk)

B

(1mk)

iii) State two properties of Sulphur that makes it possible to extract using the above process (2mks)

b) The diagram below shows the contact process used in the manufacture of concentrated sulphuric(VI) acid



i) Identify the following:

a) Substance Q formed in the burner (1mk)

b) Chamber T (1mk)

c) Substance R (1mk)

d) Substance S (1mk)

ii) Write the chemical equation occurring in the dilution chamber (1mk)

iii) Why is it necessary to pass substance Q through a purifier (1mk)

iv) State one use of sulphuric (VI) acid (1mk)

5.(a) Calamine is one of the ores from which zinc can be extracted from

(i) Name any other ore from which zinc can be extracted from (1mk)

(ii) The calamine is usually decomposed by heating to obtain substance M as shown below



Identify substance M (1mk)

(iii) Identify two methods that can be used to obtain zinc from substance M (2mks)

(b) During the extraction of zinc, name two gases likely to be emitted into the air and that are likely to cause pollution (2mk)

(c) State one likely pollution effect of each of the gases you have mentioned in (a) above (2mks)

(d) State one possible use of zinc metal (1mk)

6.(a) Define the term electrolysis (1mk)

(b) State two functions of a salt bridge during electrolysis **(2mks)**

(c) The reduction potential of elements K, L, M, and P are as given below.



(i) Which letter represents the, strongest reducing agent? give a reason **(2mks)**

(ii) Which two letters represent elements whose half cells would form an electrochemical cell with the largest e.m.f? **(1mk)**

(iii) Calculate the e.m.f of the cell formed in **(ii)** above **(2mks)**

(d) During the electrolysis of a molten chloride of metal Q, a current of 0.25A was passed though the molten chloride for 2 hours and 10minutes. Given that 0.9grams of metal Q were deposited at the cathode.

(i) Calculate the quantity of electricity passed **(1mk)**

(ii) Charge carried by the ions of metal Q given that R.A.M of metal Q is 84 **3mks)**

7 (a) Starting with magnesium oxide, describe how you can obtain a dry sample of magnesium Carbonate **(3mks)**

(b) (i) Give one example of an acid salt **(1mk)**

(ii) When sodium nitrate was heated a solid A and gas B were produced identify solid A and gas B **(2mks)**

(iii) State two uses of gas B produced in (ii) above **(2mks)**

(c) State two factors that should be considered when choosing a fuel **(2mks)**

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 7**

233/1

CHEMISTRY**PAPER 1**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

- 1) Write your name and Index Number in the spaces provided above.
- 2) Sign and write date of examination in the spaces provided above.
- 3) Answer **all** questions in the spaces provided in the question paper.
- 4) KNEC Mathematical tables and silent non-programmable electronic calculators may be used.

FOR EXAMINERS USE ONLY

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	Grand Total								

Answer **all** questions in the spaces provided

1. Silicon and carbon are both group IV elements. Silicon (IV) oxide is a solid at room temperature which melts at 1973K while carbon (IV) oxide is a gas and melts at 217K. In terms of structure and bonding, explain the difference. **(2 marks)**

2. When sodium carbonate is added to a solution containing $\text{Al}^{3+}_{(\text{aq})}$ ions, effervescence is observed. Explain **(2 marks)**

3. An element Q can be represented as $^{40}_{20}\text{Q}$ (Q is not the actual symbol of the element)

(a) Write the electron configuration of Q **(1 Mark)**

(b) To which group and period does Q belong? **(1 Mark)**

(c) Write the formula of the ion of Q. **(1 Mark)**

4. (a) Sketch a graph demonstrating Charles' law. **(2 Marks)**



(b) A fixed mass of a gas has a volume of 250cm^3 at a temperature of 27°C and 750mmHg pressure. Calculate the volume the gas would occupy at 42°C and 750mmHg. **(2 Marks)**

5. The table below shows the trend in ionization energy for elements M, N and L. Use it to answer the questions that follows.

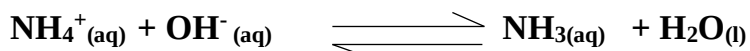
Element	First Ionization energy (kJ)
M	494
N	519
L	418

(a) Define ionization energy. **(1 Mark)**

(b) Which element has the smallest atomic radius? (1 Mark)

(c) Which is the most reactive element? Explain. (2 Marks)

6. Identify acids and bases in the following reaction using Bronsted-Lowry theory. (2 Marks)



Acids:

Bases:

7. (a) State Graham's law of diffusion. (1 Mark)

(b) 50cm³ of oxygen gas diffused through a porous plug in 80 seconds. How long will it take 100cm³ of carbon (IV) oxide gas to diffuse through the same plug? (3 Marks)

8. When hydrogen sulphide gas was bubbled into an aqueous solution of iron (III) chloride, a yellow precipitate was formed.

(a) State another observation that was made. (1 Mark)

(b) Explain the observation above. (1 Mark)

(c) Write an equation for the reaction that took place. (1 Mark)

9. Using equations, explain the observations made at the electrodes when an electric current is passed through molten Aluminium oxide. (3 Marks)

10. In a titration experiment, a student was provided with the following:-

– **Solution R** which was 0.408M HCl

– **Solution S** containing 6.9g of a metal carbonate **M₂CO₃** in 250cm³ solution

Upon titration, 24.5cm³ of solution R was required to completely neutralize 25cm³ of solution S.

Determine the following.

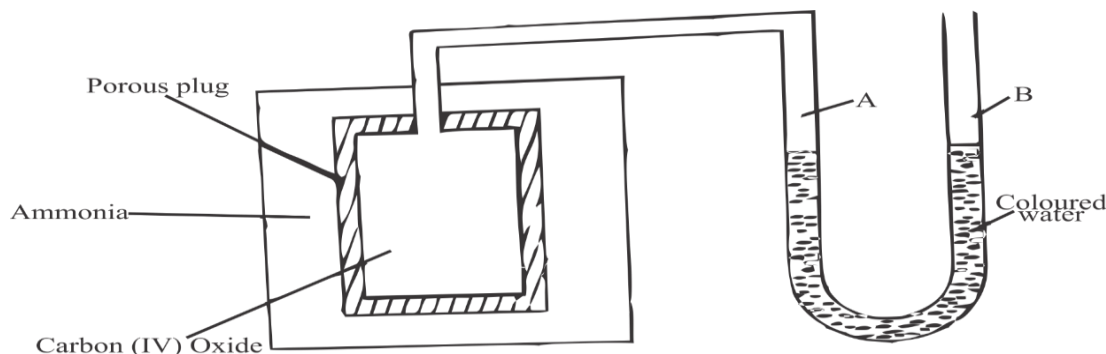
(a) Molarity of solution S (2 Marks)

(b) Formula mass of **M₂CO₃** (2 Marks)

(c) Relative atomic mass of **M** (1 Mark)

11. Compounds A and B have the same molecular formula C₃H₆O₂. Compound A liberates carbon (IV) oxide gas on addition of aqueous sodium carbonate while compound B does not. Compound B has a pleasant smell. Name and draw the structural formulae of A and B. (4 Marks)

12. The set up below was used by a form 3 student to study the difference in rates of diffusion between ammonia (NH_3) and carbon (IV) oxide (CO_2) gases. Study it and answer the questions that follow.

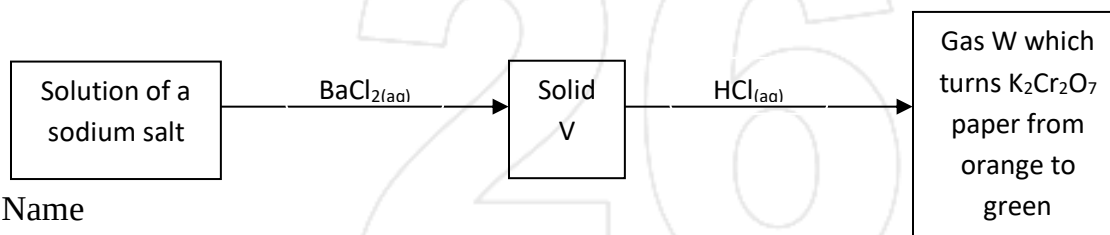


State and explain the observation made on the level of coloured water in the arms A and B on the U tube as the experiment progressed. **(3 Marks)**

13. 2.1g of a compound of carbon and hydrogen burns to form 6.6g of carbon (IV) oxide and 2.7g of water.

- Determine the empirical formula of this compound (C=12, H=1, O=16) **(2 Marks)**
- Given that the molecular mass of the compound is 42, determine its molecular formula **(1 mark)**
- To which group of organic compounds does the compound belong? **(1 Mark)**

14. Study the diagram below and answer the questions that follow.



- Name
 - Solid V **(1 Mark)**
 - Gas W **(1 Mark)**
- Write an equation for reaction between solid V and dilute hydrochloric acid. **(2 Marks)**

15. Starting with solid aluminium sulphate, describe how a solid sample of aluminium hydroxide could be prepared. **(3 Marks)**

16. (a) A burning magnesium ribbon continues to burn in a jar of nitrogen gas but a burning splint is extinguished. Explain **(1 Marks)**

(b) Using equations explain what happens when concentrated nitric (V) acid is reacted with wood charcoal. **(2 Marks)**

17. (a) State Gay Lussac's law. **(1 Mark)**

- (b) 10cm^3 of a gaseous hydrocarbon were mixed with 33cm^3 of oxygen gas which was in excess. The mixture was exploded and after cooling to room temperature, the residual volume of gas occupied 28cm^3 . On adding concentrated potassium hydroxide the volume decreased to 8cm^3 .

Work out the molecular formula of the hydrocarbon

(3 Marks)

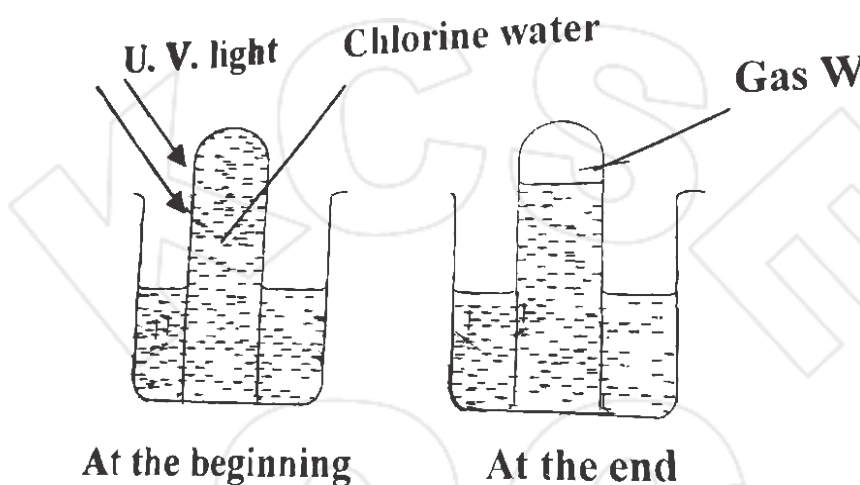
18. (a) What are isotopes?

(1 Mark)

- (b) Lithium has two isotopes ${}^7_3\text{Li}$ and ${}^6_3\text{Li}$. Determine the number of neutrons in ${}^7_3\text{Li}$. **(1 Mark)**

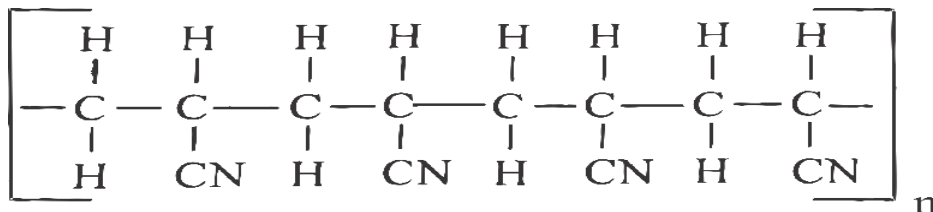
- (c) If the relative atomic mass of lithium is 6.94. Which of the two isotopes is more abundant. Give a reason. **(2 Marks)**

19. The diagram below represents a set of apparatus used to study properties of chlorine water.



- (a) Name two components of chlorine water. **(1 Mark)**
- (b) Write an equation for the reaction that produces gas W. **(1 Mark)**
- (c) The following test was carried out on chlorine water contained in a test tube. A piece of blue flower was dropped in the test tube. Explain why the flower was bleached. **(2 Marks)**

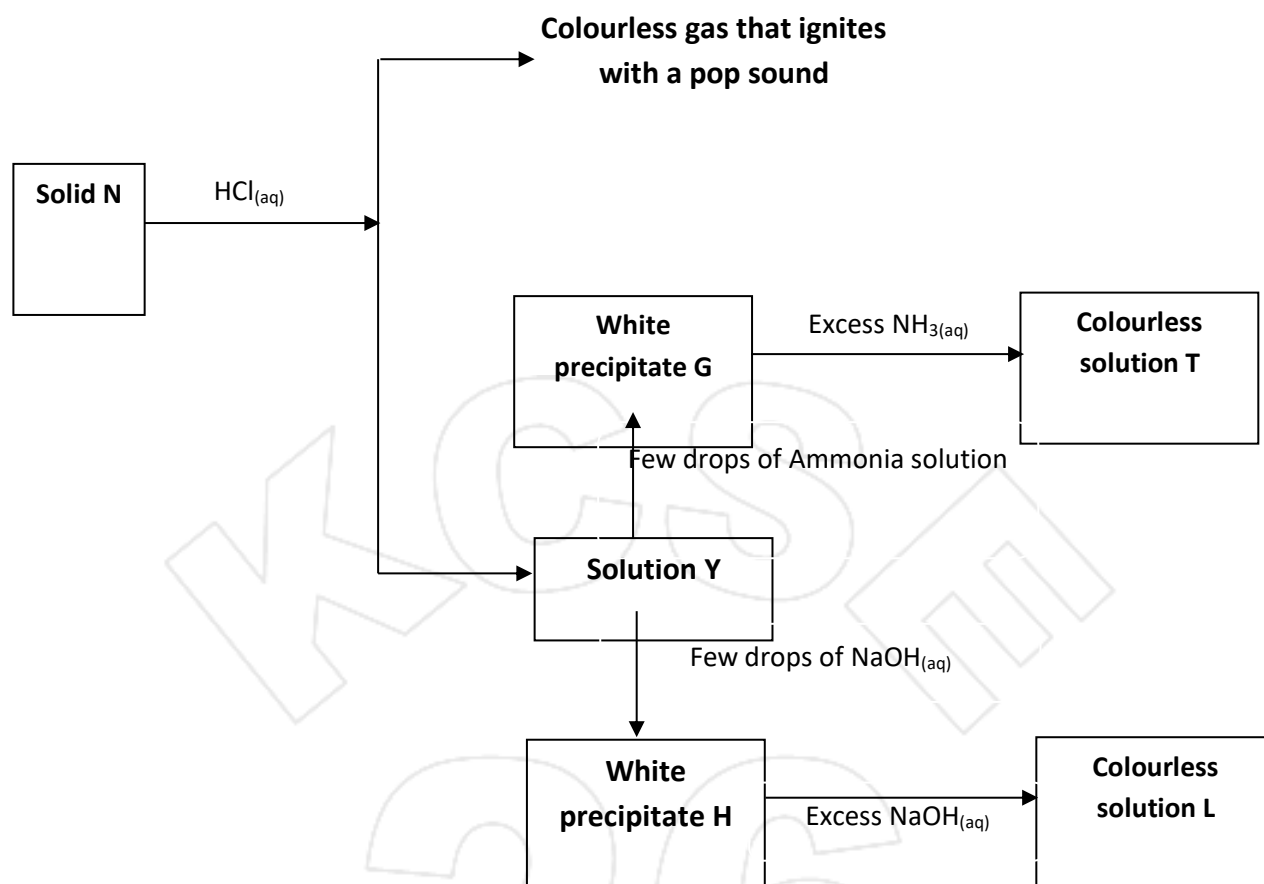
20. The diagram below shows part of a synthetic polymer. Study it and answer the questions that follow.



- (a) Draw the structural formula of the monomer from which the polymer is made. **(1 Mark)**
- (b) A sample of the polymer has a molecular mass of 63600. Calculate the number of monomers in the sample. **(2 Marks)**

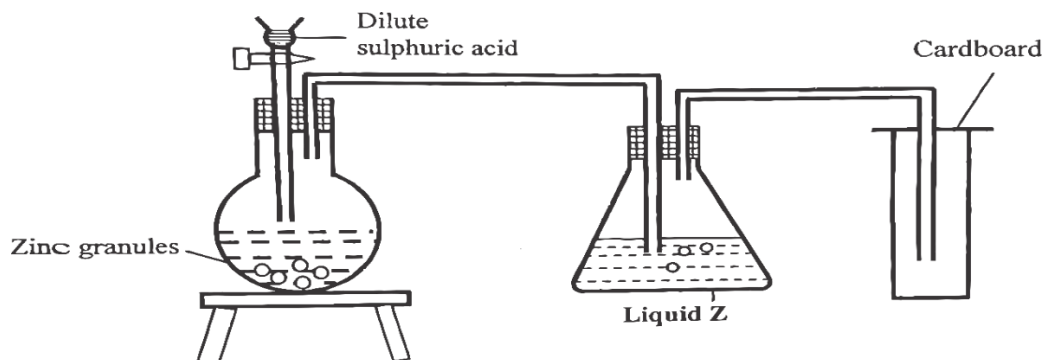
- (c) Methanol has molecular mass of 32 while ethane has a molecular mass of 30. The boiling point of methanol is 65°C while that of ethane is -89°C . Explain (2 Marks)

21. Study the reaction scheme below and answer the question that follows:-



- (a) Name solid N. (1 Mark)
- (b) State the observation that would be made if solution Y is mixed with lead (II) nitrate solution. (1 Mark)
- (c) Write an ionic equation for the formation of the colourless solution T. (1 Mark)
- (d) Name the ion present in colourless solution L. (1 Mark)

22. The setup below was used to prepare dry hydrogen gas. Study it and answer the questions that follow.



- (a) Identify one mistake in the setup above. (1 Mark)
- (b) What is the role of liquid Z? (1 Mark)
- (c) Using an equation give one chemical property of hydrogen gas. (1 Mark)
23. (a) Define solubility. (1 Mark)
- (b) In an experiment to determine the solubility of solid W in water at 40°C, the following results were obtained.
- Mass of empty evaporating dish = 36.2g
 - Mass of evaporating dish + saturated solution = 52.4g
 - Mass of evaporating dish + dry solid W = 40.4g

Use this data to calculate the solubility of W at 40°C. (2 Marks)

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 7**

233/2

CHEMISTRY**PAPER 2**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

1. Write your name and admission number in the spaces provided above.
2. Sign and write the date of the examination in space provided.
3. Answer ALL the questions in the spaces provided in the question paper.
4. All working MUST be clearly shown where necessary.
5. Mathematical tables and silent electronic calculators may be used.

FOR EXAMINERS ONLY

QUESTIONS	CANDIDATE'S SCORE

QUESTION 1

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

								A
					B			
	C			D			E	
	F							

- (i) What name is given to the group of elements to which **C** and **F** belong? (1mk)
- (ii) Explain the difference in reactivity between element **C** and **D** (2mks)
- (iii) Using (.) and cross (x) illustrate the bond between **B** and **E** (2mks)
- (iv) Write a balanced chemical equation for a reaction between element **D** and oxygen gas (1mk)
- (v) On the grid indicate a tick(✓) the position of element **G** which is in the third period of the periodic table and forms G^{3-} ions (1mk)

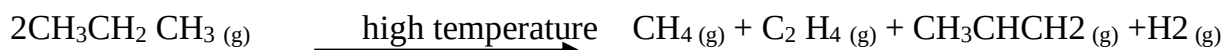
(b) Study the information in the table below and answer the questions that follow: (The letters do not represent the actual symbols of the substance)

Substance	Melting point $^{\circ}\text{C}$	Boiling points $^{\circ}\text{C}$	Solubility in water	Density at room temp in g/cm^3
H	-117	78.5	Very Soluble	0.8
J	-78	-33	Very Soluble	0.77×10^{-3}
K	-23	77	Insoluble	1.6
L	-219	-183	Slightly Insoluble	1.33×10^{-3}

- (i) Which substance would dissolve in water and could be separated from the solution by fractional distillation in the school laboratory (1mk)
- (ii) Which substance is a liquid at room temperature and when mixed with water two layers would be formed. (1mk)
- (iii) Which letter represents substance that is a gas at room temperature and which can be collected (density of air is $1.225 \times 10^{-3} \text{ g/cm}^3$)
- (i) Over water (1mk)
- (ii) By downward displacement of air (1mk)

QUESTION 2

(a) Propane can be changed into methane as shown below:



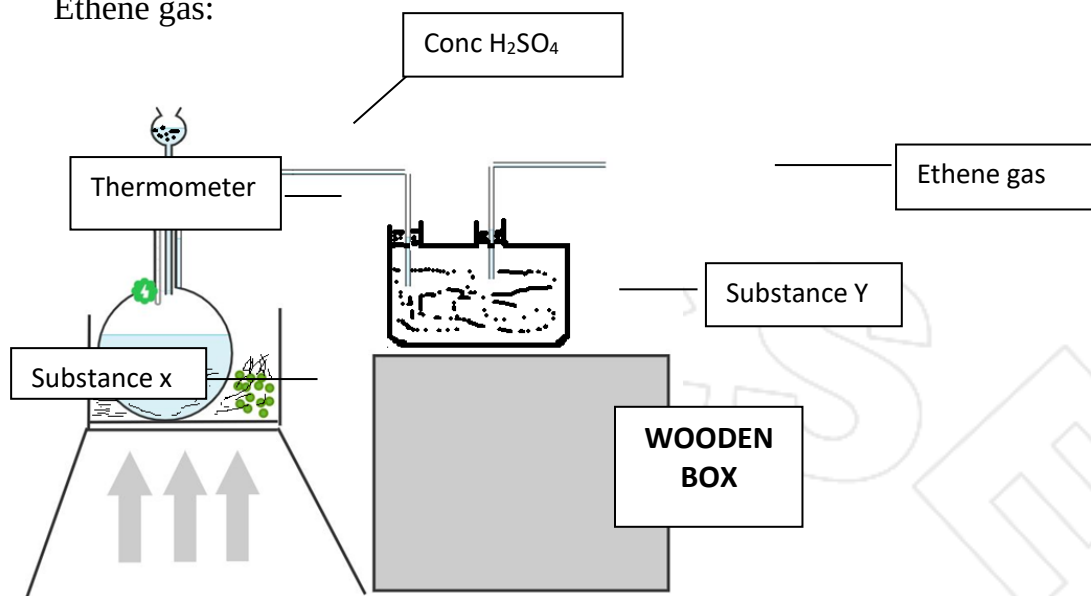
(i) Name the process undergone by propane

(1mk)

(ii) Write the equation of reaction between ethene and chlorine gas and name the product. (2mks)

(b) The diagram below shows an incomplete set-up of the laboratory preparation and collection of

Ethene gas:



HEAT

(i) Complete the diagram to show how Ethene gas is collected. (2mks)

(ii) Name substances X and Y (2mks)

(iii) Apart from being colourless and odourless, state another physical property of ethene. (1mk)

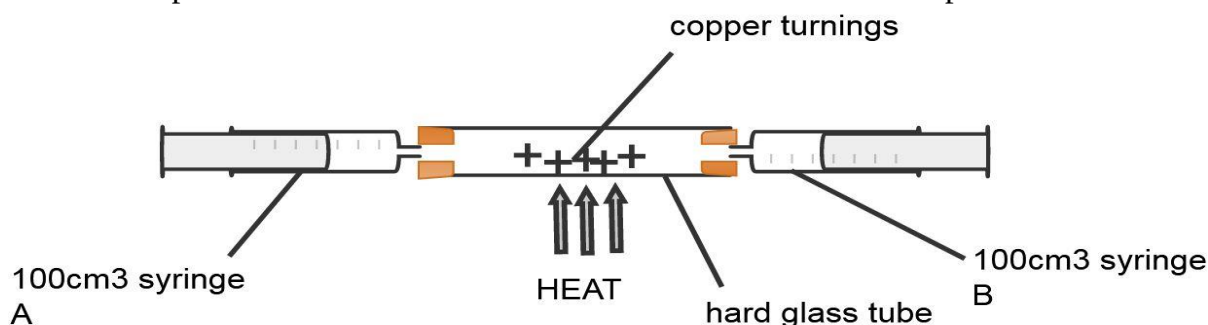
(c). the table below gives information about the major components of crude oil. Study it and answer the questions that follow.

Components	Boiling points ⁰ C
Gases	Below 40
Petrol	40-175
Kerosene	175-250
Diesel oil	250-350
Lubricating oil	350-400
Bitumen	Above 400

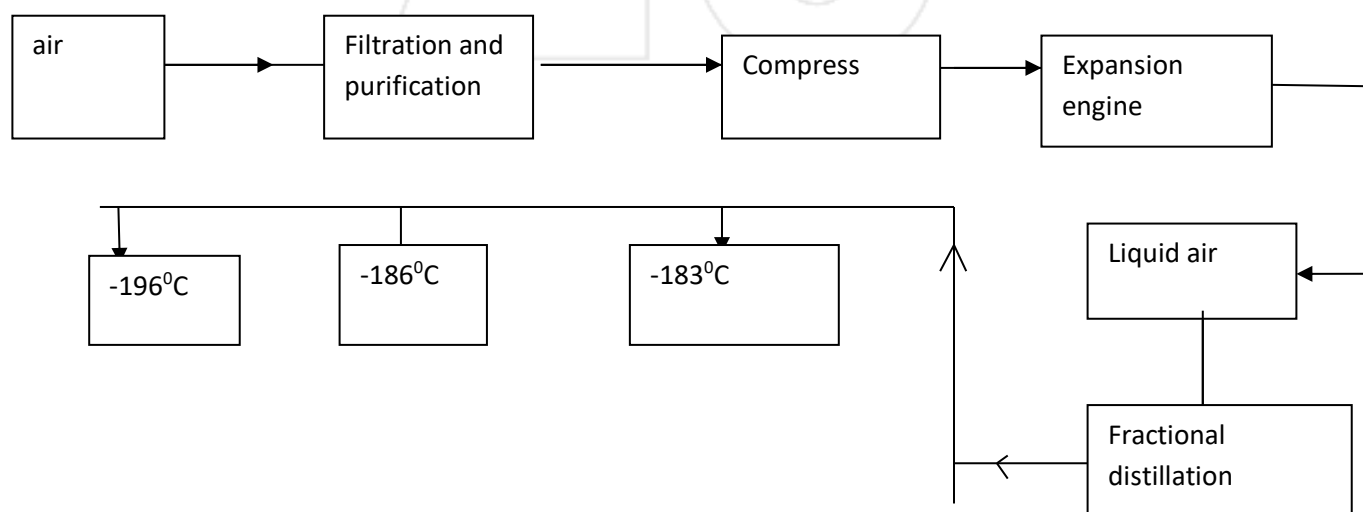
- (i) Which of the compounds of crude oil has molecules with the highest number of atoms? Explain.
(2mks)
- (ii) Explain the condition that could cause a poisonous gas to be formed when kerosene is burnt?
(2mks)

QUESTION 3

- (a) Air is a mixture of gases that can be classified as active and inactive part. The diagram below represents an experiment that can be carried out to determine the active part of air.



- (a) Describe how this set-up can be used to determine the active part of air (4mks)
- (b) When magnesium ribbon is heated in air the mass of the product is more than the mass of magnesium ribbon used. **Explain** (1mks)
- (c) Carbon (IV) oxide and sulphur (IV) oxide are some of the gases that are common pollutant in the atmosphere. Explain two measures that are taken to reduce atmospheric pollution of the two gases. (2mks)
- (d) Oxygen is obtained on large scale by the fractional distillation of air as shown on the flow chart.

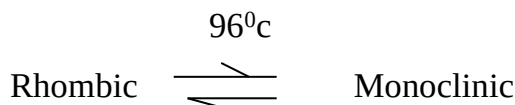


- (i) Explain how carbon (IV) oxide and water are removed before liquification of air. (2mks)

- (ii) Identify the component that is collected at -186°C (1mk)
- (iii) State one commercial use of oxygen gas apart from its use in hospital by patient with difficult breathing (1mk)

QUESTION 4

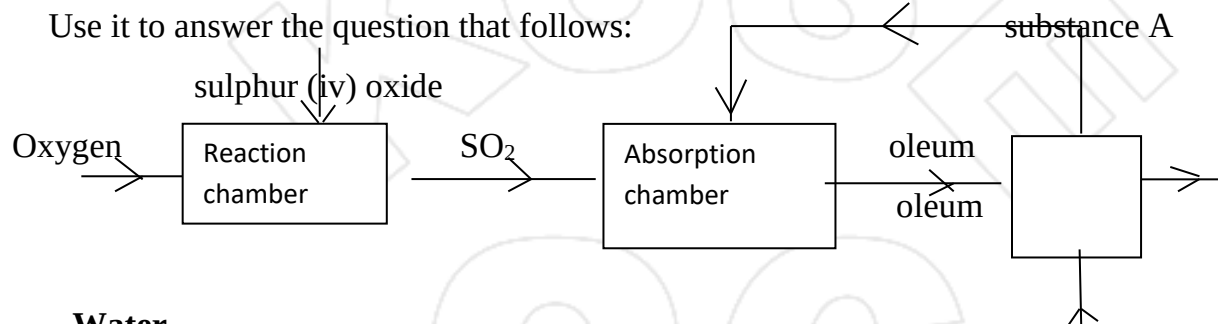
- (a) Rhombic and Monoclinic are allotropes of sulphur. They are interconvertible as shown below:



- (i) What does the temperature 96°C represent (1mk)
- (ii) State the differences in crystalline appearances between rhombic and monoclinic crystals. (1mk)

- (b) The chart below shows some process involved in large scale production of sulphuric (VI) acid.

Use it to answer the question that follows:

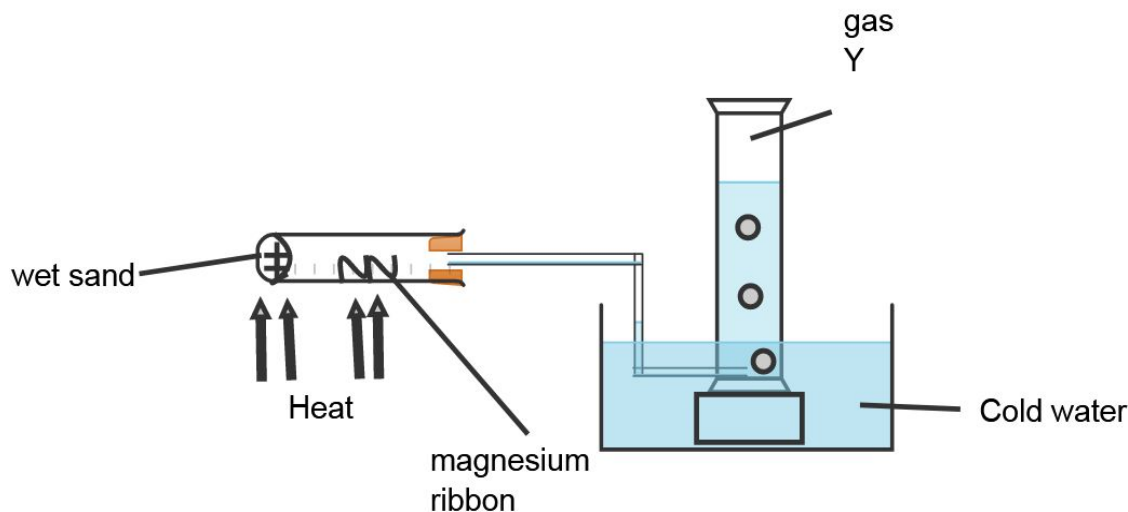


Water

- (2)(i) Name substance A (1mk)
- (ii). Write an equation that takes place in the absorption chamber (1mk)
- (iii) Vanadium (V) oxide is commonly used as a catalyst in the contact process:
- (I) Name another catalyst that can be used in this process. (1mk)
- (II) Give two reasons why vanadium V oxide is the commonly used catalyst. (2mks)
- (III) State and explain the Observation made when concentrated sulphuric (VI) acid is added to crystals of copper (II) sulphate in a beaker. (2mks)
- (v). If 100kg of sulphur(IV) oxide is used in one day by this plant, determine the mass of oleum produced in one day. (S=32. O=16 H=1) (3mks)

QUESTION 5

- (a) Draw a well labeled diagram of set-up that can be used to prepare dry hydrogen gas in the laboratory. (3mks)
- (b) The experiment below was carried out to investigate the reaction between steam and magnesium. Use it to answer the questions that follow:



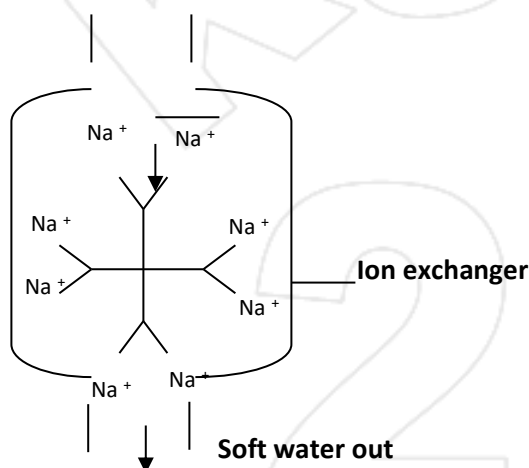
- (i) Explain why wet sand is heated. (1mk)
- (ii) State and explain what was observed in the combustion tube. (2mks)
- (iii) Name the gas Y and state how it is tested in the laboratory. (1mk)
- (c) Distinguish between:
Drying and dehydration. (2mks)
- (d). A student found two liquids labeled A and B placed on the bench in the laboratory. The liquids were colourless and did not have a smell. One liquid was water. Describe a test that you would carry out to determine the beaker that contained water. (3mks)

QUESTION 6

- (a) Give the name of the process involved in each of the following:
- (i) Crystals of hydrated sodium carbonate($\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$) when left in open air change to white powder. (1 mk)
- (ii) When anhydrous calcium chloride is used to dry hydrogen gas for a long time, it changes to a solution. (1mk)
- (b) Complete the table below by indicating the observations, type of change (permanent or temporary) and name of new compound formed. (6 mks)

Experiment	Observations	Type of change	Name of product
(i) Heating solid zinc oxide in a test tube.			
(ii) Anhydrous cobalt (II) chloride is left exposed overnight.			
(iii) Iron wool is soaked in tap water for two days			

(c) The diagram below shows a sample of hard water being passed through a vertical column to remove its hardness. **Hard water containing MgCl_2**



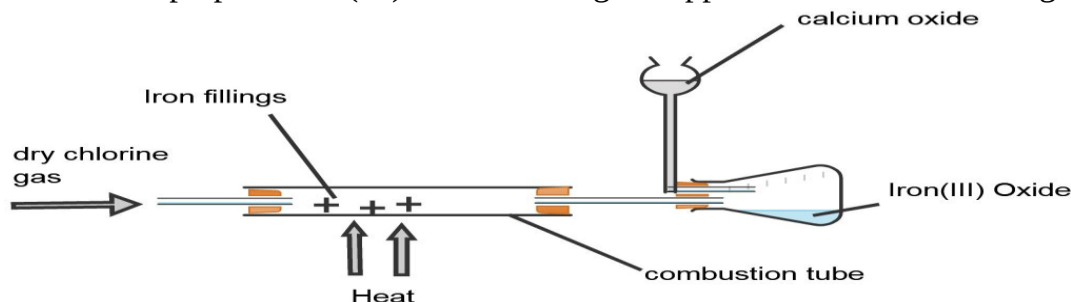
- (i) Write the formula of the two cations present in the sample of hard water. (2mks)
- (ii) What name is given to the above method of softening hard water. (1 mk)
- (iii) Write an ionic equation to show how the hard water is softened. (1 mk)
- (iv) Study the table below and answer the questions that follow.

Salt	Solubility (g/100g of water) at 20°C	Solubility (g/100g of water) at 50°C
P	10	20
Q	15	12

A solution 9g of P and 14g of Q in 100g of water at 20°C is warmed while stirring up to 50°C . State and explain the observations made. (2 mks)

QUESTION 7

(a) A student set out to prepare iron (III) chloride using the apparatus shown in the diagram below:



(i) Explain why

(a) It's necessary to pass chlorine gas through the apparatus before heating begins. (2mks)

(b) Calcium oxide is used in the guard tube. (1mk)

(c) The total mass of Iron III chloride formed was found to be 0.5g. Calculate the volume of chlorine gas that reacted with Iron.

(Fe=56.0 Cl=35.5 and molar gas volume at 298k is $24,000\text{cm}^3$) (3mks)

(d) What property of Iron (III) chloride makes it possible to be collected as shown in the diagram? (1mk)

(e) In the large scale production of hydrogen chloride gas, hydrogen gas burned in chlorine gas.

State the source of the two gases. (1mk)

KCSE 2026 FINAL PREDICTIONS

CONFIDENTIAL EXAM 8

233/1

CHEMISTRY

PAPER 1

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

Kenya Certificate of Secondary Education.

INSTRUCTIONS TO THE CANDIDATES

- Write your **name** and **Admission number** in the spaces provided.
- Answer **all** the questions in the spaces provided.
- Mathematical tables and electronic calculators may be used
- All working **MUST** be clearly shown where necessary.

For Examiner's Use Only:

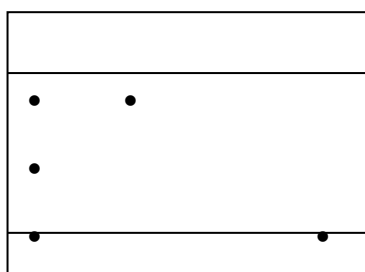
QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1-25	80 MARKS	

1. Three pure pigments were prepared and their spots placed on a filter paper as shown below.

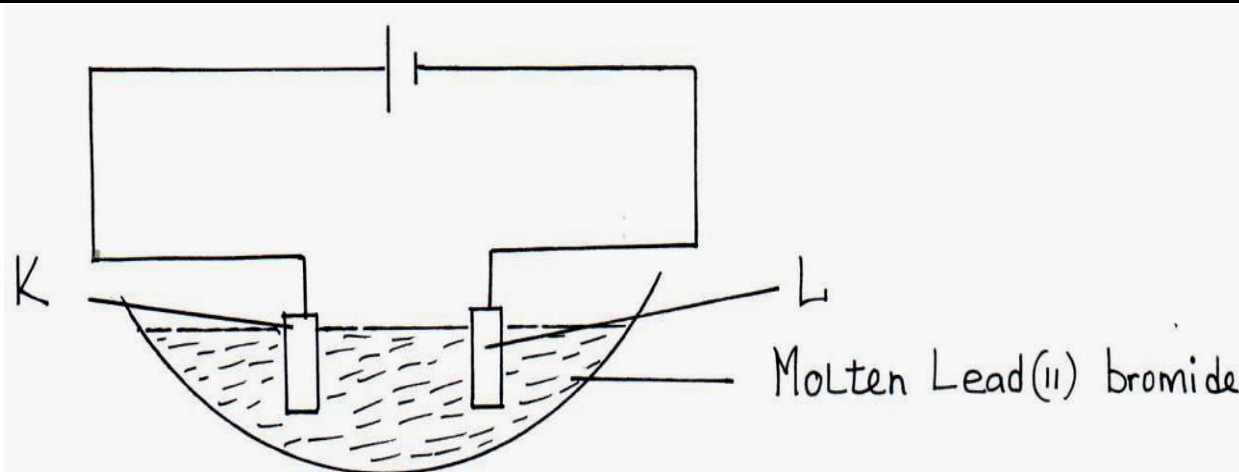
The

three pigments are A, B and C. A mixture F was also placed on the filter paper at the same time

with the pure pigments. The filter paper was then dipped in ethanol solvent and left for some half an hour. The results were obtained as follows.



- (i) Which of the three pure pigments is most sticky? Give a reason for your answer. **(1mk)**
 - (ii) Which pure pigment is not present in the mixture F? **(1mk)**
 - (iii) Show on the diagram the baseline. **(1mk)**
2. Describe how a pure sample of lead (II) carbonate can be prepared in the laboratory starting with lead II oxide. **(3mks)**
3. Write ionic equations for the reactions between : **(4mks)**
- (a) Aqueous solution of sodium chloride and lead nitrate
 - (b) Aqueous solution of barium chloride and magnesium sulphate
 - (c) Aqueous solution of potassium hydroxide and dilute nitric acid
 - (d) Zinc and an aqueous solution of copper (II) sulphate
4. If it takes 20 seconds for 200cm³ of oxygen gas to diffuse across a porous plug. How long will it take an equal volume of sulphur (IV) oxide to diffuse across the same plug? **(3mks)**
5. Explain reaction of lithium, sodium and potassium with water and write down the chemical equations in each case. **(6mks)**
6. A mixture contains ammonium chloride, aluminium oxide and sodium chloride. Describe how each solid substance can be obtained from the mixture. **(3mks)**
7. State the difference between the following salts;
Deliquescent and hygroscopic salts. **(2mks)**
8. Below is a set-up of apparatus used to investigate the effect of electric current on molten lead (II) bromide.



(a) Name electrode.

(1mk)

K

L

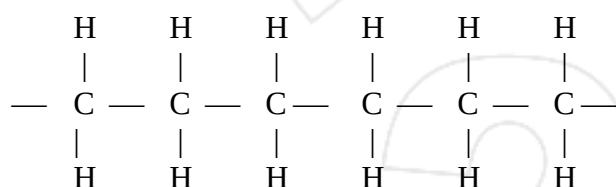
(b) State the observation made at electrode K.

(1mk)

(c) Write an equation for the reaction taking place at electrode L.

(1mk)

9. A sample of a polyethene polymer has the following structure.



a) Draw the structural formula of the monomer that makes the above polymer

b) The polymer is found to have a molecular mass of 2268g. Determine the number of monomers in the polymer. (H = 1, C = 12).

(2mks)

10. The isotopes hydrogen are ^1_1H and ^2_1H . Determine the molecular masses of the molecules formed when each of these isotopes react with chlorine. (Cl = 37, H=1)

(1mk)

11. The table below gives the atomic numbers of elements W, X, Y and Z. The letters do not represent the actual symbol of the elements

Element	A	B	C	D
Atomic number	9	10	11	12

a) Which **one** of the elements is unreactive? Explain

(1mk)

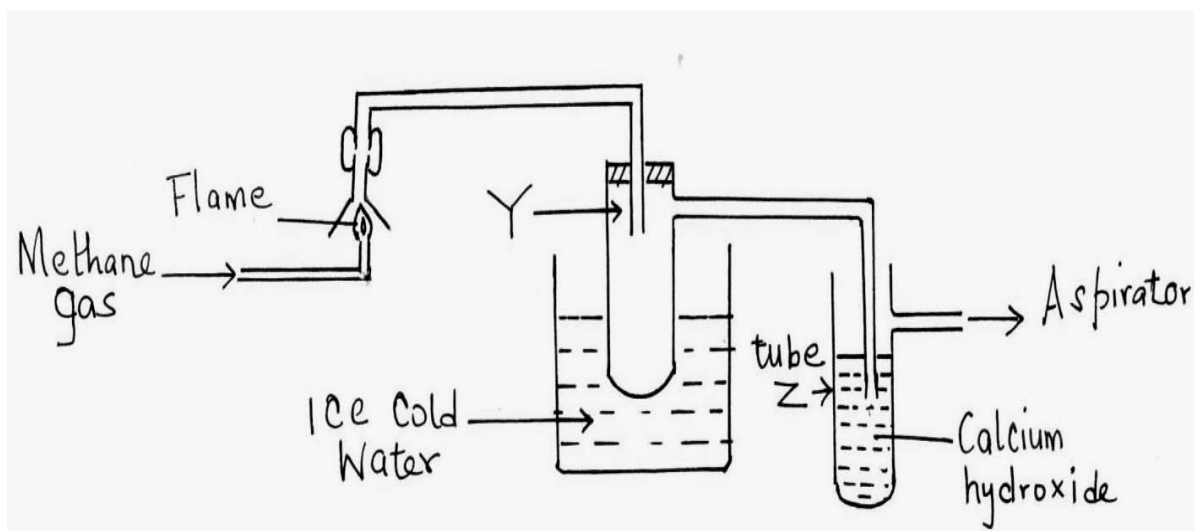
b)i) Which **two** elements would react most vigorously with each other?

(1mk)

ii) Give the formula of the compound formed when the elements in b (i) above react

(1mk)

- 12a) Distinguish between a hydrogen bond and covalent bond (2mks)
- b) Explain why the boiling point of water is higher than that of hydrogen Sulphide (Relative molecular mass of water is 18 while that hydrogen sulphide is 34) (2mks)
13. The set-up below was used to investigate the products of burning methane gas. Study it and answer the questions that follow:



- (a) What product will be formed in the test tube Y? (1mk)
- (b) State and explain the observations made in tube Z. (2mks)
14. Below are P^H values of some solutions.

Solution	Z	Y	X	W
P^H	6.5	13.5	2.2	7.2

- (i) Which solution is likely to be
- I Acidic rain. (½mk)
- II Potassium hydroxide (½mk)
- (ii) A basic substance V reacted with both solutions Y and X. What is the nature of V. (1mk)
15. In cold countries, salt is sprayed on the road to melt ice but in the long run it costs the motorists.
- (a) How does the salt help in melting ice? (1mk)
- (b) How does the salt affect the motorists? (1mk)
16. Using dots (.) and crosses (x) to represent electrons, show bonding in the compounds formed when the following elements react: (Si=14, Na=11, Cl=17).
- (a) Sodium and chlorine. (2 Mks)

(b) Silicon and chlorine.

(2 Mks)

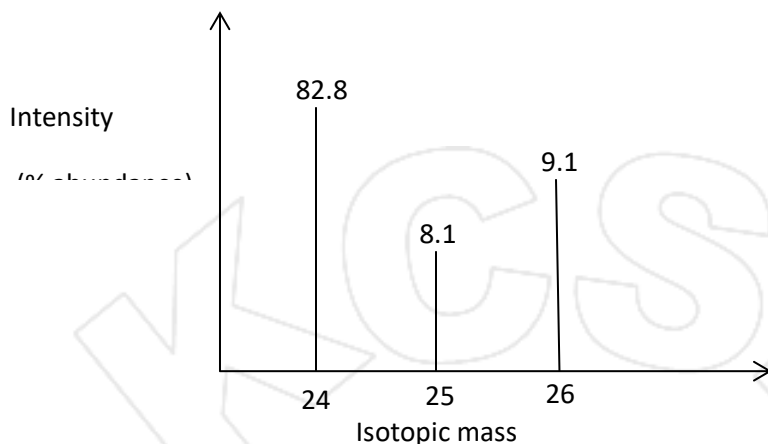
17. (a) State Graham's law of diffusion.

(1mk)

(a) 20cm³ of an unknown gas Q takes 12.6 seconds to pass through a small orifice, 10cm³ of oxygen gas takes 11.2 seconds to diffuse through the same orifice under the same conditions of temperatures and pressure. Calculate the molecular mass of unknown gas Q (O = 16).

(3mks)

18. The peaks below show the mass spectrum of element X.



Calculate the relative atomic mass of X.

(2mks)

19. Name the following compounds using the IUPAC rules.

(a) $\text{CH}_3\text{CH}_2\text{CHCH}_2\text{CH}_2\text{CH}_3$

|

CH_2CH_3

(1mk)

(b) $\text{CH}_3\text{CHCHCH}_3$

(1mk)

(c) Draw TWO structural formulae of isomers of compound with the molecular formula

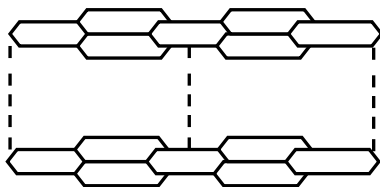
$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$

(2mks)

20.(a) What is meant by allotropy?

(1 mk)

b) The diagram below shows the structure of one allotropes of carbon.



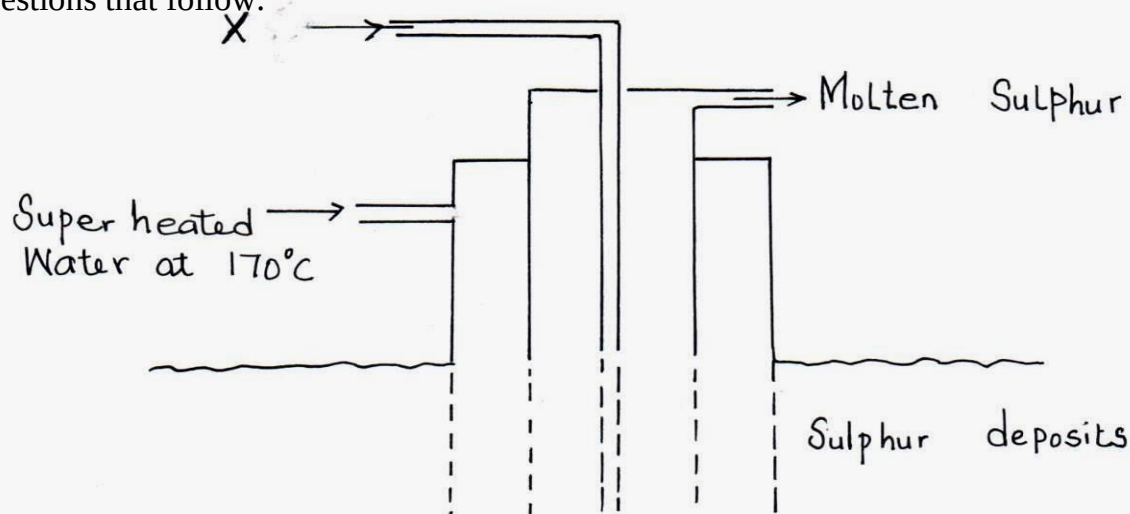
i) Identify the allotrope

(1 mk)

ii) State **one** property of the above allotrope and explain how it is related to its structure.

(2mk) .

21. 24cm^3 of a solution of 0.1 M potassium hydroxide were exactly neutralized by 30cm^3 of a solution of sulphuric acid. Find the molarity of the acid. (3 mks)
22. (a) Give **one** use of hygroscopic substances in the laboratory. (1 mk)
- (b) What is meant by the terms: (2 mks)
- (i) Isotopes
- (ii) Mass number
- (c) The formulae for a chloride of phosphorus is PCl_3 . What is the formula of its sulphide? (1 mk)
23. The diagram below shows the Frasch process used for extraction of sulphur. Use it to answer the questions that follow.



- (i) Identify X. (1mk)
- (ii) Why is it necessary to use super heated water in this process? (1mk)
- (iii) State **two** physical properties of sulphur that makes it possible for it to be extracted by this method. (1mk)
24. A certain carbonate XCO_3 , reacts with dilute hydrochloric acid according to the equation given below:
- $$\text{XCO}_{3(s)} + 2\text{HCl}_{(aq)} \longrightarrow \text{XCl}_{2(aq)} + \text{CO}_{2(g)} + \text{H}_2\text{O}_{(l)}$$
- If 4g of the carbonate reacts completely with 40cm^3 of 2M hydrochloric acid, calculate the relative atomic mass of X. (C=12.0 ,O=16.0, Cl=35.5). (3 Mks)

25. The table below gives some properties of three substances **I**, **J** and **K**. Study it and answer the questions that follow.

Substance	Mpt (°C)	Solubility in water	Electrical conductivity	
			Solid	Molten
I	1063	Insoluble	Conduct	Conduct
J	113	Insoluble	Doesn't	Doesn't
K	402	Sparingly soluble	Doesn't Conduct and Is decomposed	

(a) Suggest the type of structure in

(i) **I** (1mk)

(ii) **K** (1mk)

Explain why the molten **K** is decomposed by electric current but **I** is not decomposed.(2mks)

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 8**

233/2

CHEMISTRY**PAPER 2****TIME: 2 HOURS**

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

- a) Write your name and admission 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) All working must be clearly shown where necessary.
- e) Mathematical tables or silent electronic calculators may be used.

QUESTIONS	MAX SCORE	STUDENT SCORE
1	14	
2	14	
3	14	
4	12	
5	13	
6	13	
TOTAL	80	

Q1(a) The grid below represents part of the periodic table. Letters are not actual symbols of the elements. Use it to answer the questions that follow.

A							B
				C		H	
J	E			D			G
	F						

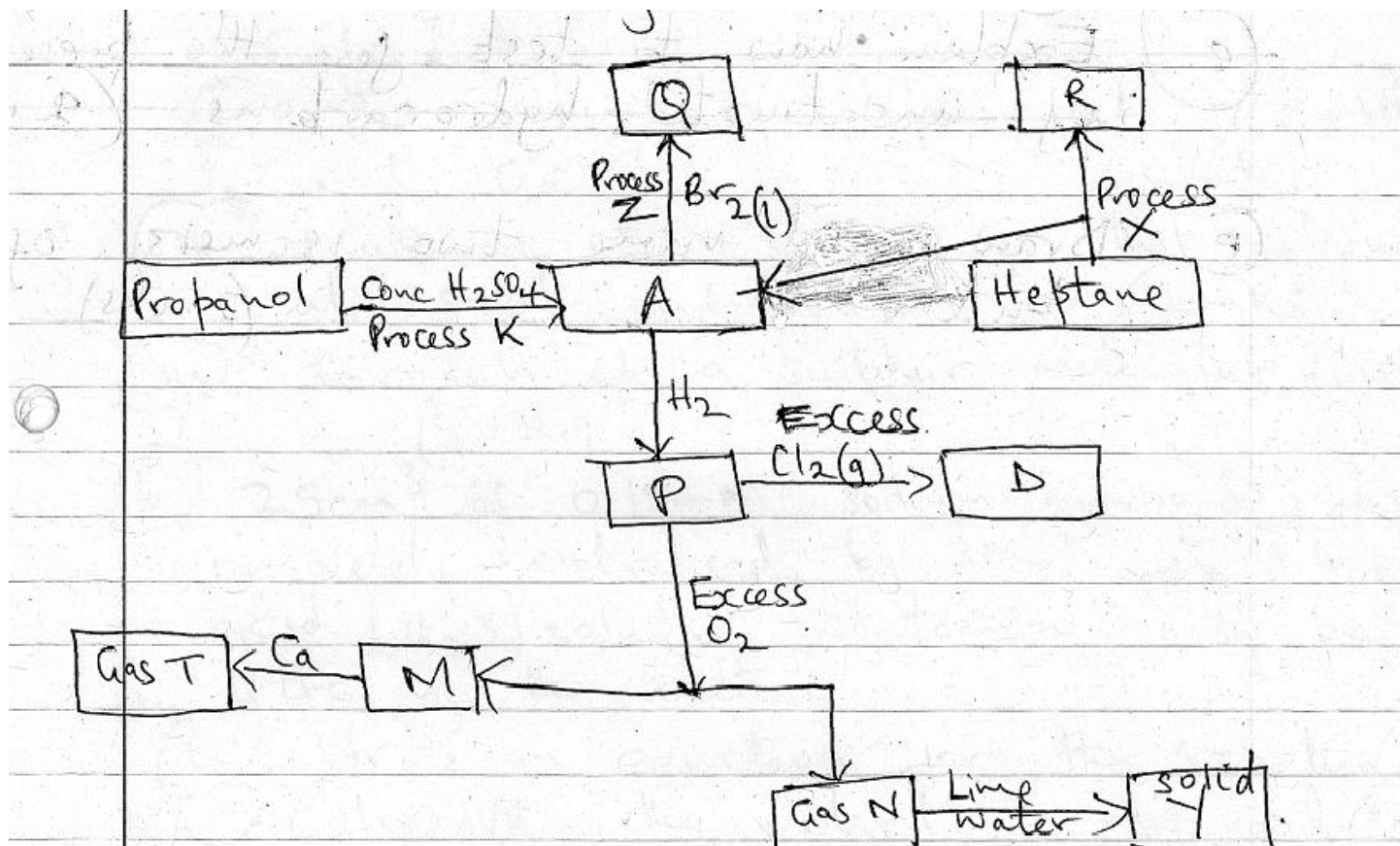
- (i) Name the family to which E and F belong. (1mk)
- (ii) Name the least reactive element and give a reason. (1mk)
- (iii) What type of structure is formed when E and G react. (1mk)
- (iv) Draw the structure of the molecular compound formed between D and G clearly showing the types of bonds that exist. (2mks)
- (v) Write the formula of the compound formed between E and H. (1mk)
- (vi) Name the product formed when sodium is burnt in insufficient oxygen and write the equation for reaction between the product and water. (2mks)
- (vii) Indicate using a tick on the grid the position of element M which forms an ion with formula M^{2-} and electronic arrangement 2.8.8.8 (1mk)
- (b) Study the table below and use it to answer the questions that follow. (Letters are not actual symbols)

Element	Atomic number
L	13
M	16
N	19
P	9
Q	17

- (i) Compare giving reasons the reactivity of P and Q. (2mks)

- (ii) How does the radius of L and M compare (1mk)
- (iii) Select the most reactive metal from the group. (1mk)
- (iv) Write an equation for reaction between N and water. (1mk)

Q2 Use the flow chart below to answer the questions that follow.



- (a) Name the substances (4mks)
- P
 - R
 - T
 - Y
- (b) Write equations using actual formula of substances for formation of; (3mks)
- Q
 - M and N
 - Gas T
- (c) Name the processes
- X

(ii) K

(iii) Z

(3mks)

(d) Draw the structures of

(i) A

(ii) D

(2mks)

(e) Draw and name two isomers of butene.

(2mks)

Q3(a) 2.56g of sulphur formed vapour at 546°C and 760mmHg. The vapour occupied a volume of 672cm³. Calculate

(i) the volume of vapour at 760mmHg and 0°C.

(2mks)

(ii) Mass of 22.4 litres of the vapour at STP conditions.

(2mks)

(iii) Formula of a sulphur molecule. (S = 32)

(2mks)

(b) 25cm³ of 0.154M sodium hydroxide, was completely neutralized by 30cm³ of mineral dibasic acid (H₂X) solution containing 6.3g per litre of the solution.

(i) Write an equation for the reaction.

(1mk)

(ii) Calculate the molarity of the acid.

(3mks)

(iii) Determine the RFM of the acid.

(2mks)

(iv) Identify x

(2mks)

(C=12, O=16, S=32, Cl=35.5, H=1, N=14)

Q4 Hydrogen gas is passed through solid Y in a U-tube before being burnt in air.

(i) Explain how to test for presence of hydrogen gas.

(1mk)

(ii) What is the purpose of substance Y and suggest its identity.

(2mks)

(b) The products of burning hydrogen were passed through a test tube dipped in ice-cold water.

Unburnt gas was then passed over heated CuO.

(i) Write an equation for burning of hydrogen in air.

(1mk)

(ii) Name a substance that can be used to test for the substance collected in the test-tube dipped in ice-cold water.

(1mk)

(iii) What is the observation made on the copper(II) oxide after a short while.

(1mk)

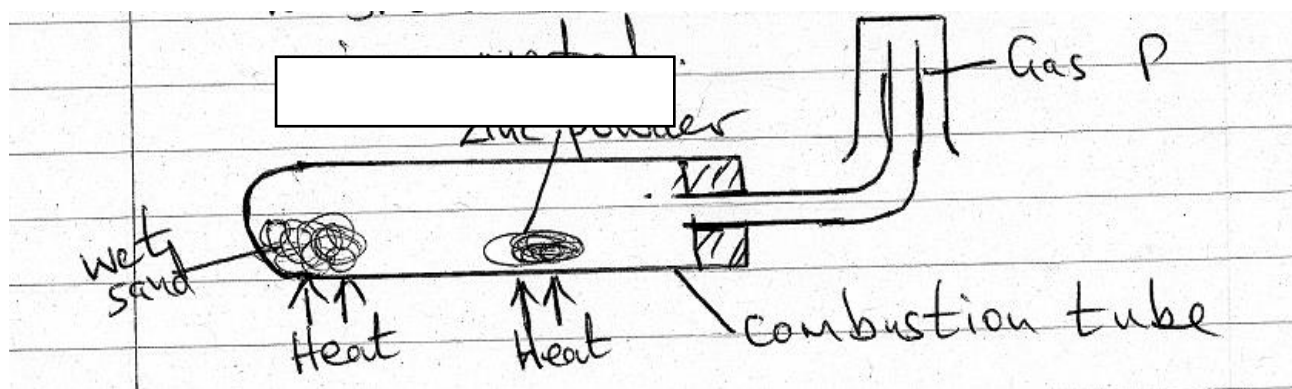
(iv) Write an equation for the reaction that takes place on the copper(II) oxide solid.

(1mk)

(v) Other than for manufacture of ammonia and hydrochloric acid, state another use of hydrogen.

(1mk)

(c) The diagram below is a set-up used to show how water reacts with zinc metal.



(i) Why is wet sand used and not water. (1mk)

(ii) Write an equation for the reaction in the combustion tube. (1mk)

(iii) What observation is made in the combustion tube as heating went on. (1mk)

(iv) Explain why potassium cannot be used in place of zinc. (1mk)

Q5(a) Carbon(II) Oxide gas can be prepared by dehydrating methanoic acid using concentrated sulphuric(VI) acid.

(i) Give two physical properties of carbon(II) oxide gas. (2mks)

(ii) Explain how carbon(II) oxide gas causes poisoning if inhaled. (1mk)

(iii) Describe a simple chemical test that can be used to distinguish between carbon(II) oxide and carbon(IV) oxide. (2mks)

(b) Soot is a form of impure carbon

(i) Name another form of carbon that is amorphous. (1mk)

(ii) State the difference in conductivity between the two crystalline allotropes of carbon. (2mks)

(iii) Give one use for each of the two crystalline allotropes. (2mks)

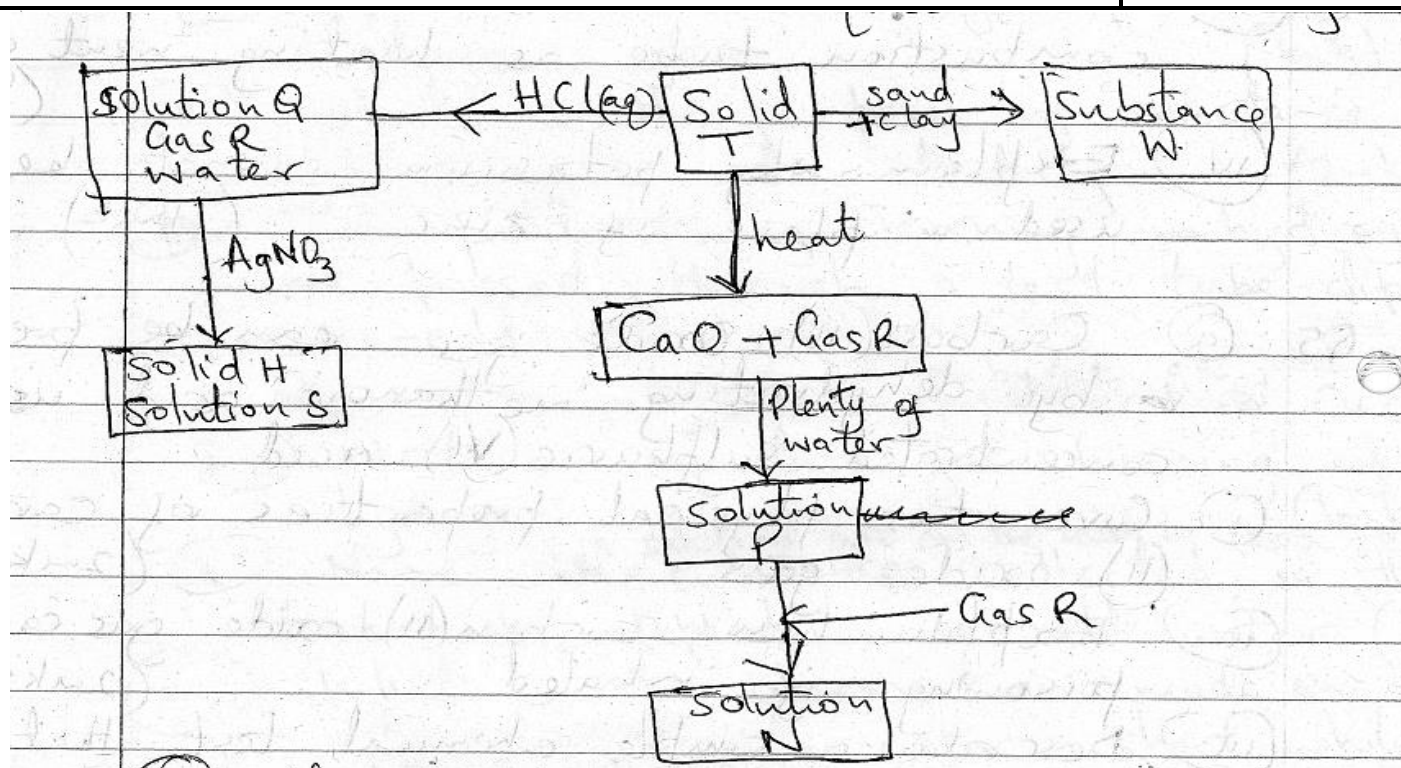
(c)(i) Write an equation for decomposition of ammonium carbonate on heating. (1mk)

(ii) Explain the observations made when each of the carbonates below is reacted with dilute sulphuric(VI) acid:

Lead carbonate

Copper(II) carbonate (2mks)

Q6. The flow chart below shows some reactions undergone by some salts. Use it to answer the questions that follows.



- (a) Name (3mks)
- Gas R
 - Solution N
 - Solid H
- (b) Write equations for the following reactions. (3mks)
- Addition of AgNO_3 to solution Q
 - Heating solid T
 - Formation of solution P
- (c) Give one use for the substances below (3mks)
- Gas R
 - Substance W
 - Silver bromide
- (d)(i) Name the method used to prepare salts H and S (1mk)
- (ii) Name another salt that can be prepared using the method in d(i) above. (1mk)
- (e) Ammonium ferrous sulphate hexahydrate an example of a double salt. Write its formula. (1mk)
- (f) Give one example of a salt contained in fertilizers. (1mk)

KCSE 2026 FINAL PREDICTIONS

CONFIDENTIAL EXAM 9

233/1

CHEMISTRY

PAPER 1

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

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

FOR EXAMINERS USE ONLY

Questions	Maximum Score	Students Score
1-28	80	

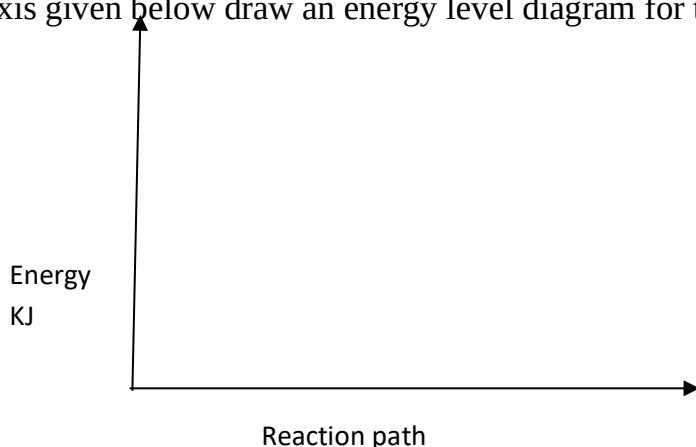
Answer **all** questions in the spaces provided

1. A certain element Y has atomic number 15 and mass number of 31.
 - a) How many electrons are in this element? (1mk)
 - b) Write the electron arrangement of the ion formed by element Y. (1mk)
 - c) How would the atomic size of the above element compare with another atom X whose atomic number is 11 and mass number 23? Explain. (2mks)
2. Explain why the pH of 1.0 M hydrochloric acid is 2.0 while that of 1.0M ethanoic acid is 5.0. (2mks)
3. Ethanedioic acid (COOH)₂ is used instead of methanoic acid (HCOOH) to prepare carbon (II) oxide in the laboratory. It gives equal volume of carbon (II) oxide and carbon (IV) oxide.
 - a) If water is one of the products write an equation for the dehydration of elthanedioic acid. (1mk)
 - b) How can pure carbon (II) oxide be obtained from the mixture of the two gases? (2mks)
4. State the Charles' law. (1mk)
- b. A volume of 120cm³ of nitrogen gas diffused through a membrane in 40 seconds, how long will 180cm³ of carbon (IV) oxide take to diffuse through the same membrane? (2mks)
5. A solution of chlorine in tetrachloromethane turns colourless when propene gas is bubbled through it.
 - a) What type of reaction takes place? (1mk)
 - b) Write an equation for the above reaction. (1mk)
 - c) State one use of ethane gas. (1mk)
6. Study the information in the table below then answer the question that follow.

<i>Bond</i>	<i>Bond energy (KJmol⁻¹)</i>
H – H	435
Cl – Cl	243
H – Cl	431

- a) Calculate the enthalpy change for the following reaction. (2mks)
- H₂(g) + Cl₂(g) 2 HCl (g) →

b) On the axis given below draw an energy level diagram for the reaction above. (1mk)



7. 22.2cm³ of sodium hydroxide solution, containing 4.0 g per litre of sodium hydroxide were required for complete neutralization of 0.1g of a dibasic acid. Calculate the relative formula mass of the dibasic acid. (Na = 23.0, O= 16.0, H= 1.0) (3mks)

8. The melting and boiling point of molecular substances increase with increase in relative molecular mass. Explain why water with a lower relative molecular mass of 18 has a higher boiling point of 100°C than hydrogen sulphide with relative molecular mass of 34 and a boiling point of -61°C. (2mks)

9. In an experiment to determine the solubility of solid Y in water at 30°C the following results were obtained:

Mass of evaporating dish = 26.2.

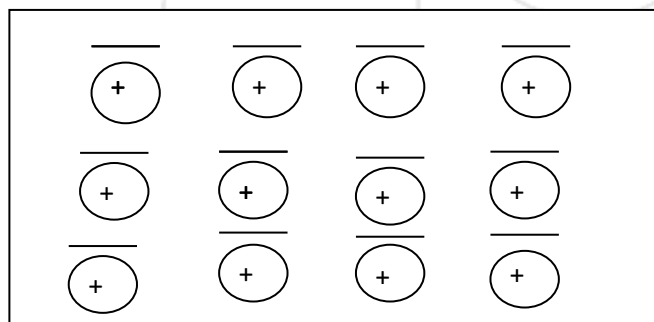
Mass of evaporating dish + saturated solution = 42.4g

Mass of evaporating dish + dry solid Y = 30.4g

Using the information, determine the solubility of solid Y at 30°C in grams per 100g. (2mks)

10. A, B, C and D are dyes present in a mixture. C is more soluble than B. A is more soluble than C while D is the least soluble in a given solvent. Draw a round paper chromatogram showing how they would appear when separated using the solvent. (2mks)

11. The diagram below shows a section of a model of the structure of element T.



Key



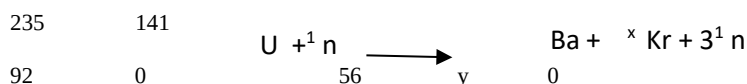
Charged nucleus

An electron



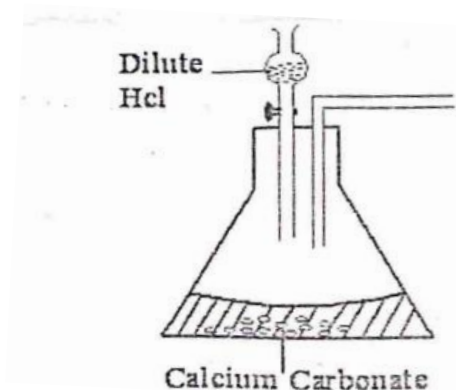
- a. State the bonding type that exists in element T. (1mk)
- b. In which group of the periodic table does element T belong? Give a reason. (1mk)

12. Determine the values of the scalars X and Y in the nuclear equation shown below.

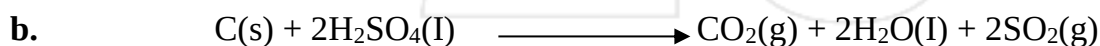
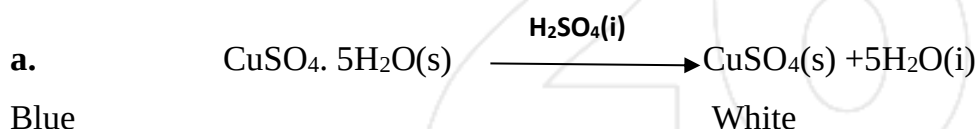


- b. State one application of this type of reaction. (1mk)
- c. State one danger associated with exposure of human beings to radioactive substances. (1mk)

13. The diagram below shows an incomplete set up of the laboratory preparation of dry carbon (IV) oxide. Complete it. (2mks)



14. Write down the property of concentrated sulphuric (VI) acid shown in the following reaction. (2mks)



15. When excess chlorine gas is bubbled through dilute sodium hydroxide solution, the resulting solution acts as a bleaching agent.

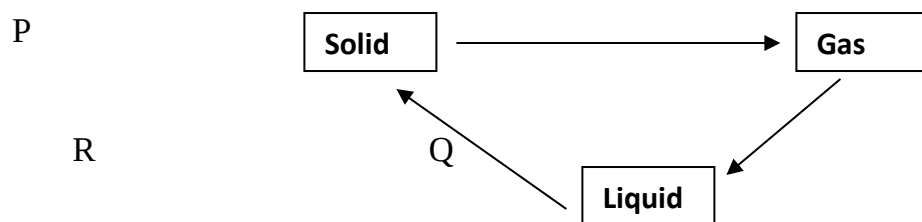
a) Write an equation for the reaction between chlorine gas and sodium hydroxide solution. (1mk)

b) Explain how the resulting solution acts as a bleaching agent. (2mks)

16. An element P has a relative atomic mass of 88. When a current of 0.5 amperes was passed through the fused chloride for 32.16 minutes, 0.44g of P were deposited at the cathode.

Determine the charge on an ion of P. (1 F = 96500 coulombs) (3mks)

17. Matter exists in three states which can be related as shown in the diagram below.



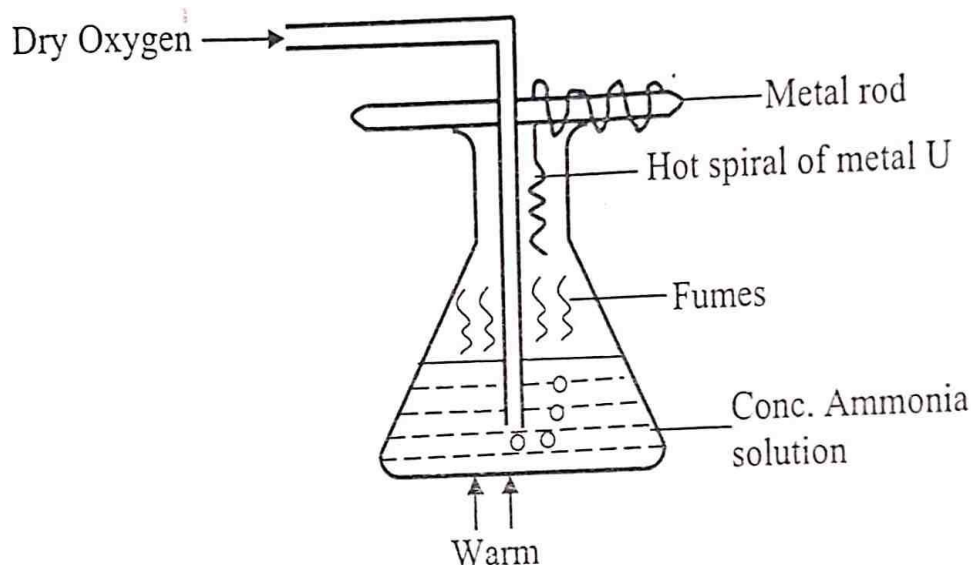
a) Name processes **P** and **R**.

(2mks)

b) Explain whether process Q is exothermic or endothermic.

(1½ mks)

18. Study the diagram below.



a) Give the most likely identity of metal U.

(1mk)

b) State two observations made in the conical flask.

(2mks)

c) Write an equation for the reaction which took place between ammonia and oxygen inside the flask.

(1mk)

19. In an experiment, soap solution was added to three separate samples of water. The table below shows the volumes of soap solution added in order to form lather with 1000cm³ of each samples before and after boiling.

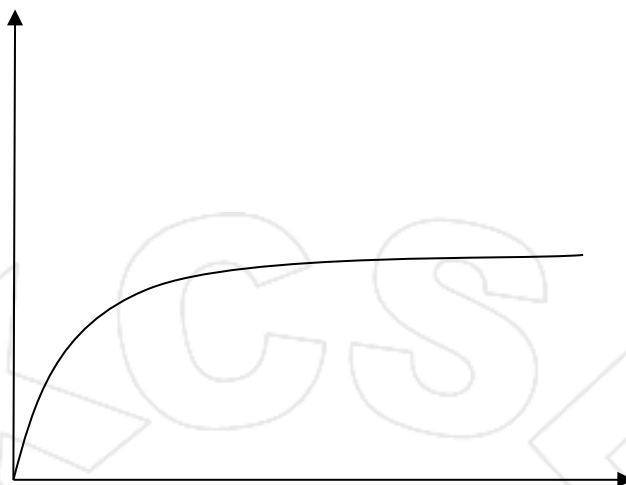
	Sample I	Sample II	Sample III
Volume of soap added to unboiled sample (cm ³)	27.0	3.0	10.6
Volume of soap added after boiling the sample (cm ³)	27.0	3.0	3.0

a) Identify the sample that was likely to be soft water. Explain.

(1mk)

- b) Explain the change in the volume of soap solution in sample III. (1mk)
- c) Give one disadvantage of hard water. (1mk)

20. In an experiment to monitor the rate of reaction of magnesium and hydrochloric acid a student recorded the volume of hydrogen produced at regular time intervals and obtained the graph shown below.



- a) On the same set of axes sketch the curve expected if the experiment is repeated with a few crystals of copper (II) sulphate added to the reactants. (1mk)
- b) Explain the shape of your curve. (1mk)
- c) State the factor that can increase the rate of a reaction. (1mk)
21. The grid below is a section of the periodic table. Study it and answer the questions that follow.

	A					D		
B			C			F		
E								

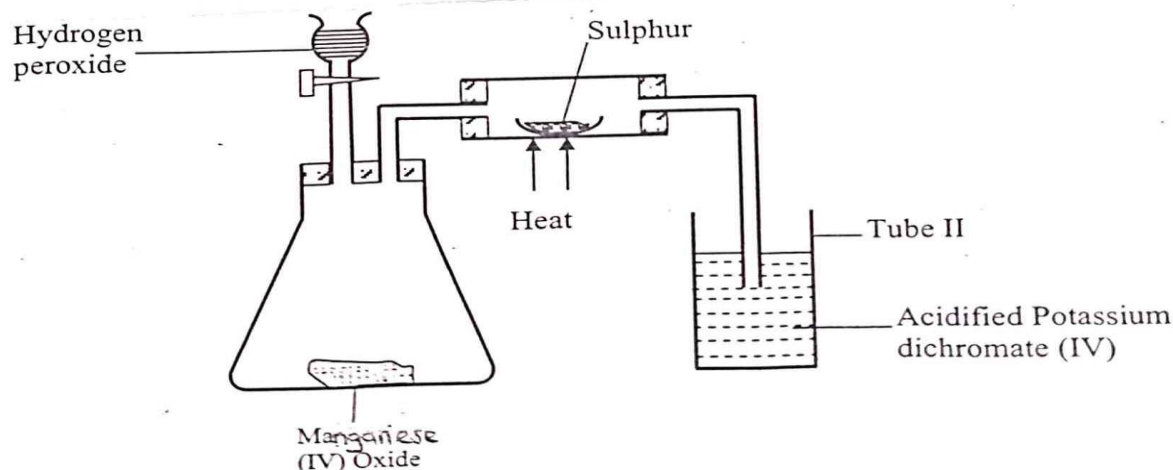
- a) State the name given to the family of B and E. (1mk)
- b) Identify the most reactive metal. (1mk)
- c) Which type of bond exists in the compound formed by A and F. Explain. (1 ½ mks)
22. Write the formula of the chief ore (bauxite) from which aluminum is extracted. (1mk)
- b. Explain the role of molten cryolite in aluminum smelting. (1mk)

23. Aluminum does not apparently react with dilute nitric (V) acid to liberate hydrogen gas.

Explain.

(1mk)

24. Study the diagram below.



a) State the role of manganese (IV) oxide in the set up shown above.

(1mk)

b) State and explain the observation made in tube II.

(2mks)

25. Two manila papers were placed at different levels of a non- luminous flame. Paper A was placed at the lowest part of the flame, while B was placed at the top.

a) Indicate the observations made on each manila paper.

(1mk)

b) Explain the observation made on paper A.

(1mk)

26. Starting with 50cm³ of 2.8M sodium hydroxide, describe how a sample of pure sodium sulphate crystals can be prepared.

(3mks)

27. In an experiment to determine the percentage of magnesium hydroxide in an anti-acid a solution containing 0.5g of the anti-acid was neutralized by 23.0cm³ of 0.10M hydrochloric acid. Given the relative formula mass of magnesium hydroxide is 58. Calculate the:

a) Mass of magnesium hydroxide in the anti-acid.

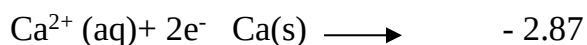
(2mks)

b) Percentage of magnesium hydroxide in the anti-acid.

(1mk)

28. Study the standard electrode potentials in the table below and answer the questions that follow.

E⁰/volts

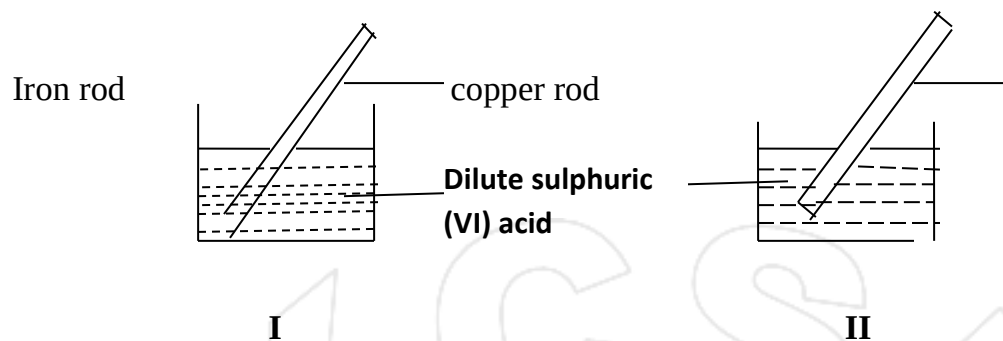


a) Which of the metals is the strongest reducing agent?

(1mk)

b) What observations will be made if a silver coin is dropped into an aqueous solution of copper (II) sulphate? Explain. (2mks)

29. A student used the figure below to investigate the action of dilute sulphuric (VI) acid on some metals. Beaker I and II contained equal volumes of dilute sulphuric (VI) acid. To beaker I, a clean iron rod was dipped and to beaker II, a clean copper rod was dipped.



a) Describe the observations made in each beaker.

Beaker I

(1mk)

Beaker II

(1mk)

b) Explain observations in (a) above.

(1mk)

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 9**

233/2

CHEMISTRY**PAPER 2**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES.**

- Write your name and index number in the spaces provided above.
- Answer **ALL** the questions in the spaces provided.
- Mathematical tables and silent electronic calculators may be used.
- All working **MUST** be clearly shown where necessary.

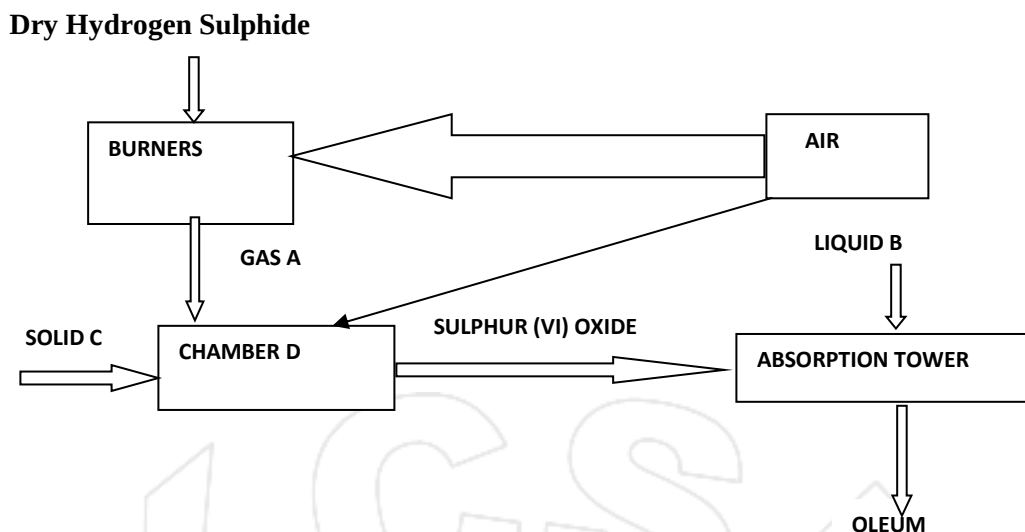
FOR EXAMINER'S USE ONLY.

Questions	Maximum score	Candidates score
1	13	
2	11	
3	13	
4	13	
5	12	
6	10	
7	8	
Total score	80	

Answer **ALL** the questions in the spaces provided

1. Sulphuric (VI) acid can be prepared using hydrogen sulphide as shown in flow chart below.

Study it and answer the questions that follow.



(a) Identify:

(i) Gas A: (1 mark)

(ii) Liquid B: (1 mark)

(b) (i) What function does solid C play in the chamber D? (1 mark)

(ii) Write an equation for the reaction in chamber D. (1 mark)

(c) Explain the observations made if hydrogen sulphide gas is bubbled through copper (II) nitrate solution? (2 marks)

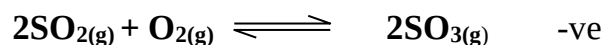
(d) Write an ionic equation for the confirmatory test for hydrogen sulphide gas. 1 mark

(e) Write a chemical equation to show the formation of concentrated Sulphuric (VI) acid from the oleum. (1 mark)

(f) Explain why in contact process SO_3 gas is **not** directly dissolved in water to make concentrated sulphuric (VI) acid. (2 marks)

(g) Name the main pollutant from the process above and how it is controlled. (2 marks)

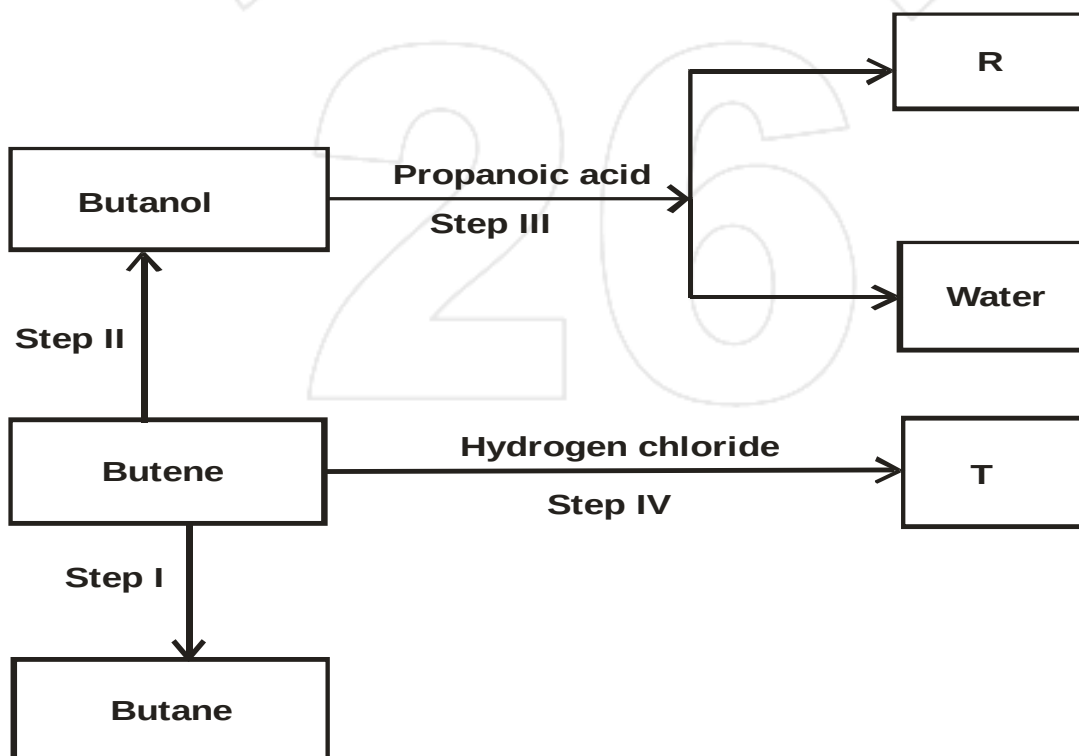
(d) State two factors that increases the yield of sulphur (VI) oxide using the equation below. (1 marks)



2.a) During an experiment a student added soap solution to separate samples of water until lather was formed. Below is a table showing the volumes of soap solution that was required to form lather with **100cm³** of each sample of water before and after boiling the samples.

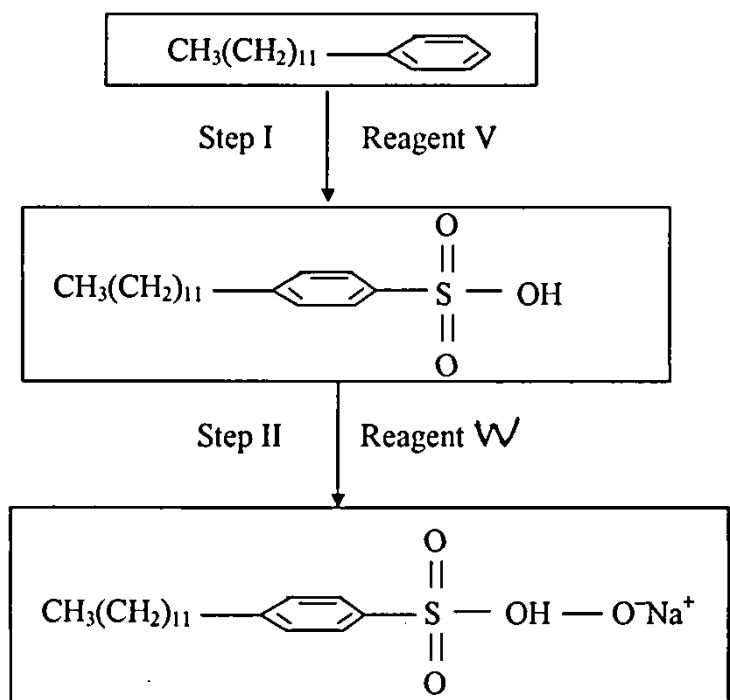
	Volume (cm ³) of soap required by water sample		
	X	Y	Z
Before boiling	4.5	19.5	22.5
After boiling	4.5	19.5	4.5

- i) (a) State the most likely source of water sample **X**. (1/2 mark)
 (b) Identify a salt most likely to be present in water sample **Y**. (1/2 mark)
 ii) Write an equation for the reaction that may have occurred in water sample **Z** when it was being boiled. (1 mark)
- b) Study the flowchart below and answer the questions that follow.



- i) Name the types of reaction that occurs in steps **I** and **II**
- Step I : (1/2 mark)
 Step II : (1/2 mark)

- ii) What conditions are necessary for the reaction you have named in (i) above? (1½ mark)
- iii) Write a chemical equation for the reaction that takes place in step IV (1 mark)
- iv) Why is substance **R** used in some soaps? (½ mark)
- c) The flow diagram below shows some of the steps followed during the industrial manufacture of a detergent.

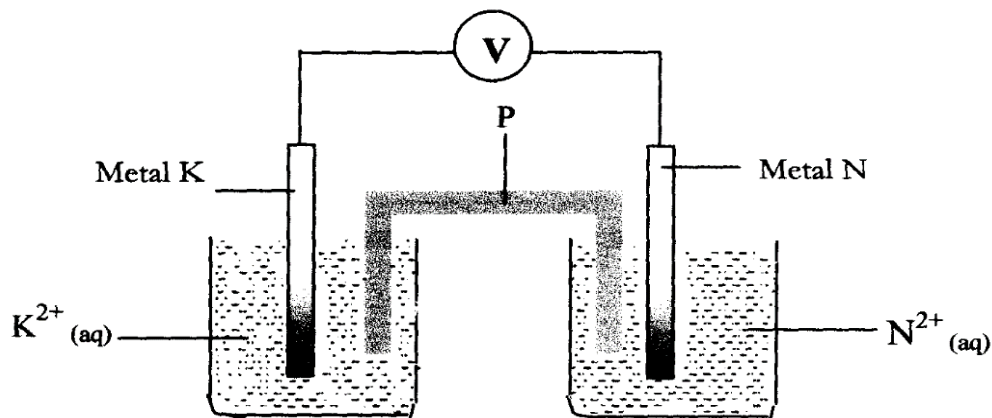


- i) What is a detergent? (1 mark)
- ii) Identify reagents **V** and **W** (2 marks)
- I) Reagent **V**
- II) Reagent **W**
- iii) Write an equation for the reaction that may occur when the detergent is added to water containing magnesium ions. (1 mark)
- iv) State **one** advantage of using the above detergent. (1 mark)

3. Metals **K** and **N** were connected to form a cell as shown in the diagram below. Their reduction potentials are as shown below:

$$\text{K}^+_{(\text{aq})} / \text{K}_{(\text{s})} \equiv - 0.17\text{V}$$

$$\text{N}^+_{(\text{aq})} / \text{N}_{(\text{s})} = + 1.1\text{ 6V}$$



I. Write the equation for the half-cell reaction that occurs at

Metal **K** electrode

(1mark)

Metal **N** electrode

(1mark)

II) Identify **P** and state **two** roles in the above setup

(i). Identity of **P**

(1 mark)

(iii) **Two** Roles of **P** in the setup.

(1 mark)

III. On the diagram, show the flow of :-

I. Electrons

($\frac{1}{2}$ mark)

II. Current.

($\frac{1}{2}$ mark)

IV. Calculate cell potential (E) for the cell represented in the setup above

(1 mark)

(b) The table gives the standard redox potentials for a number of half reactions. Use it to answer the questions that follow:-

		<u>(E⁰/Volts)</u>
$\text{Zn}^{2+}(\text{aq}) + 2\text{e}^-$	$\rightleftharpoons \text{Zn}(\text{s})$	-0.76
$\text{Fe}^{2+}(\text{aq}) + 2\text{e}^-$	$\rightleftharpoons \text{Fe}(\text{s})$	-0.44
$\text{I}_2(\text{l}) + 2\text{e}^-$	$\rightleftharpoons 2\text{I}^-(\text{aq})$	+0.54
$\text{Fe}^{3+}(\text{aq}) + \text{e}^-$	$\rightleftharpoons \text{Fe}^{2+}(\text{aq})$	+0.77
$\text{Ag}^+ + \text{e}^-$	$\rightleftharpoons \text{Ag}(\text{s})$	+0.88

(e) Relative to which half-cell reaction are the above electrode potentials expressed? ($\frac{1}{2}$ mark)

(ii) Calculate the e.m.f of the cell made up by combining the $\text{I}_{2(\text{l})}/2\text{I}^-(\text{aq})$ electrode and

$\text{Zn}^{2+}(\text{aq})/\text{Zn}(\text{s})$ electrode

(1marks)

(ii) Which of the substances listed in the above table is :-

(1marks)

I. The strongest oxidising agent

II. The strongest reducing agent

(iv) Which substances could be used to convert iodide ions to iodine? Write balanced equations for any possible conversions (1mark)

(v) Draw a cell diagram formed between zinc and lead. (2marks)

c) A steady current of **2.5A** was passed for **15** minutes through a cell containing divalent ions M^{2+} . During this process **0.74g** of metal **M** was deposited (IF = **96500C**)

Calculate the quantity of electricity passed in this cell (1mark)

ii) Determine the relative atomic mass of **M** (2marks)

4. In an experiment, a student measured the amount of gas produced with time when excess **1.0 M** hydrochloric acid was reacted with **0.42 g** of a carbonate, XCO_3 and obtained the following results. (Note: The reaction was carried out at room temperature)

Time (minutes)	Volume of carbon (IV) oxide, cm^3
0.0	0
0.5	20
1.0	32
2.0	52
5.0	86
7.5	103
10.0	112
12.0	118
14.0	120
16.0	120
18.0	120

a) On the graph paper provided, draw a graph of volume of carbon (IV) oxide against time. {3 mks}

b) From the graph,

i) Determine the time at which half the original mass of marble chips will have reacted. (1 mrk)

i) Determine the reaction rate between the 5th and 6th minutes. (2 marks)

c) i) Write the equation for the reaction that takes place. (1 mark)

ii) Calculate the total number of moles of carbon (IV) oxide produced in this reaction.

(Molar gas volume at r.t.p = **24 dm³**) (2 marks)

iii) Determine the relative molecular mass of XCO_3 . (2 marks)

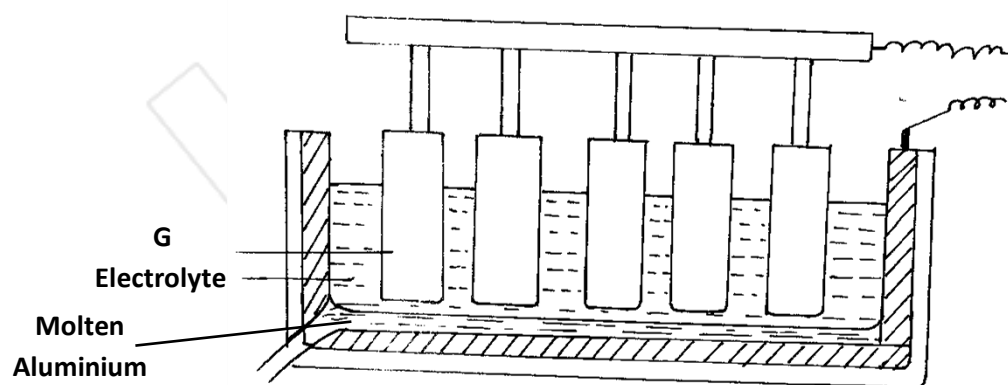
iv) Determine the relative atomic mass of **X**. (1 mark)

- d) On the same graph paper, draw a sketch of the curve that would be obtained if **0.5 M** hydrochloric acid was used. Label the curve A. **(1 mark)**
5. Sodium metal tarnishes when exposed to air to form a white powder on its surface. A small piece of sodium metal was dropped into **30 g** of propanol and **2400cm³** of hydrogen gas produced at room temperature and pressure .The unreacted propanol was evaporated and white solid remained .(molar Gas Volume at room temperature and pressure =**24dm³** **Na=23 , C=12 , O=16**)
- a) (i) Give the name of the white powder formed on the original piece of sodium metal. **(1mark)**
 (ii) Explain how the white solid was formed. **(2marks)**
- b) (i) Write down the chemical equation for the reaction between propanol and sodium metal. **(1mark)**
 (ii) Determine the mass of sodium that reacted with propanol. **(2marks)**
 (iii) What mass of propanol was evaporated? **(2 marks)**
 (iv) The propanol was evaporated at **97^oc** and the white solid remained unaffected at this temperature .what is the difference in structure of propanol and white solid. **(1 mark)**
- c) (i) Name the inorganic liquid which liberates hydrogen gas with sodium metal. **(1 mark)**
 (ii) State two differences you would observe if similar pieces of sodium metal were dropped separately into beakers containing equal amount of propanol and liquid named in (i) above respectively. **(2marks)**
6. The figure below is a section of periodic table. Study and answer the questions that follow. The letters do not represent the actual symbol of elements.

A								
					D		I	E
F	G			H				
J								

- (i) Select the elements which belongs to the same chemical family. **(¹/₂ mark)**
 (ii) Identify the strongest reducing element. **(¹/₂ mark)**
- b) (i) The chloride of **H** vaporizes easily while the oxide of **H** has a high melting point. Explain the observation in terms of structure and bonding. **(2marks)**

- (ii) **Blue** and red litmus papers were dropped into solution of chloride of **H**, state and explain the observations made. (1mark)
- c) **K⁻** has ionic configuration of **2:8:8**
- (i) Give the chemical family name to which element **K** belong. (1mark)
- (ii) Place element **K** on the above periodic table. (1mark)
- d) The first and second ionization energies of element **G** at random are **665 kJ mol⁻¹** and **560 kJ mol⁻¹**
- (i) Define the term the ionization energy. (1mark)
- (ii) Write equations for the first and second ionization energies for element **G** indicating their energies. (1 mark)
- (iii) Explain your answer in (ii) above. (1mark)
- e) Explain the difference in the atomic radii of **D** and **I**. (1mark)
7. The diagram below illustrates the Hall's cell for the extraction of Aluminium. Study it and answer the questions that follow.



- (a) (i) Name the electrode labeled **G** (1 mark)
- (b) Electrolysis is carried at **800 – 900°C** and newly formed Aluminium is tapped off as a liquid. What does this indicate about the melting point of Aluminium? (1 mark)
- (c) (i) Give the ionic equations for the reaction that takes place at the cathode. (1 mark)
- (ii) **The** anode has to be replaced frequently. Explain. (1 mark)
- d) **Cryolite** is used in the extraction of aluminium from bauxite. State its function. (1mark)
- d) A piece of unpolished aluminium foil is not attacked by water steam and dilute hydrochloric acid. Explain. (1mark)
- e) (i) The basic raw material for extraction of aluminium is bauxite. Name two major impurities in bauxite. (1 mark)
- (ii) State one property of duralium that make it more suitable than pure aluminium in aeroplane construction. (1 mark)

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 10**

233/1

CHEMISTRY**PAPER 1****TIME: 2 HOURS**

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES:**

1. Write your name and index number in the spaces provided above.
2. Answer all the questions in the spaces provided.
3. All working must be clearly shown.
4. Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

FOR EXAMINER'S USE ONLY

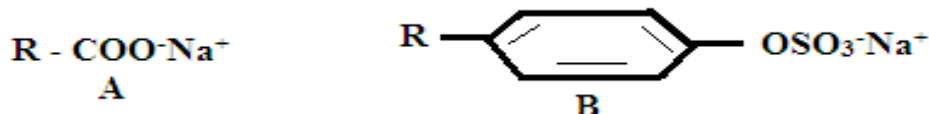
QUESTIONS	MAXIMUM SCORE	CANDIDATES SCORE
1 – 28	80	

QUESTIONS

- State two reasons why we use the non-luminous flame for heating in a laboratory instead of using the luminous flame. (1mk)
- Chlorine has two isotopes with atomic mass 35 and X occurring in the ratio 3:1 respectively. The relative atomic (R.M.A) of chlorine is 35.5. Determine the value of X. (3mks)
- During an experiment sulphur (IV) oxide gas was formed to diffuse through a certain pore at a rate of 25cm³ per minute. When the experiment was repeated under the same conditions with another gas G, gas G was found to diffuse through the same pore at a rate of 26.26cm³ per minute. Work out the molecular mass of Gas G. (O=16, S=32) (3mks)
- Calculate the volume of 0.6M sulphuric (VI) acid solution needed to neutralize 30cm³ of 0.2M potassium hydroxide. (2mks)

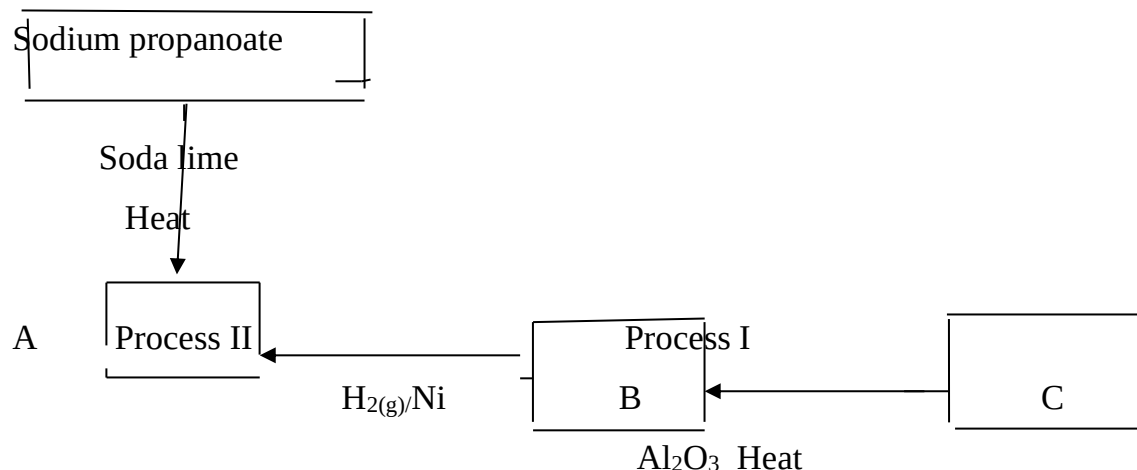


- What is meant by dynamic equilibrium? (1 mk)
 - State and explain observation made, when a few pellets of Potassium Hydroxide are added to equilibrium mixture (2 mks)
6. Study the standard reduction potentials below and answer the questions that follow; The letters are not actual symbols of the elements
- | Half cell | E volts |
|---|---------|
| $\text{P}^{2+}(\text{aq}) + 2\text{e}^- \rightarrow \text{P}(\text{s})$ | - 0.76 |
| $\text{R}^{2+}(\text{aq}) + 2\text{e}^- \rightarrow \text{R}(\text{s})$ | - 2.37 |
| $\text{S}^+(\text{aq}) + 1\text{e}^- \rightarrow \text{S}(\text{s})$ | + 0.80 |
| $\text{T}^{2+}(\text{aq}) + 2\text{e}^- \rightarrow \text{T}(\text{s})$ | - 0.14 |
- Select the element which is the strongest reducing agent. Give a reason. (1mk)
 - Select two half cells when combined would produce the largest e.m.f (1mk)
 - Calculate the e.m.f of the electrochemical cell formed when the two half cells in (ii) above are combined. (1mk)
7. The structure below represents two cleansing agents A and B.



- Name the cleansing agents
 A(1mk)
 B(1 mk)
- State a cleansing agent that would be suitable for washing in water containing calcium chloride. Give a reason. (1mk)

8. Study the reaction scheme below and answer the questions that follow.



a) Identify substances

(1mk)

A.....

C.....

b) Another substance D combines with one mole of hydrogen gas to form substance B. Give the structural formula of D .

(1mk)

c) Explain how you would distinguish between $\text{C}_2\text{H}_6\text{O}$ and $\text{C}_2\text{H}_4\text{O}_2$

(1mk)

9. Name the following processes;

a) When anhydrous calcium chloride is left in an open beaker overnight a solution was formed.(1mk)

b) When sodium carbonate decahydrate crystals are left in an open beaker for some days it turned into a powder. (1mk)

10. The standard enthalpies of combustion of ethyne (C_2H_2), carbon (C) and hydrogen (H_2) are - 1300 kJ/mol, -394 kJ/mol and -286 kJ/mol respectively. Calculate the enthalpy of formation of ethyne. (3mks)

11. The following data gives the PH values of solutions A, B, C.

SOLUTION	PH
A	13.9
B	7.0
C	1.5

a) i) Which solution gives a pink colour after adding a few drops of phenolphthalein indicator? (1mk)

ii) Give the possible identity of that solution.

(1mk)

b) Which solution would produce Carbon(IV)Oxide when reacted with Copper(II) Carbonate.(1mk)

12. Explain the following;

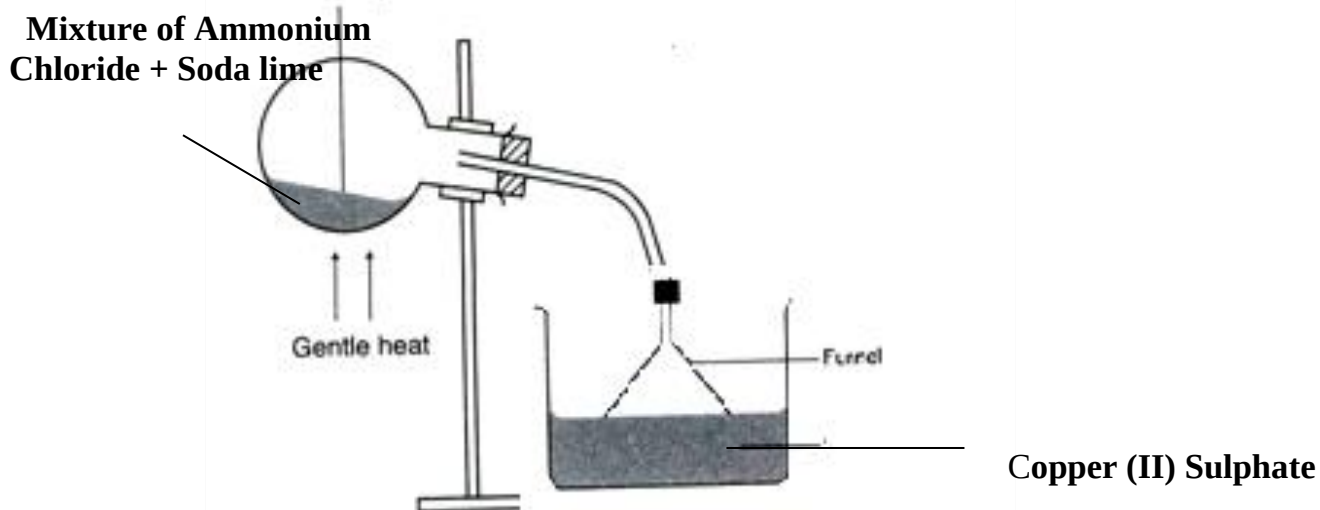
a) Oxide ion (O^{2-}) has a larger radius than oxygen atom (O).

(1mk)

b) Calcium is a weaker conductor of electricity compared to aluminium.

(1mk)

13. A student prepared ammonia gas and bubbled it into a solution of Copper (II) Sulphate as shown below.



a) State one observation made in the beaker and one made in the round bottomed flask.

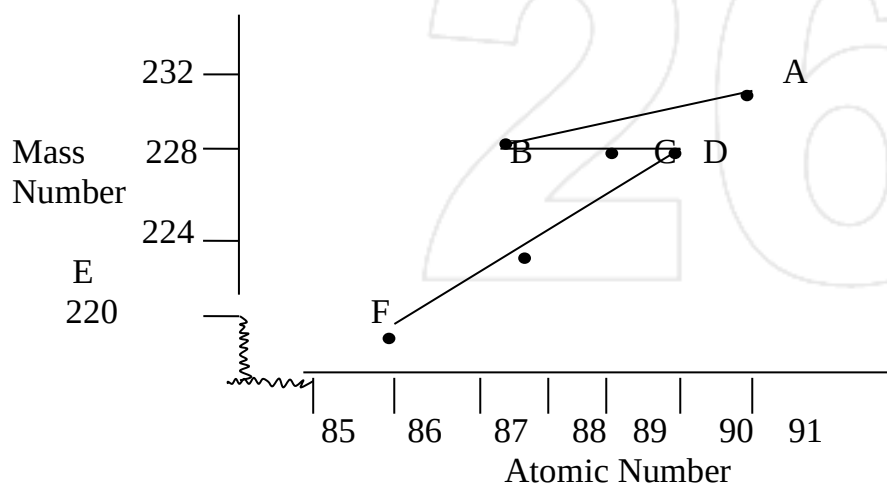
i) A short **while** (1mk)

ii) A long **while** (1mk)

b) Write the formula of the ion formed in the beaker for (ii) above. (1mk)

14. a) Define the term half **life** (1mk)

b) The graph below represents a radio active decay series for Isotope A. Study it and answer the questions that follow;



a) Name the type of radiation involved when;

(i) A changes to B (1mk)

(ii) B changes to C (1mk)

15. a) One of the uses of sulphur is in vulcanization of rubber. Define vulcanization. (1mk)

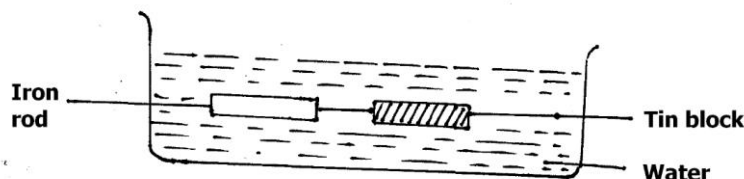
b. State one properties that vulcanized rubber possesses. (1mk)

16. The table below shows the standard electrode potential of four elements.

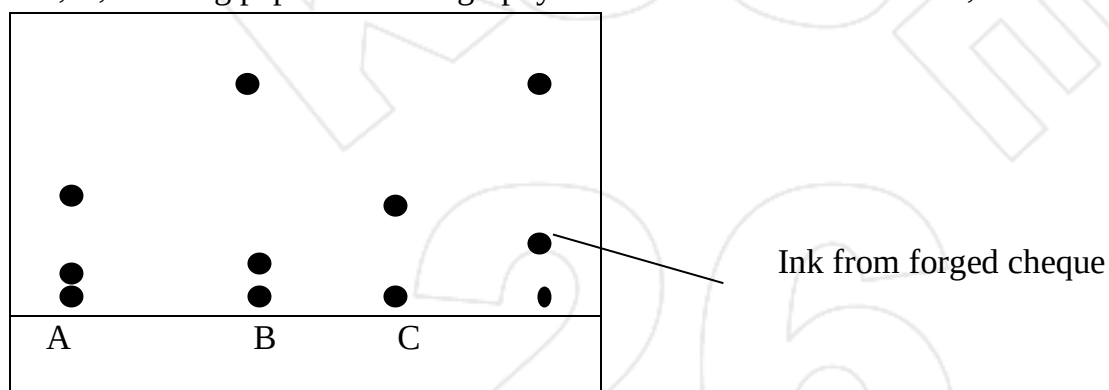
Element	V	W	X	Y	
E°	-0.55	0.00	+0.20	+0.35	

- a) Arrange the elements in order of reactivity starting with the most reactive. (1mk)
- b) Identify element W. Give a reason for your answer. (2mks)

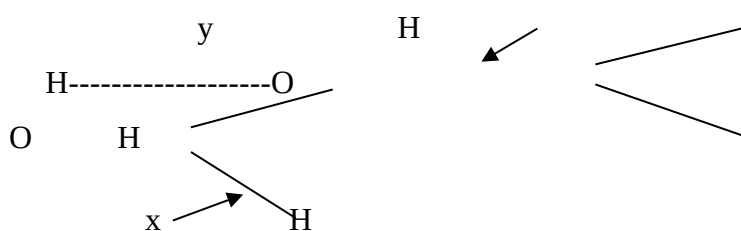
17. The set – up below was used by a student to try to prevent the rusting of an Iron rod.



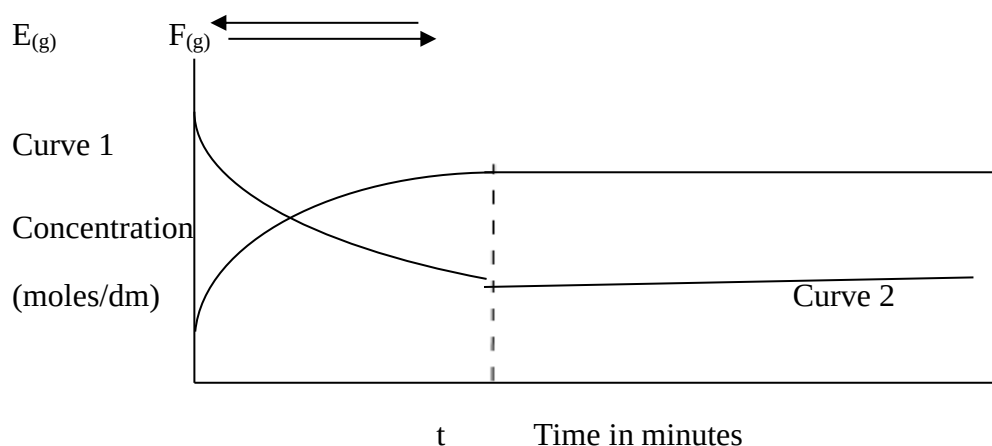
- (a) Did the student succeed in preventing the rusting of Iron using the set – up above? (1mk)
- b) Which method of rust prevention was the student investigating. (1mk)
18. Ink from a signature that forged a cheque was compared with ink from pens of three suspects A, B, C using paper chromatography. The results were as follows;



- a) Describe how the ink was taken from the forged cheque. (2mks)
- b) Which suspect was not guilty? (1mk)
19. The diagram below shows the structure of the molecules of water.



- a) Name the types of bonds labelled x and y. (1mk)
- b) Explain why water has a higher melting point than Hydrogen Sulphide. (1mk)
20. The curves below represents the changes in the concentrations of substances E and F with time in the reaction.



a) Which curve represents the changes in the concentration of substance F? Give a reason. (2mks)

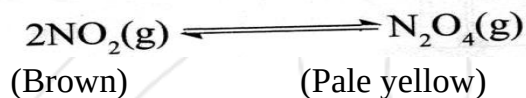
b) Give a reason for the shapes of the curves after time (t) minutes. (1mk)

22. Potassium salt gave white precipitate with Barium Nitrate solution. An addition of dilute Hydrochloric Acid, the white precipitate disappear and a colourless gas that turns acidified potassium dichromate (VI) green was evolved.

a) Write the formula of the compound which formed the white precipitate. (1mk)

b) Write the equation for the reaction between dilute hydrochloric acid and the compound whose formula is written in(a) above. (1mk)

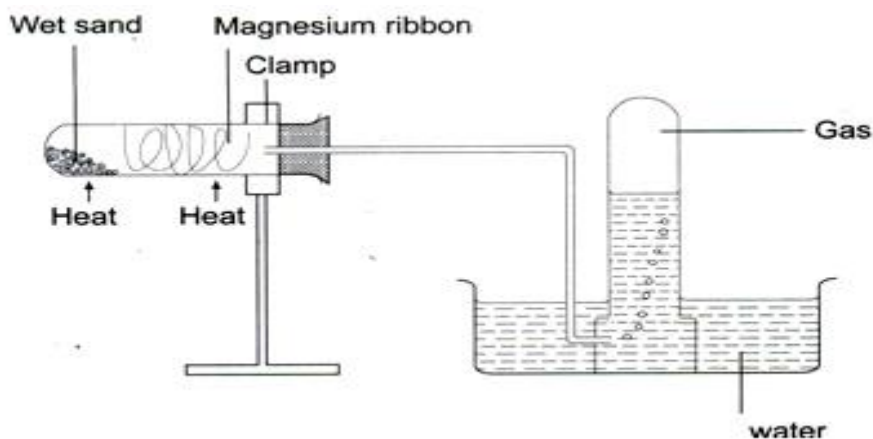
23. NO_2 and N_2O_4 gases exists in equilibrium as shown below.



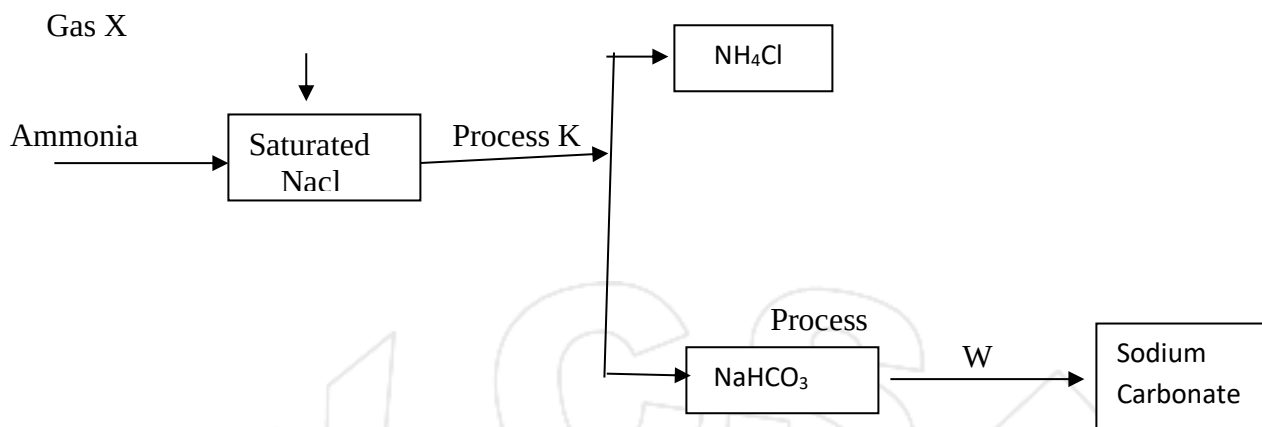
a) State Le Chatelier's principle (1mk)

b) State and explain the effect of increased pressure on the equilibrium. (1mk)

24. A student set up the experiment below to collect gas Q.



- a) Name the gas Q. (1mk)
- b) Write the equation for the reaction in the boiling tube if magnesium was replaced with iron (1mk)
- c) State two uses of gas Q (1mk)
25. The Schematic diagram is part of the Solvay process used for the manufacture of sodium carbonate.



- i) Name gas x (1mk)
- ii) Identify process K (1mk)
- iii) Write the equation for the reaction in process W. (1mk)
26. The solubility of potassium nitrate is 85g/100g of water at 50°C and 32g/100g of water at 25°C.
- a) Define the term solubility. (1 mark)
- b) Calculate the mass of the crystals formed if a saturated solution of potassium nitrate in 50g of water at 50°C is cooled to 25°C. (2 marks)
27. Chlorine gas was bubbled through water and observation made after 24 hours
- a) Draw a diagram to show the observation made after 24 hours. (2 marks)
- b) Write an equation for the reaction that occurs when chlorine gas is bubbled into hot concentrated sodium hydroxide (1mk)
- c) One of the products in (b) above is used as an antiseptic. State its other use (1mk)
28. Aluminium is extracted from its ore by the process of electrolysis. (1mk)
- (i) Name the ore of aluminium that is normally used.
- (ii) Aluminium ore in (i) above has very high melting point (2015°C) though it is electrolysed at a lower temperature of about 900°C. Explain how the low temperature is achieved. (1mk)
- (iii) In the above process graphite electrodes are used. What is the disadvantage of using this kind of electrode. (1mk)

29. Study the reaction below and answer the questions that follow

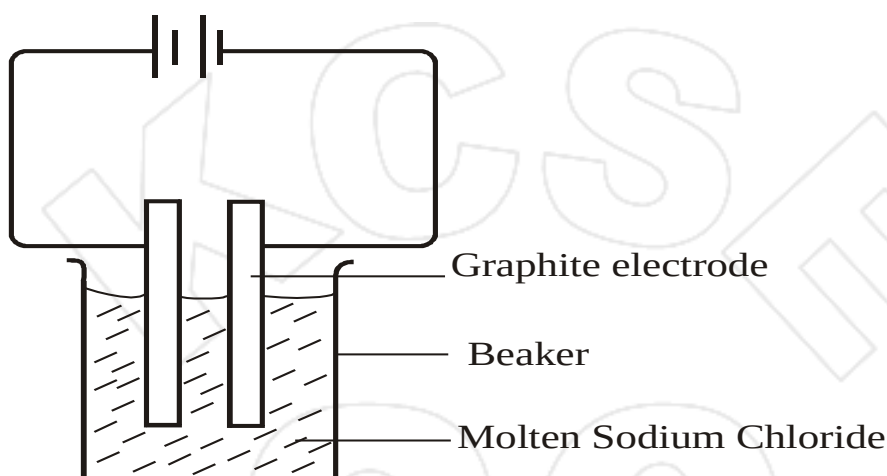


- (a) Give the Bronstad-Lowry definition of acid (1mk)
 (b) Identify an acid in the backward reaction (1 mark)

30. When 34.8g of hydrated sodium carbonate $\text{Na}_2\text{CO}_3 \cdot n\text{H}_2\text{O}$ were heated to a constant mass.

15.9g of anhydrous sodium carbonate were obtained. Find the value of “n” in hydrated carbonate (Na= 23), (O = 16), (C= 12), (H = 1.0) (3 mks)

31. The diagram below represents an experiment which was carried out by a student, to investigate the effect of passing an electric current on molten sodium chloride.



a. Molten sodium chloride is a binary electrolyte. State the meaning of the term binary electrolyte. (1mk)

b. State two observations made at the anode (1 mk)

c. Write an equation to show what happens at the cathode. (1 mk)

32. Starting with Copper metal, describe how a solid sample of Copper (II) nitrate can be prepared. (3mks)

KCSE 2026 FINAL PREDICTIONS**CONFIDENTIAL EXAM 10**

233/2

CHEMISTRY**PAPER 2**

TIME: 2 HOURS

NAME.....

SCHOOL..... SIGN.....

INDEX NO..... ADM NO.....

*Kenya Certificate of Secondary Education.***INSTRUCTIONS TO CANDIDATES**

- Write your name, admission number, date and school in the spaces provided.
- Answer all the questions in the spaces provided.
- All working must be clearly shown where necessary.
- Scientific calculators may be used.

FOR EXAMINERS' USE ONLY

Questions	Maximum Score	Candidate's Score
1	14	
2	12	
3	07	
4	12	
5	14	
6	11	
7	13	
	80	

1. Use the information in the table below to answer the questions that follow. The letters do not represent the actual symbols of the elements.

Element	Atomic number	Melting point $^{\circ}\text{C}$
R	11	97.8
S	12	650.0
T	15	44.0
U	17	-102.0
V	18	-189.0
W	19	64.0

(a) Give a reason why the melting point of

(i) **S** is higher than that of **R**. (2 marks)

(ii) **V** is lower than that of **U**. (2 marks)

(b) How does the reactivity of **W** with chlorine compare with that of **R** with chlorine? (2 marks)

(c) When 0.30g of **R** was reacted with water 1600cm³ of gas was produced. Determine the relative atomic mass of **R**. (Molar gas volume = 24000cm³ r.t.p) (3 marks)

(d) Give **one** use of element **V**. (1 mark)

(e) Draw a structure of the compound formed when **S** reacts with **U**. (1 mark)

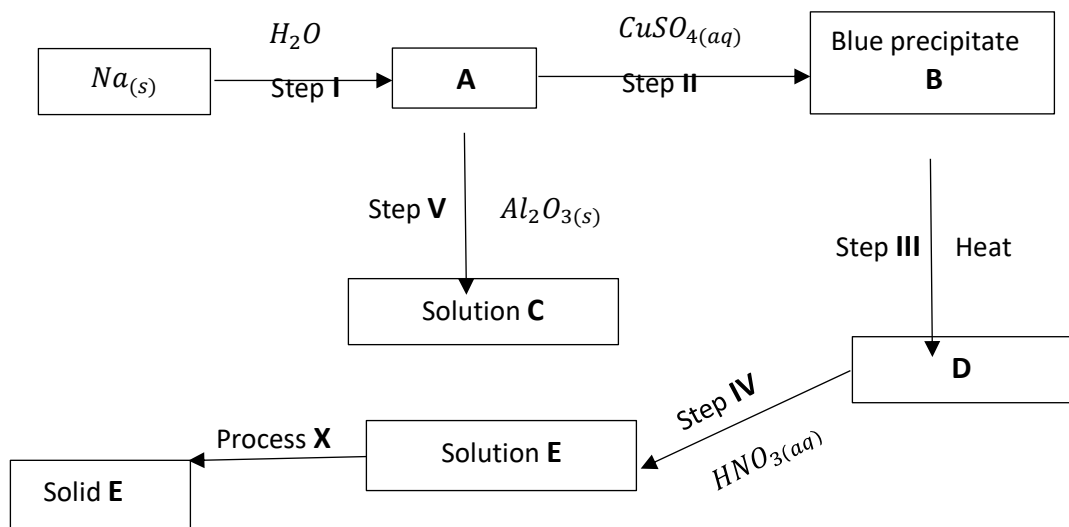
(f) Compare the atomic radius of element **S** and **V**. Give a reason. (2 marks)

2.(a) Give the name of the following processes.

(i) A hot saturated solution of copper (II) sulphate is cooled to form crystals of copper (II) sulphate.

(ii) A white powder is formed when concentrated sulphuric (VI) acid is added to blue hydrated copper (II) sulphate. (1 mark)

(b) Study the flow chart below and answer the questions that follow.



(i) Name substances: (4 marks)

B

C

D

Solid E

(ii) Write equations for the reactions in steps; (2 marks)

III

V

(iii) Write the ionic equation for the reaction in step **II**. (1 mark)

(iv) State any **two** observations made in step **I**. (2 marks)

(c) Write an equation to show how addition of ammonia solution is used to remove temporary water hardness. (1 mark)

3.4g zinc powder was added to 200cm³ of 1M CuSO_{4(aq)}. During the experiment there was a temperature rise of 10K. If the density of the solution was 1g/cm³ and specific heat of the solution was 4.2kJ/kg/K;

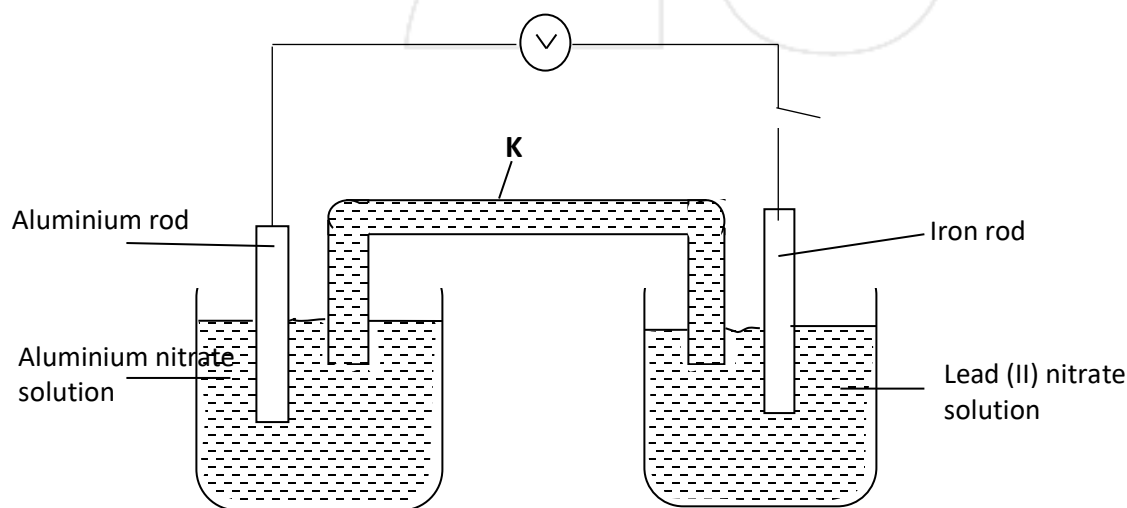
(a) determine the energy change of the reaction. (Zn = 65) (2 marks)

(b) What would be the enthalpy change of the above reaction? (3 marks)

(c) Write a thermochemical equation to represent the above reaction. (1 mark)

(d) State **two** observations made when zinc powder is added to copper II sulphate solution. **1 mark)**

4.(a) The diagram below shows electrochemical cell. Study it and answer the questions that follow.



Given the following:



(i) On the diagram, show the direction of flow of;

(I) Electrons

(½ mark)

(II) Current

(½ mark)

(ii) Name a substance that is used to fill part **K**. Give a reason.

(2 marks)

(iii) State the **two** observations made in the half cell containing iron (II) ions.

(2 marks)

(iv) Write the half ionic equation for the reaction that results into oxidation.

(1 mark)

(v) Write the cell diagram for this electrochemical cell.

(1 mark)

(vi) Give any one use of the part **K**.

(1 mark)

(b) In an experiment to electroplate iron with silver, current of 1 Ampere was passed through a silver solution of ions for 60 minutes.

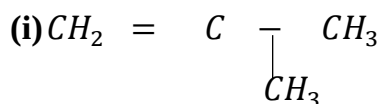
(i) Give a reason why it is necessary to electroplate iron.

(1 mark)

(ii) Calculate the mass of silver deposited on iron during the electroplating process. (3 marks)

(Ag = 108, IF = 96500c)

5.(a) Give the systematic names of the following compounds.



(1 mark)

(ii) $CH_3CH_2CH_2C \equiv CH$ (1 mark)

(b) State the observations made when Propan-1-ol reacts with:

(i) Acidified potassium dichromate (VI) solution.

(1 mark)

(c) Ethanol obtained from glucose can be converted to ethane as shown below.



Name and describe the process that takes place in steps I and II.

Step I

(1 mark)

Step II

(1 mark)

(d) Compounds A and B have the same molecular formula $C_3H_6O_2$. Compound A

liberates carbon (IV) oxide on addition of aqueous sodium carbonate while compound B does not.

Compound B has a sweet smell. Draw the possible structures of;

(i) Compound A (1 mark)

(ii) Compound B (1 mark)

(e) Give **two** reasons why the disposal of polymers such as polychloroethane by burning pollutes the environment. (2 marks)

(f) Some animal and vegetable oils are used to make margarine and soap. Give the reagents and conditions necessary for converting the oils into:

(i) Margarine (1 mark)

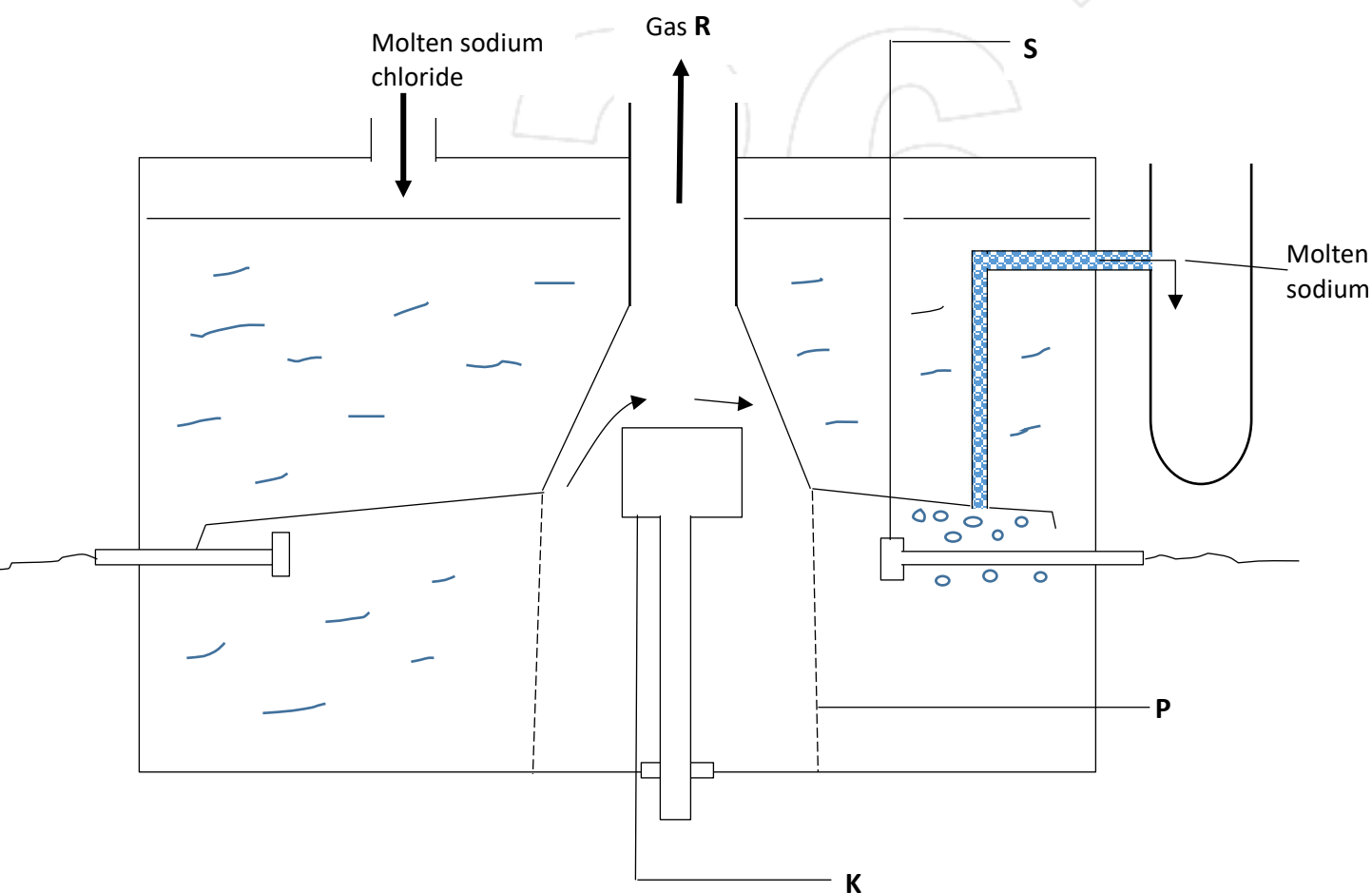
(ii) Soap (1 mark)

(g) (i) The use of CFCs has been linked to depletion of ozone layer. What does CFC stand for? (1 mark)

(ii) Explain the problem associated with the depletion of the ozone layer. (1 mark)

(iii) State another environment problem caused by CFCs. (1 mark)

6. Use the diagram below to answer the questions that follow.



(a) Identify the substances labelled. (2 marks)

R

S

K

P

(b) What is the function of the part labelled P? (1 mark)

(c) Write half equations at the electrodes. (2 marks)

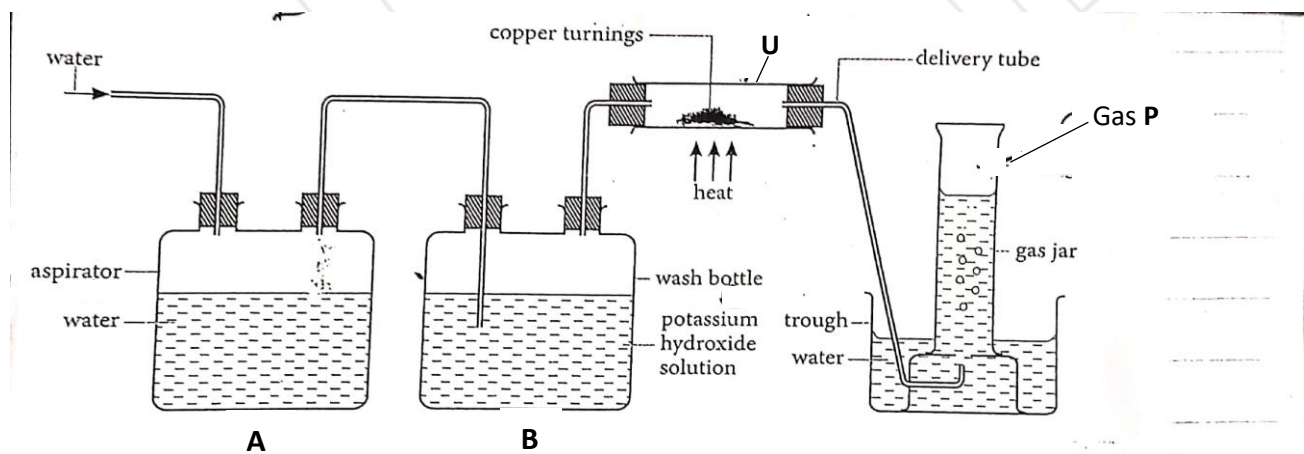
(d) Why is molten sodium chloride used instead of sodium chloride solution? (1 mark)

(e) Why is calcium chloride added in the electrolysis of molten sodium chloride? (1 mark)

(f) How is the calcium eventually separated from the sodium? (2 marks)

(g) When sodium is left exposed in the air a white solid is formed but when sodium is burnt in oxygen, a yellow solid is formed. Explain this difference using equations. (2 marks)

7.(a) The diagram below was used to obtain gas P in the laboratory. Study it and answer the questions that follow.



(i) State the role of aspirator A. (1 mark)

(ii) Write an equation in wash bottle B. (1 mark)

(iv) Give the name of apparatus U. (1 mark)

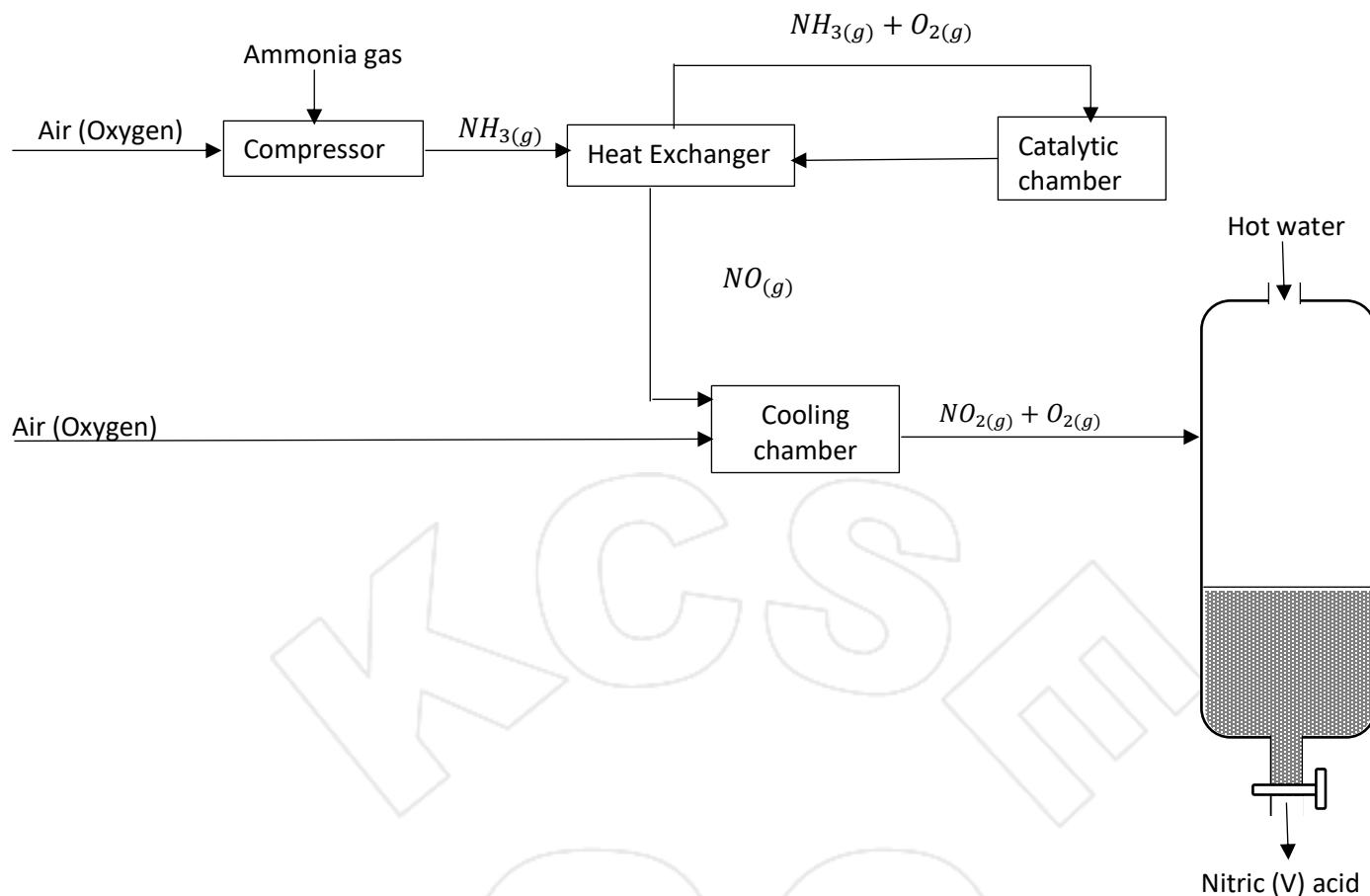
(v) State and explain the observation made in apparatus U. (1 mark)

(vi) Gas P was found to be denser than the form obtained when heating ammonium nitrate.

I. Write an equation for decomposition of ammonium nitrate. (1 mark)

II. Explain the difference in densities of two gases. (1 mark)

(b) The chart below is used in industrial preparation of Nitric (V) acid.



(i) State the role of heat exchange.

(1 mark)

(ii) Write the equation in the catalytic chamber.

(1 mark)

(iii) State **three** conditions in the catalytic chamber.

(1 ½ marks)

(iv) State observations made in cooling chamber.

(½ mark)

(v) Name **one** method of concentrating Nitric (VI) acid obtained.

(1 mark)

(vi) State uses of Nitric (VI) acid.

(2 marks)

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In the event that any of these revision questions closely match or appear in the upcoming national examinations, please stay composed.

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