





FORM 3 CHEMISTRY 2024 NOVEMBER-DECEMBER HOLIDAY ASSIGNMENT

INSTRUCTIONS:

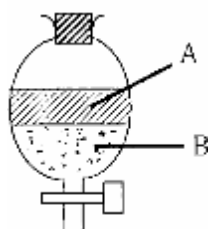
Answer all the questions

WEEK 1

1. a) Name three illegal drugs (3 marks)
- b) State three ways of preventing drug abuse. (3 marks)
2. Complete the following table (8mks)

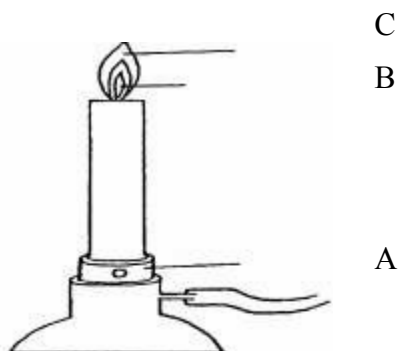
Apparatus	name	use
i 		
ii 		
iii 		
iv 		

3. State two laboratory safety rules (2mks)
4. The apparatus below were used to separate a mixture of liquid A and B.



- a) State two properties of liquids that make it possible to separate using such apparatus.
- b) Give the name of the above apparatus. (1 mark)
5. Describe how you can separate a mixture of sand and common salt (3 marks)

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



i) Name the regions labelled B and C. (2 marks)

ii) What is the function of the part labeled A? (1 mark)

7. State three differences between physical and chemical change. (3 marks)

8. i) Differentiate between an acid and base (2 marks)

ii. The following is a list of pH values of some substance: Substance M N V X Z

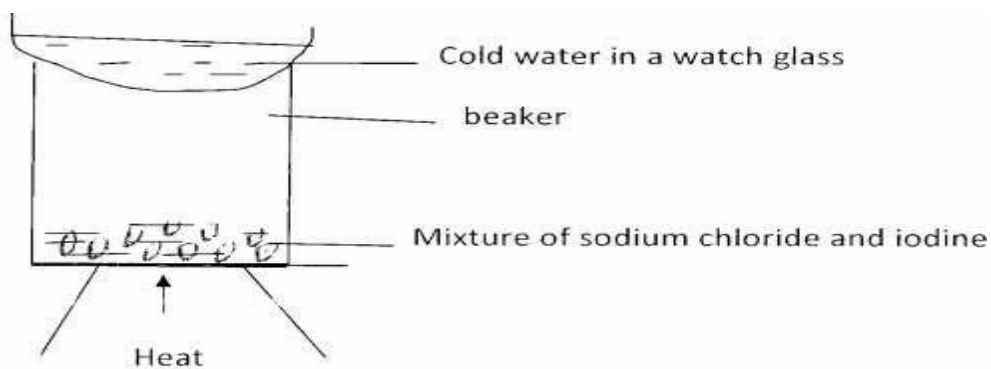
pH 10.6 ,7.2 ,13.2 ,5.9, 1.5 respectively Identify:

a) Strong acid

b) Weak base (1 mark)

WEEK 2

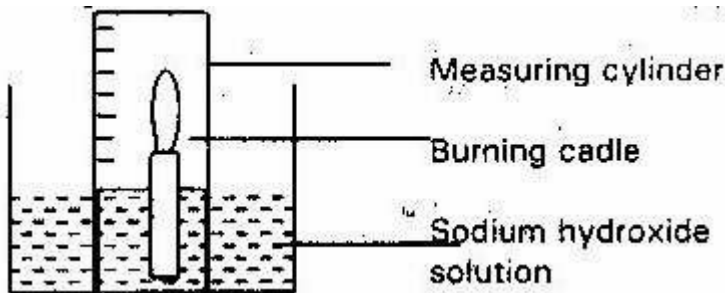
9. A form one student wanted to separate and obtain iodine and sodium chloride (common table salt) from a mixture of the two. He set the experiment set up shown below.



(a). the mixture was heated for some time and left to cool. On cooling, shiny black crystals and white crystals were observed on the surface of the watch glass and in the beaker respectively. Name:

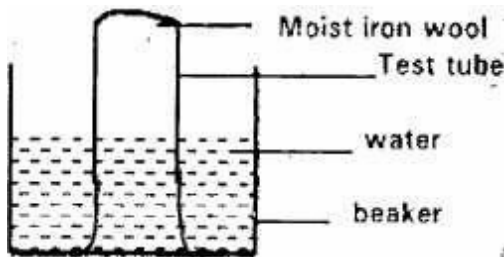
- i. Shiny black crystals (1mk)
 - ii. White crystals (1mk)
- (b). what was the purpose of the cold water in the watch glass? (1mark)
- (c). what property of iodine makes it be collected on the watch glass as shown? (1mark)
- (d). Explain why it is possible to separate a mixture of iodine and sodium chloride. (1mark)

10. A candle was burnt using the apparatus shown below. The initial volume of measuring cylinder was 90cm³. The apparatus was allowed to cool and the volume of air in the measuring cylinder had dropped to 70cm³.



- a) Why was the volume recorded when the air was cooled? (1mk)
- b) What was the purpose of sodium Hydroxide? (1mk)
- c) Use the results given to calculate the percentage of oxygen in air. (2mks)

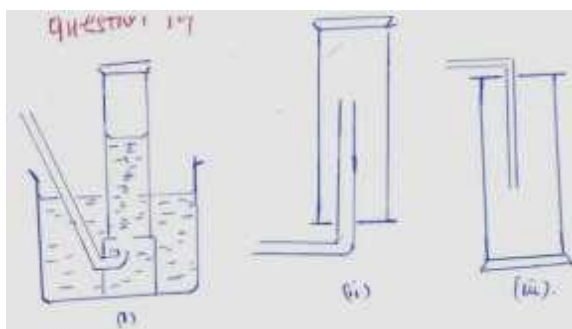
11. The set up below was used to study some properties of air



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

12. The diagram below represents three methods for collecting gases in the laboratory

- a) Name the methods shown in the diagram (3mks)



- i
- ii
- iii

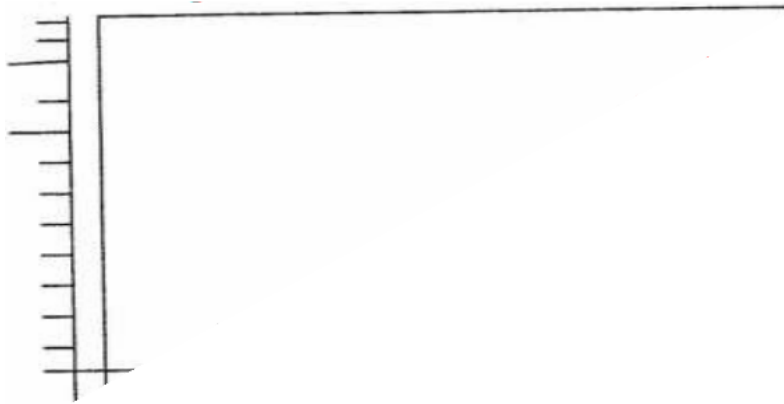
d) State with reasons the most suitable methods for collecting each of the following gases.

i) Oxygen (1mk)

ii) Hydrogen (1mk)

13. a) The diagram below shows spots of pure substance A, B, and C on a chromatography paper. Spot D is that of a mixture after development, A, B and C were found to have moved 8cm, 3cm and 6 cm respectively.

D has separated into two spots which had moved 6cm and 8 cm



(i) On the diagram

I Label the baseline (origin) (1 mark)

II Show the positions of all the spots after development (3 marks)

(ii) Identify the substances present in the mixture D (2 marks)

(b) Describe how solid ammonium chloride can be separated from a solid mixture of ammonium chloride and anhydrous calcium chloride (2 marks)

Use the information given to answer the questions that follow

(i) Name the method that can be used to separate L1 and L3 from a mixture of two (1mk)

(ii) Describe how a mixture of L2 and L4 can be separate

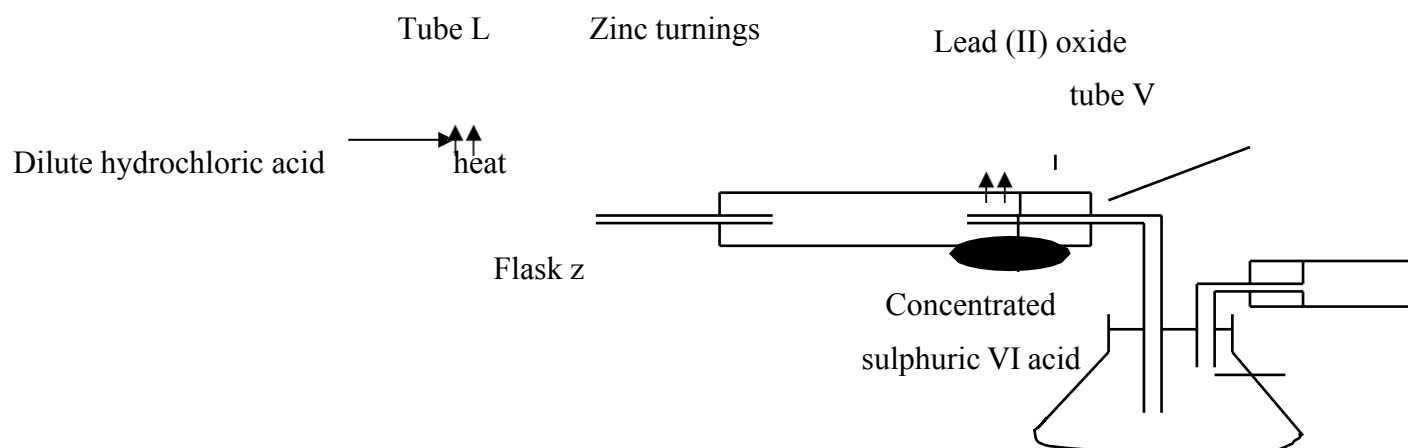
14. Complete the word equations for the following reactions; (3mks)

(a) Sodium carbonate + hydrochloric acid =

(b) Zinc + sulphuric acid =

(c) Potassium hydroxide + nitric acid =

15. In an experiment, dry hydrogen chloride gas was passed through heated Zinc turnings as shown in the diagram below. The gas produced was then passed through heated Lead II Oxide.



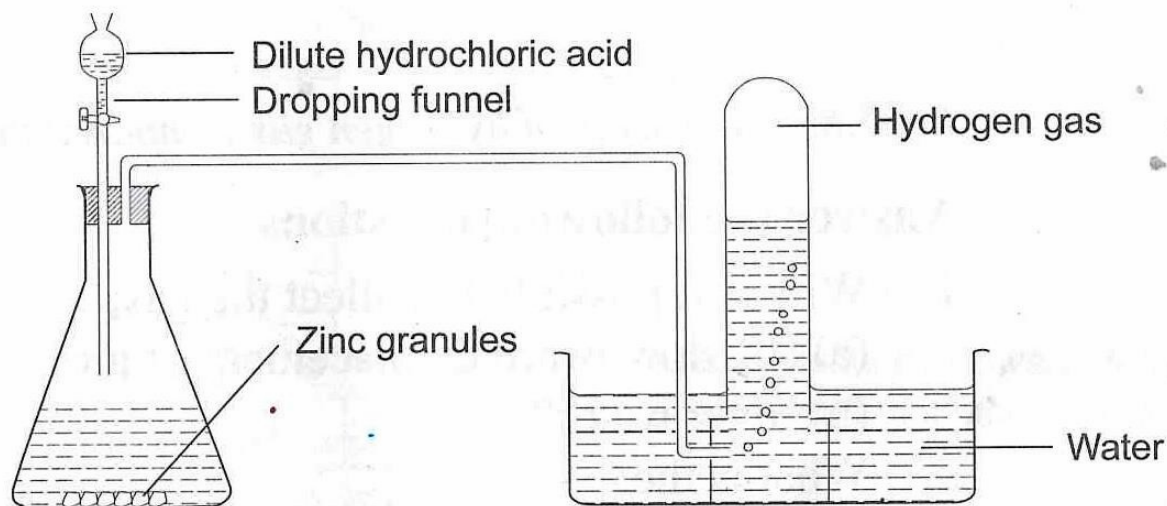
- I. What is the function of the water in the flask Z? (1 mark)
- II. Write word equation for the reaction that took place in the combustion tubes.(4marks)
- III. State three observations made when a piece of potassium is dropped in water (3mks)

WEEK 3

1. What is a fume chamber/cupboard and give its use

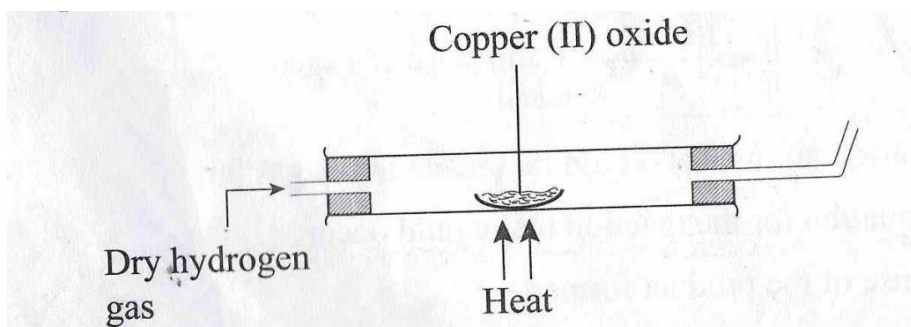
(2mks)

2. The setup below was used to prepare and collect hydrogen gas



- (a) write an equation for the reaction that produces hydrogen gas (2mks)
 - (b) Why is hydrogen gas collected over water (1mk)
 - (c) State what is observed when a few drops of phenolphthalein indicator were added to a solution of wood ash. (1mk)
3. Fractional distillation of liquid air is a method used to separate various gaseous mixture in air. Explain how to (3mks)
 - i)remove carbon(IV) oxide
 - ii) remove water
 - iii) obtain nitrogen

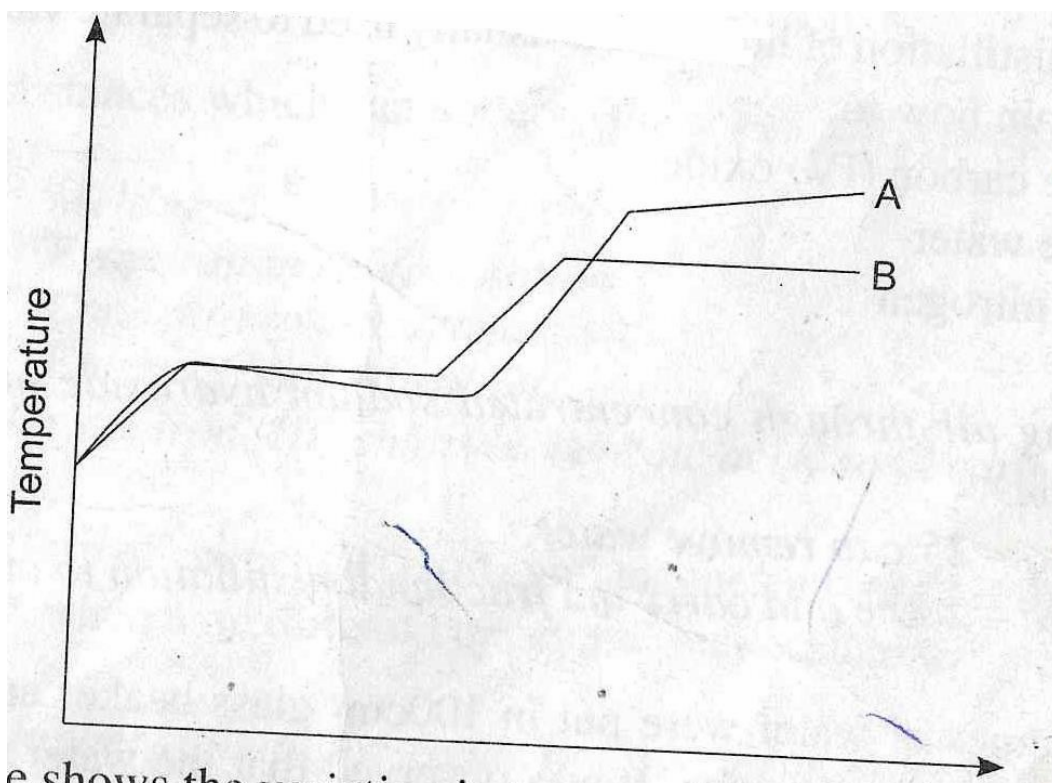
4. The following apparatus and chemicals are used to investigate the percentage of air used when iron rusts: iron fillings, 100ml measuring cylinder, trough and water.
- a) Draw a setup of the experiment (2mks)
5. What is the method used to obtain sunflower oil from sunflower seeds (1mk)
6. After use, a non-luminous flame should be put off or adjusted to a luminous flame. Explain (2mks)
7. Draw and show the electron arrangement of phosphorus (atomic number 15) (2mks)
8. Atoms are made up of subatomic particles. Name them (3mks)
9. In an experiment hydrogen gas was passed over heated copper(II) oxide as shown.



- i. State the observations made in the combustion tube after the experiment (2mks)
- ii. Write the equation for the reaction between copper(II) oxide and hydrogen gas (1mk)
- iii. Explain why heat is necessary in this experiment. (1MK)

WEEK 4

10. The curves below represent the variation in temperature with time when pure and impure samples of a solid were heated separately.



- i. Which curve shows variation in temperature of a pure solid. Explain (2mks)
- ii. state the effect of an impurity on the melting and boiling points of a pure substance (2mks)

11. The table below gives the atomic number of elements M,N,P,Q,R,S and T. The letters are not the actual symbols of the elements.

Element	M	N	P	Q	R	S	T
Atomic no.	12	13	14	15	16	17	18

- a)
 - i. Write the electron arrangement of element P (1mk)
 - ii. The stable ion of N (2mk)
- b) Write the formula of the compound formed between N and S (2mks)

c) Using dot (.) and cross (x) diagram show how bonding occurs between P and S
(2mks)

d) Using dot (.) and cross (x) diagram show how bonding occurs in water molecule.H₂O
(2mks)

12. Explain the following observations

i. Noble gases are generally unreactive (1mks)

ii. Atomic radius of alkali metals increase down the group (1mk)

iii. Aluminium is a better conductor of electricity than sodium
(1mk)

13. An element Q consists of three isotopes with mass number of 22,24 and 25 with percentage abundance of 89.6%,6.4% and 4% respectively.Find the relative atomic mass of element Q.
(2mks)

14. Write the formula of the compounds below.

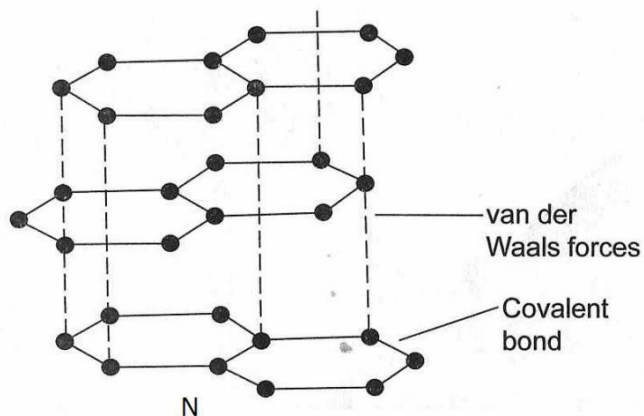
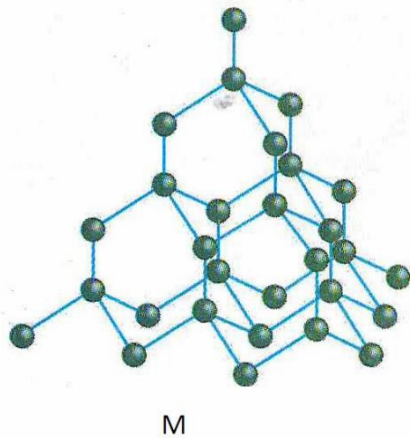
(3mks)

NAME	FORMULAR OF COMPOUND
COPPER(I) OXIDE	
IRON(II)SULPHATE	
SULPHUR(IV)OXIDE	

15. List any 3 elements that belong to group (VIII)of the periodic table

(3mks)

16. The following diagrams show the structures of two allotropes of carbon. Study them and answer the questions that follow.



i. Name allotrope (2mks)

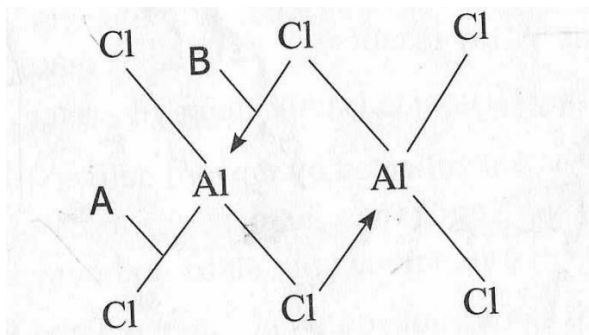
M N

Give one use of N (1mk)

ii. Which allotrope conducts electricity? Explain

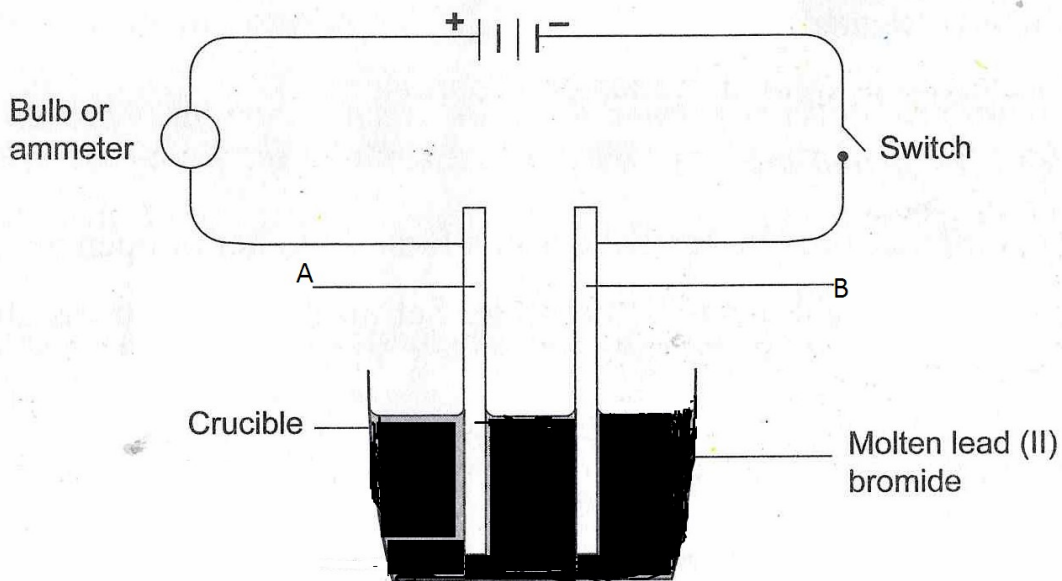
(2mks)

17. Below is a structure of Aluminium chloride.



- i. Identify the bonds labelled A and B (2mks)
- ii. Aluminium oxide is said to be an amphoteric oxide, what is an amphoteric oxide (2mks)

18. study the diagram below and use it to answer the questions that follow.



- i) Differentiate between electrolyte and non-electrolyte (2mks)
- ii) Identify electrode A and B (2mks)
- iii) Write the electrode half equation at electrode A (1mk)
- iv) State any two applications of electrolysis (2mks)

19. Write the chemical equation for the effect of heat on

(2mks)

- i) Lead carbonate- $\xrightarrow{\text{heat}}$
 ii) State two uses of carbon(IV)oxide

(2mks)

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

L							L	
M	P			T		J	U	X
N	Q		R	S			V	Y
							W	

- a) Explain why element **L** appears in two different groups in the grid above (2mk)
- b) State the name of the chemical family to which **P** and **Q** belong (1mk)
- c) Write the formula of the compound formed between **P** and **V** (1mk)
- d) Compare the melting points of **Q** and **V**. Explain (2mks)
- e) Write the equation for the burning of **T** in excess air (1mk)
- f) State **two** use of element **X** (2mk)
21. Define the term efflorescence (2mks)

WEEK 5

1. The grid below shows a section of the periodic

K	L			M		N	P	
	Q			R	S	T	V	
W								
			10					

- a) Name the family into which element **P** belongs to (1mk)

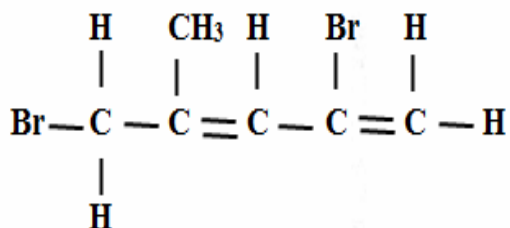
- b) Which two elements forms the most soluble carbonates (1mk)
- c) With a reason, identify elements in period 3 with the largest atomic radius (2mks)
- d) Write the formula of the compound formed between Q and M (1mk)
- e) State two uses of element R and for each use, state property of element R that 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 Q and oxygen (2mks)

g) In terms of structure and bonding explain why the oxides of element T has relatively low boiling points (2mks)

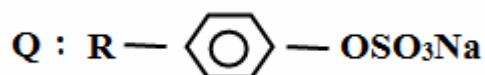
2. (a) Name the following compounds (3mks)



(ii)



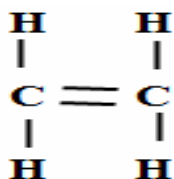
b) Two types of detergents P and Q can be represented as



- (i) Identify each type of the detergent (2mks)
- (ii) Which of the two detergents is the best to use with hard water? Give a reason (2mks)

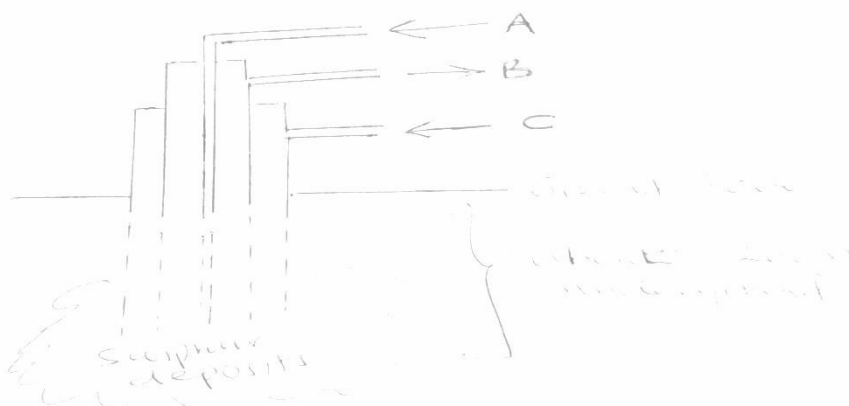
- (iii) State one advantage of detergent P (1mk)
 (iv) State one disadvantage of detergent Q (1mk)

(c) An hydrocarbon can be represented as follows



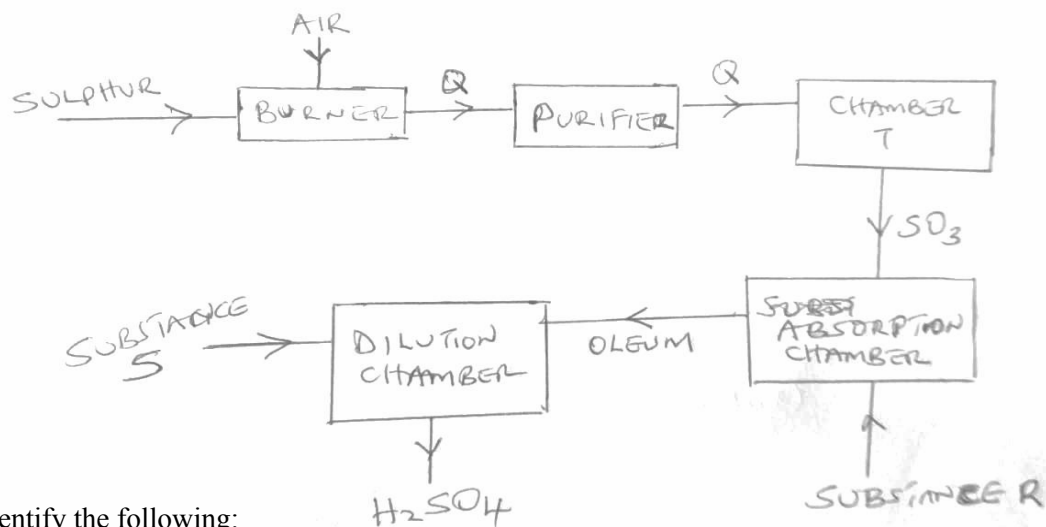
- (i) Identify the hydrocarbon (1mk)
 (ii) Name two reagents that can reacted together to generate the hydrocarbon (2mks)
 3.(a) Name two apparatus that can be used for determining mass in a laboratory (2mks)
 (b) One of the flames produced by Bunsen burner is the luminous flame
 i) Explain why this 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 component 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

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

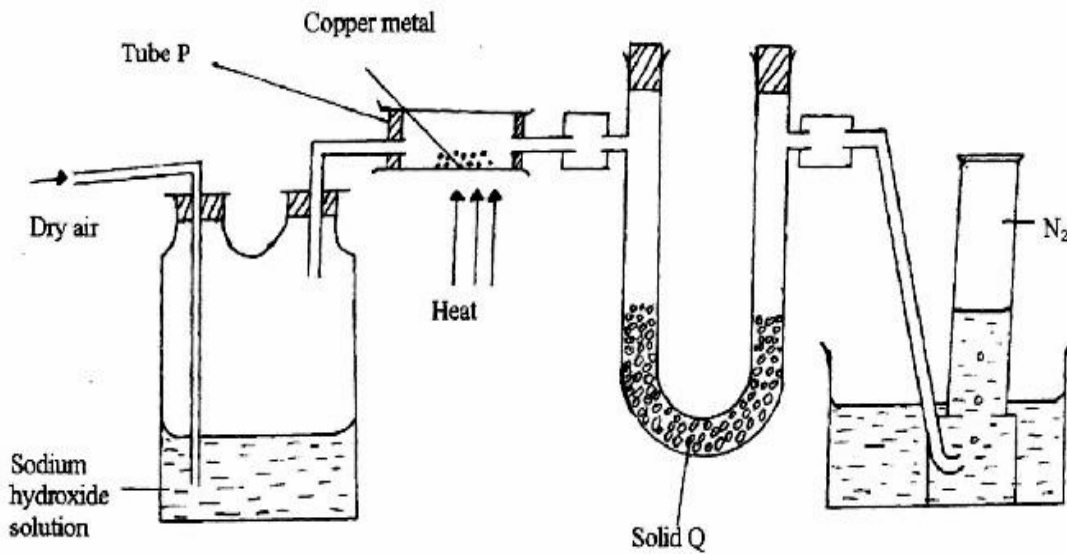


i) Identify the following:

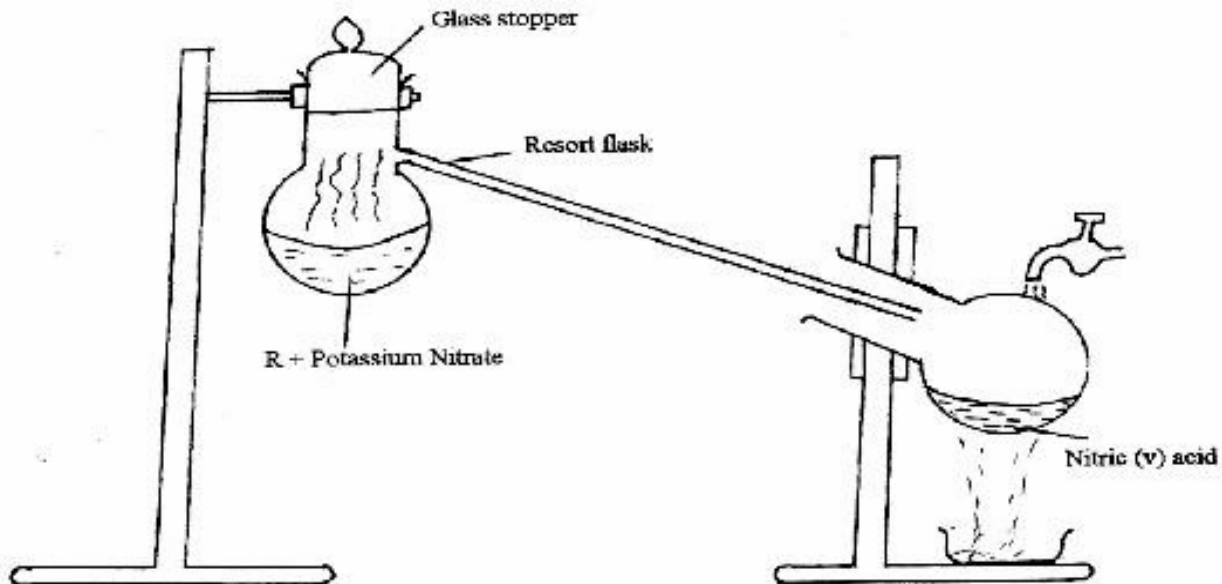
- a) Substance Q formed in the burner (1mk)
 - b) Chamber T (1mk)
 - c) Substance R (1mk)
 - d) Substance S (1mk)
- ii) Write the chemical equation occurring in the dilution chamber (1mk)
- iii) Why is it necessary to pass substance Q through a purifier (1mk)
- iv) State one use of sulphuric (VI) acid (1mk)

WEEK 6

5. (a) The diagram below represents a set-up that was used to obtain dry nitrogen from air. Study it and answer the questions that follow.



- (i) **Name** solid *Q*. (1mk)
- (ii) **What is** the purpose of sodium hydroxide? (1mk)
- (iii) **Write** an equation for the reaction which took place in tube *P*. (1mk)
- (iv) **Give the name** of one impurity in the nitrogen gas obtained. (1mk)
- (v) **Why is** liquid nitrogen used for storage of semen for artificial insemination? (1mk)
- (b) The set-up below was used to prepare nitric acid.



- I. **Give** the name of liquid *R*. (1mk)
- II. **Write an equation** for the reaction which took place in the retort flask. (1mk)

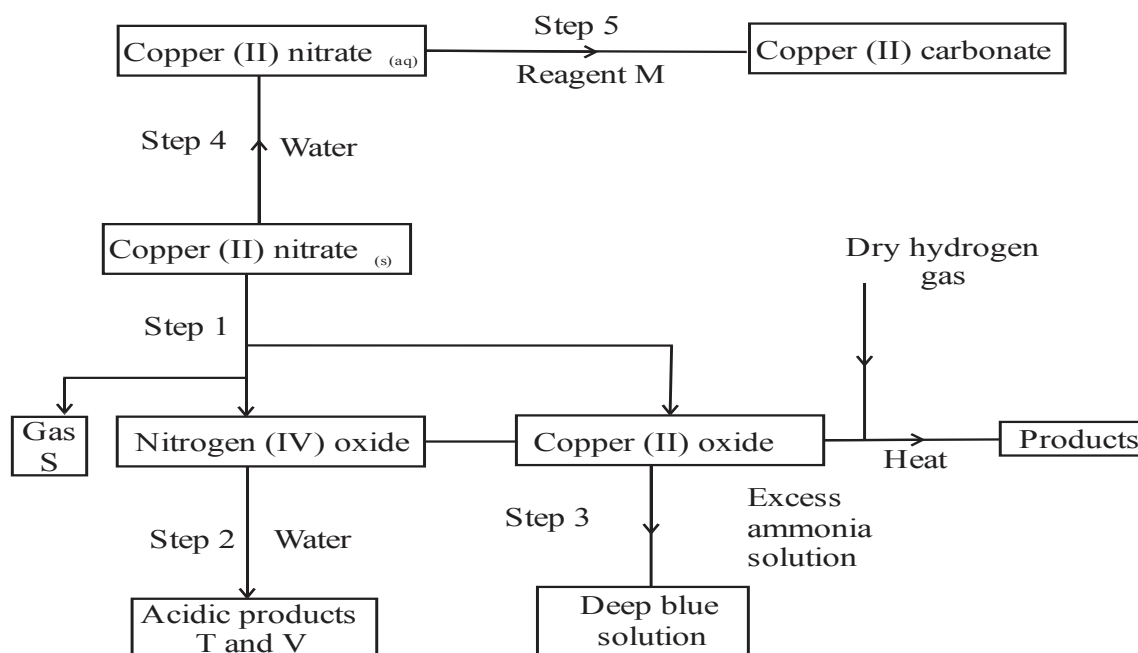
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III. **Explain** why: -

- (a) Nitric acid is not stored in clear/transparent glass. (2mks)

(b) The reaction between copper metal with 50% nitric acid (*one volume of acid added to an equal volume of water*) in an open test tube produces brown fumes. (2mks)

6. The flow chart below shows some reactions starting with copper (II) nitrate. Study it and answer questions that follow.



i) State the condition necessary in step 1 (1mk)

ii) Identify: (4mks)

Reagent M

Gas S

Acidic products T

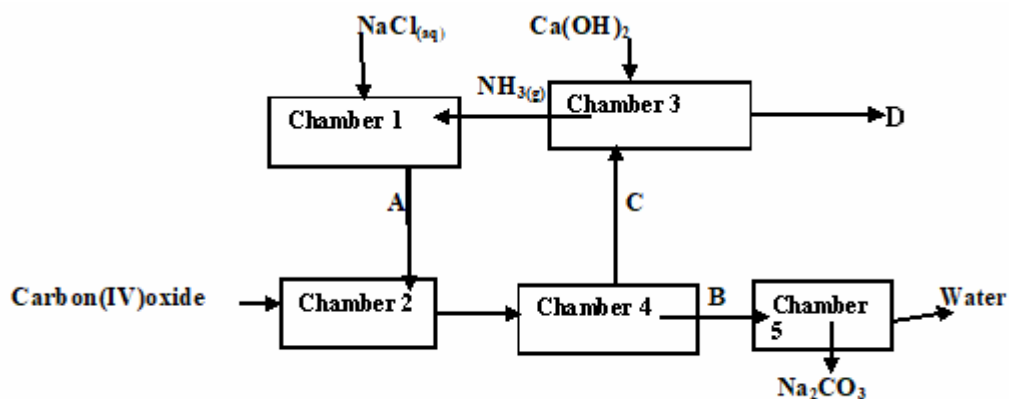
V

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iii) Write the formula of the complex ion formed in step 3. (1mk)

- iv) Write the equations for the reaction in (2 mks)
 Step 1
 Step 2

7. The flow chart below shows industrial manufacture of sodium carbonate. Study it and answer the questions that follow.



- (a) Name substances A, B, C and D. (4mks)
 A
 B
 C
 D
- (b) Write equation for the reactions taking place in chamber 2, 3 and 5. (3mks)
 Chamber 3
 Chamber 5
 Chamber 2
- (c) Name the physical process in chamber 4 and 5. (2mks)
 Chamber 4
 Chamber 5
- (d) Name **one** source of carbon (IV) oxide for Solvay process. (1mk)
- (f) give 2 uses of sodium carbonate (1mk)