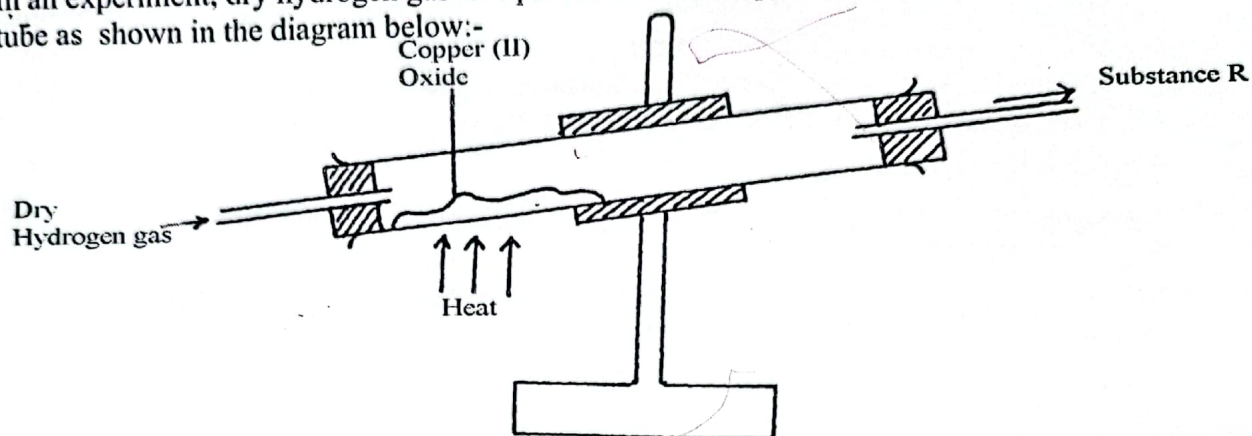


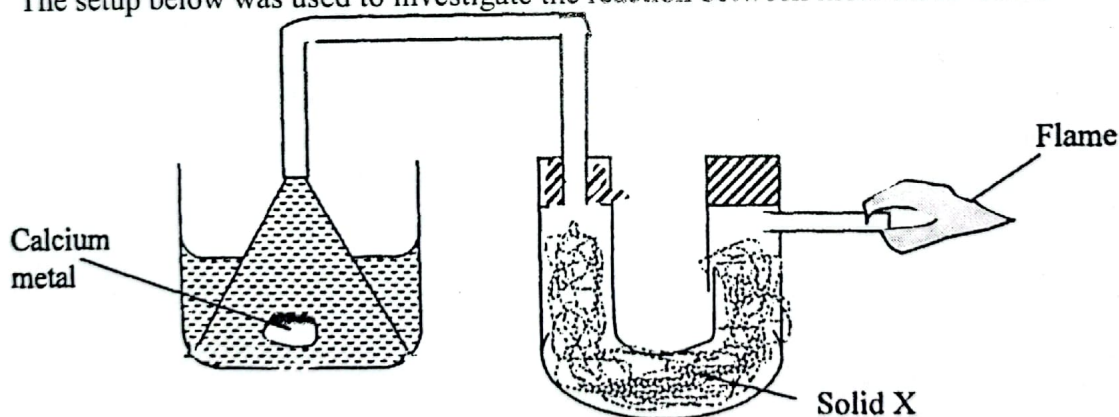
5. Water and hydrogen

1. (a) Hydrogen can reduce copper(II) oxide but not aluminium oxide. Explain
 (b) When water reacts with potassium metal the hydrogen produced ignites explosively on the surface of water.
 (i) What causes this ignition?
 (ii) Write an equation to show how this ignition occurs

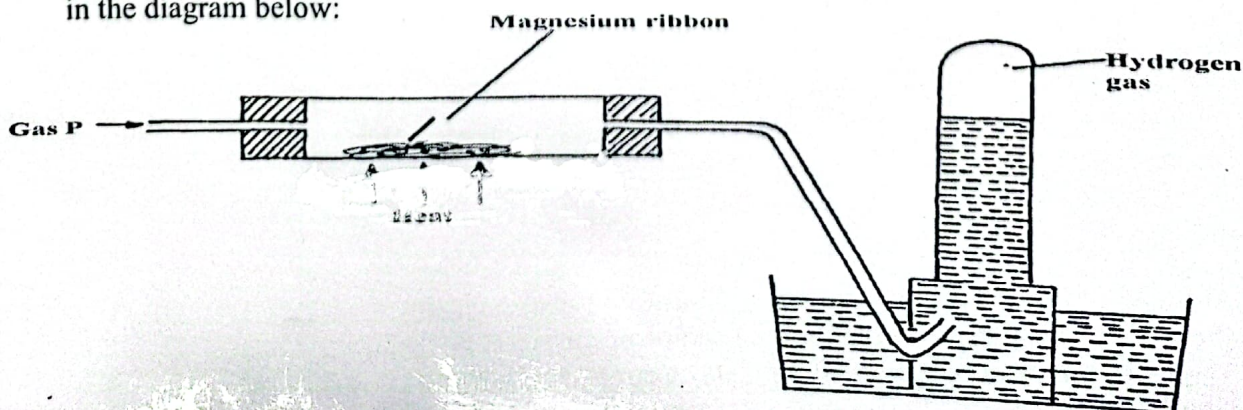
2. In an experiment, dry hydrogen gas was passed over hot copper (II) oxide in a combustion tube as shown in the diagram below:-



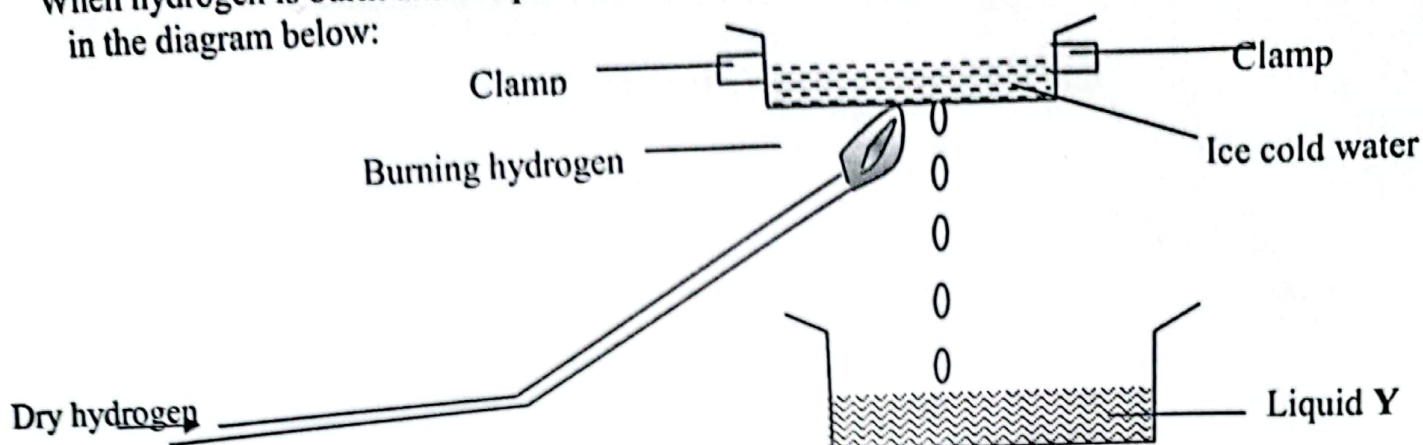
- (a) Complete the diagram to show how the other product, substance R could be collected in the laboratory.
 (b) Describe how copper could be obtained from the mixture containing copper (II) oxide
3. The setup below was used to investigate the reaction between metals and water.



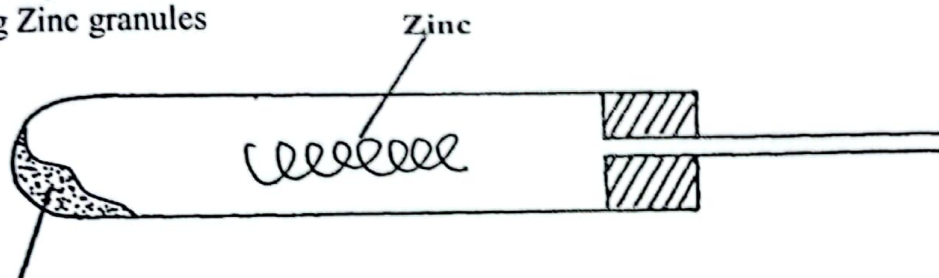
- (a) Identify solid X and state its purpose
 Solid X
 Purpose
 - (b) Write a chemical equation for the reaction that produces the flame.
4. Gas P was passed over heated magnesium ribbon and hydrogen gas was collected as shown in the diagram below:



5. (i) Name gas P
 (ii) Write an equation of the reaction that takes place in the combustion tube
 (iii) State one precaution necessary at the end of this experiment
 When hydrogen is burnt and the product cooled, the following results are obtained as shown in the diagram below:

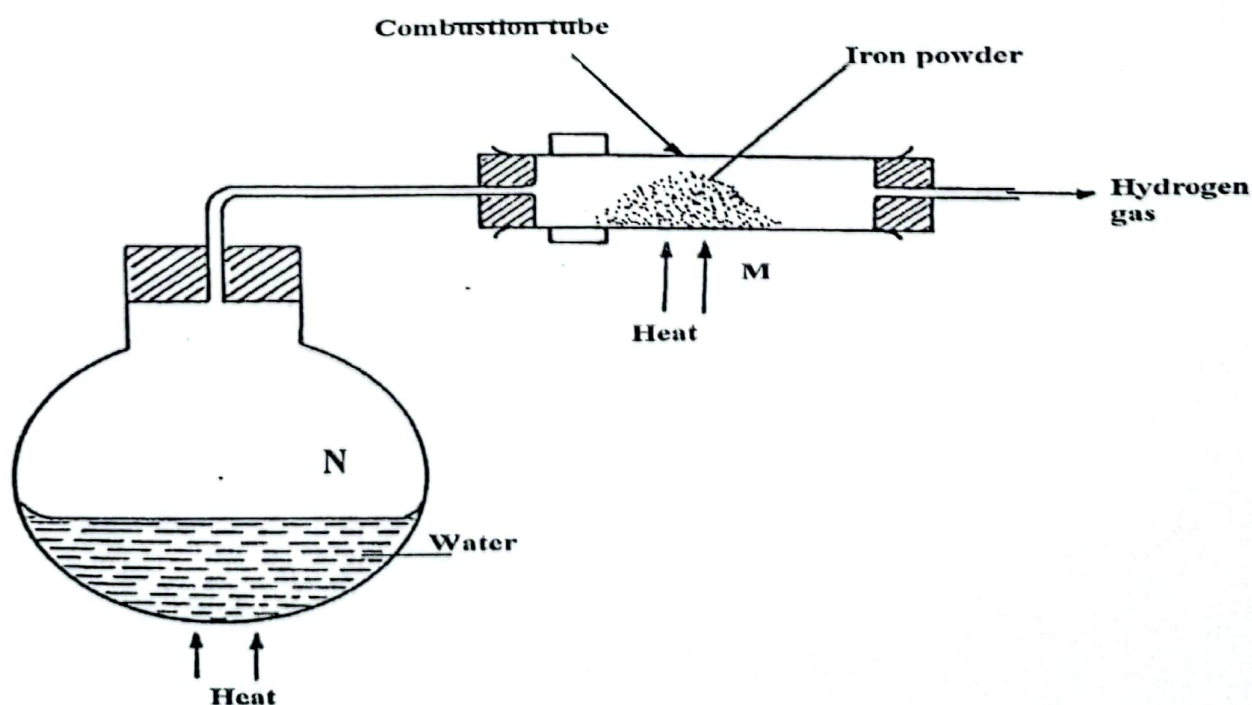


- (a) Write the equation for the formation of liquid Y
 (b) Give a chemical test for liquid Y
 6. Jane set-up the experiment as shown below to collect a gas. The wet sand was heated before heating Zinc granules



- (a) Complete the diagram for the laboratory preparation of the gas
 (b) Why was it necessary to heat wet sand before heating Zinc granules?

7.



- (a) Between N and M which part should be heated first? Explain
 (b) Write a chemical equation for the reaction occurring in the combustion tube.
 8. The set-up below was used to investigate electrolysis of a certain molten compound;-

8. The two elements **P** and **R** were separately burned in air, the products gave the results recorded in the table below:

ELEMENTS PHYSICAL STATE AT ROOM TEMPERATURE	P SOLID	R SOLID
Physical states of products	White solid powder only	Colourless gases L and M
Nature of solutions in water	Basic	L strongly acidic M slightly acidic

(a) Suggest the identity of element **R**.

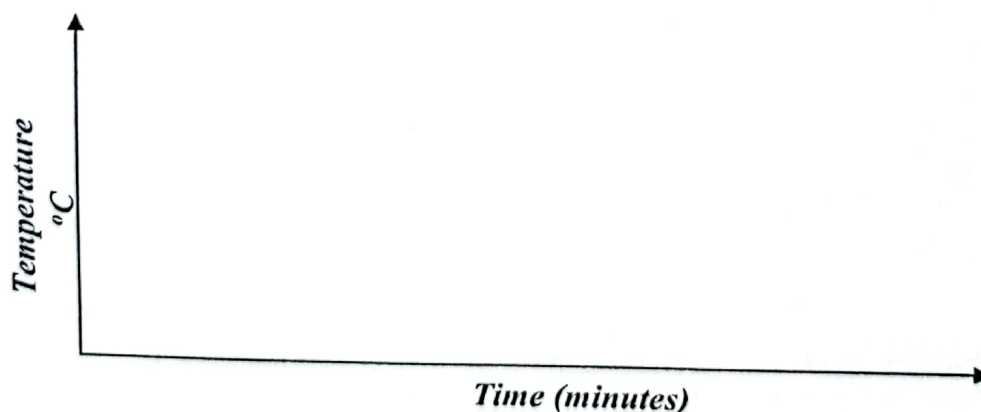
(b) Describe how the nature of the solutions of the of the oxides were determined

9. The diagram below represents a paper chromatography for the three brands of soft drinks containing banned artificial food additives.

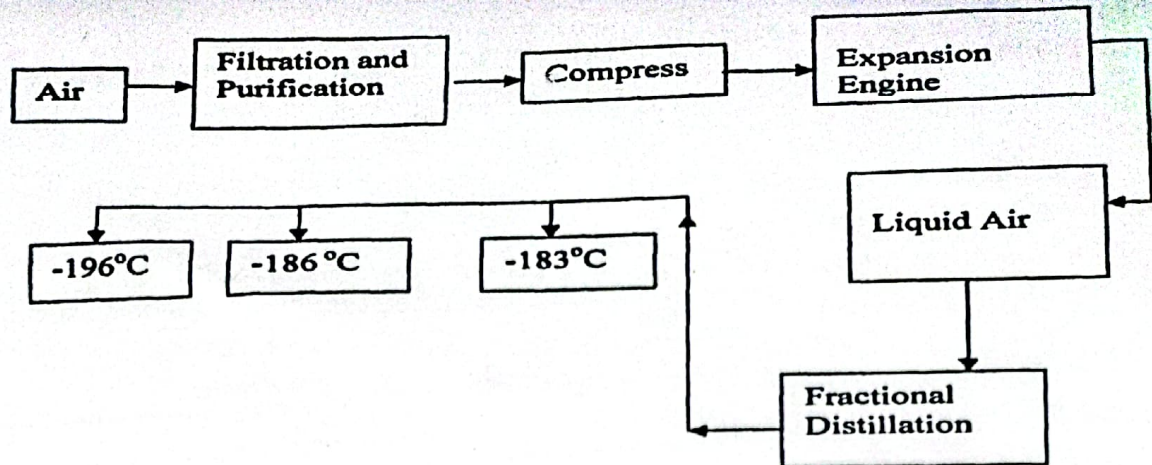
	_____	6 _____	7 _____
4	_____	_____	5 _____
	_____	2 _____	3 _____
1			
	A	B	C
BRANDS OF SOFT DRINKS			

A and C found to contain the banned artificial food additives. Which numbers indicate the banned artificial food additives?

10. Without using any laboratory chemical, describe a simple laboratory experiment to distinguish between calcium hydrogen carbonate and sodium hydrogen carbonate
11. Substance **Q** has a melting point of 15°C and boiling point of 70°C .
- (a) On the same axes, draw the melting point and boiling point graph for **Q** and the room temperature

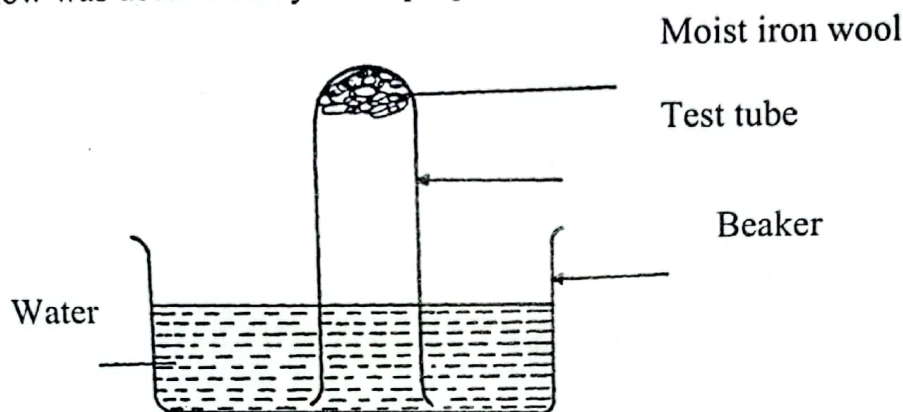


- (b) State the physical state of substance **Q** at room temperature
12. Cooking oils comprise of a mixture of compounds which have a boiling point range of 23°C to 27°C .
- (i) What evidence is then to support the statement that cooking oil is a mixture?
- (ii) Name another experimental technique that could be used to confirm your answer in part (i) above
13. A form 1 student carried out the separation as shown in the set-up below:-



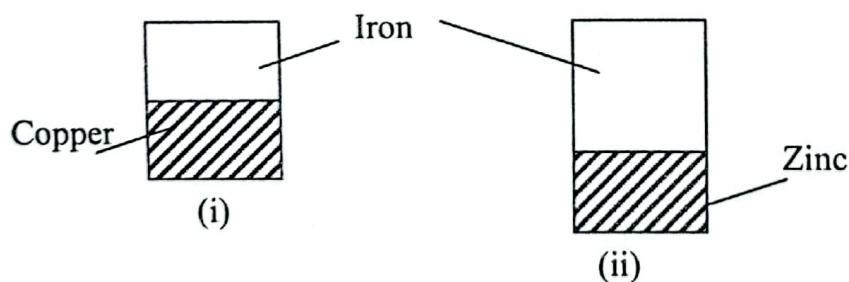
- Identify the substance that is removed at the filtration stage
- Explain why Carbon (IV) oxide and water are removed before liquefaction of air
- Identify the component that is collected at -186°C

6. 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

7. A form two student in an attempt to stop rusting put copper and Zinc in contact with iron as shown:-



- State whether rusting occurred after one week if the set-ups were left out
- Explain your answer in (a) above

8. In an experiment, a piece of magnesium ribbon was cleaned with steel wool. 2.4g of the clean magnesium ribbon was placed in a crucible and completely burnt in oxygen. After cooling the product weighed 4.0g

- Explain why it is necessary to clean magnesium ribbon
- What observation was made in the crucible after burning magnesium ribbon?
- Why was there an increase in mass?
- Write an equation for the major chemical reaction which took place in the crucible
- The product in the crucible was shaken with water and filtered. State and explain the observation which was made when red and blue litmus paper were dropped into the filtrate

9. In an experiment a gas jar containing some damp iron fillings was inverted in a water trough containing some water as shown in the diagram below. The set-up was left un-disturbed for three

- (b) From the above experiment, which part of the flame is better to use for heating? Give a reason.
10. 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.
11. Study the information in the table below and answer questions that follow.
(Letters given are not real symbols)

Ions	Electron arrangement	Ionic radius (nm)
A ⁺	2.8	0.95
B ⁺	2.8.8	0.133
C ²⁺	2.8	0.065

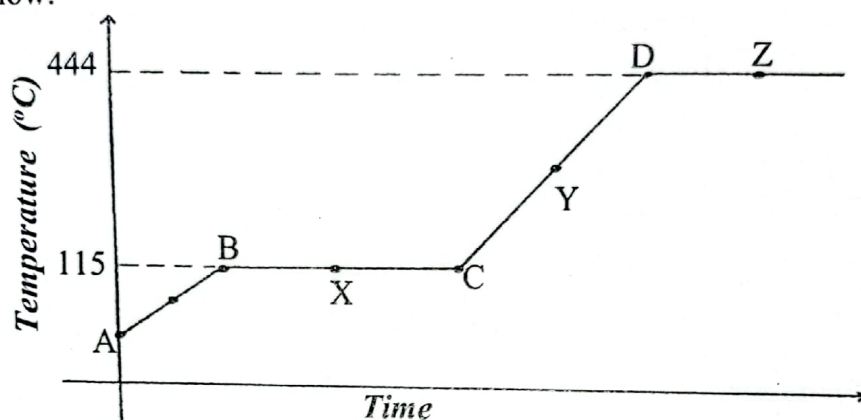
Explain why the ionic radius of :-

(a) B⁺ is greater than that of A⁺

(b) C²⁺ is smaller than the of A⁺

Simple classification of substances

1. The diagram below shows the heating curve of a pure substance. Study it and answer the questions that follow:



- (a) What physical changes are taking place at points X and Z?
(b) Explain what happens to the melting point of sodium chloride added to this substance

2. (a) State two differences between luminous flame and non-luminous flame
(b) It is advisable to set a Bunsen burner to luminous flame prior to an experiment.
Explain
3. The paper chromatography of a plant extract gave the following results:

Solvent	Number of spots
X	6
Y	2
Z	3

- (a) Which is the most suitable solvent for purifying the extract? Explain
(b) Ball pen cannot be used to mark solvent front in the above chromatography. Explain
4. Name the process which takes place when:

- (a) Solid Carbon (Iv) Oxide (dry ice) changes directly into gas
(b) A red litmus paper turns white when dropped into chlorine water
(c) Propene gas molecules are converted into a giant molecule

5. A sample of copper turnings was found to be contaminated with copper (II) oxide. Describe how a sample of copper metal can be separated from the mixture

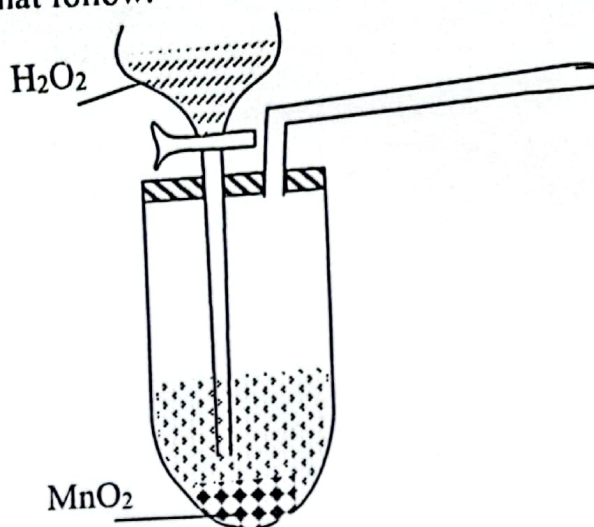
6. Copper (II) oxide and charcoal are black solids. How would you distinguish between the two solids?

7. a) What is chromatography?

b) Give two applications of chromatography

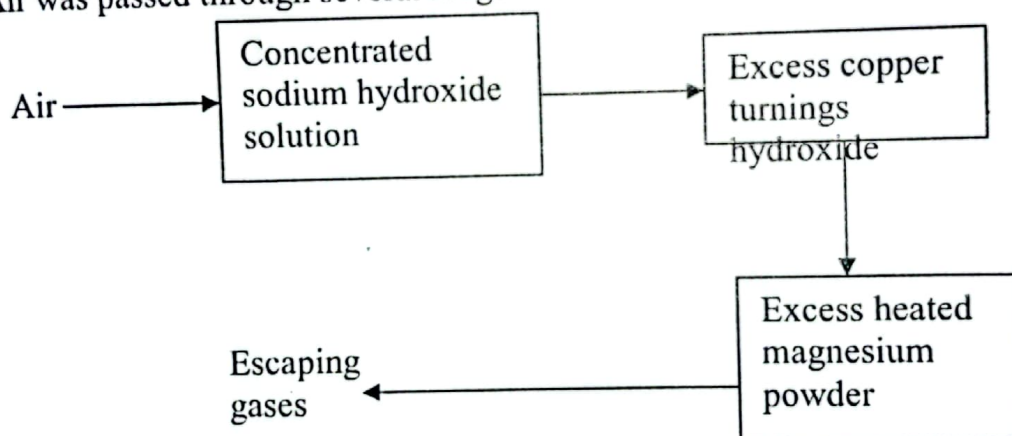
Air and combustion

1. The set-up below was used to prepare a sample of oxygen gas. Study it and answer the questions that follow.



- Complete the diagram to show how Oxygen can be collected
- Write a chemical equation of the reaction to produce oxygen

2. Air was passed through several reagents as shown below:



- Write an equation for the reaction which takes place in the chamber containing Magnesium powder
 - Name **one** gas which escapes from the chamber containing magnesium powder. Give a reason for your answer
- 3.
- What is rust?
 - Give **two** methods that can be used to prevent rusting
 - Name **one** substance which speeds up the rusting process
4. 3.0g of clean magnesium ribbon 8.0g of clean copper metal were burnt separately in equal volume of air and both metals reacted completely with air;
- State and explain where there was greater change in volume of air
Mg = 24 Cu = 64
 - Write an equation for the reaction between dilute sulphuric acid and product of burnt copper
5. Oxygen is obtained on large scale by the fractional distillation of air as shown on the flow chart bellow.