

QUESTIONS –CHEMISTRY
FORM ONE

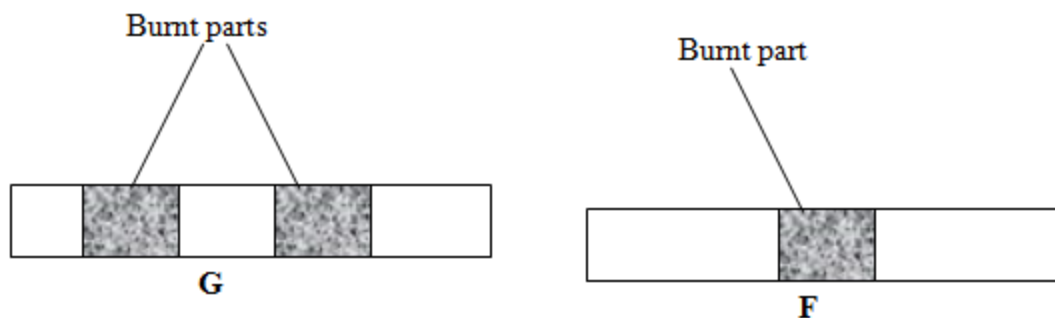
INTRODUCTION TO CHEMISTRY Q

INSTRUCTIONS TO CANDIDATES

Answer **ALL** questions in this paper in the spaces provided.

1. Wooden splints **F** and **G** were placed in different zones of a Bunsen burner flame.

The diagram below gives the observations that were made

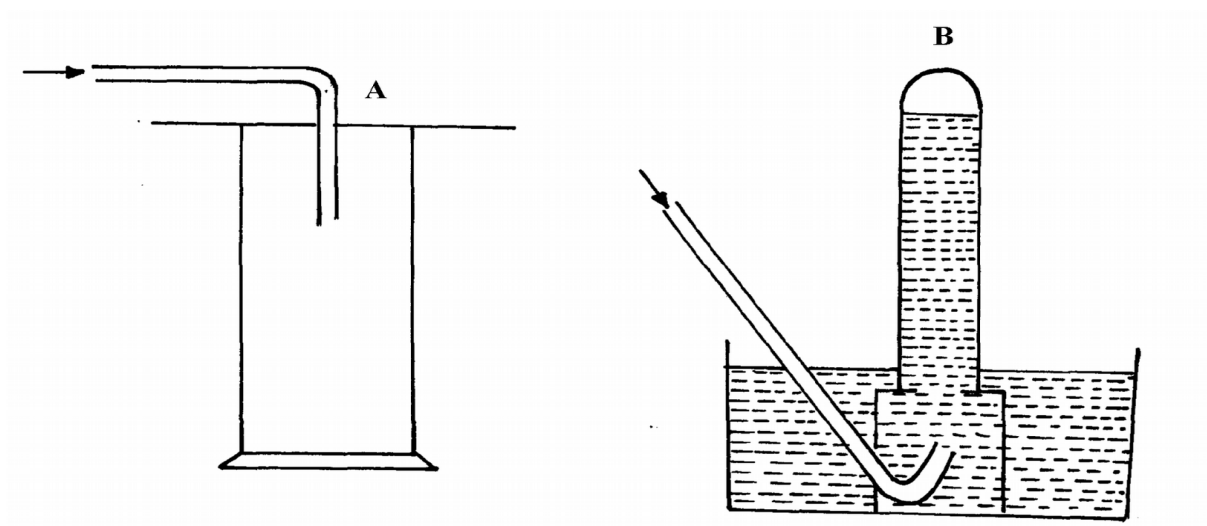


- (a) Explain the difference between **F** and **G**
- (b) Name the type of flame that was used in the above experiment
2. (a) When the air-hole is fully opened, the bunsen burner produces a non-luminous flame.
Explain
- (c) Draw a labelled diagram of anon-luminous flame

3. (a) What is a drug?

(b) Give **two** drugs that are commonly abused by the youth.

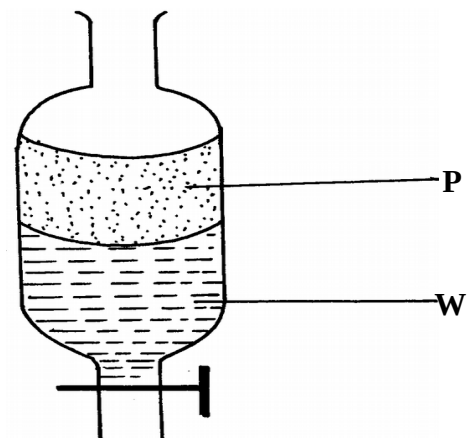
4. The diagram below shows three methods for collecting gases in the laboratory



(a) Name the methods **A** and **B**

(b) From the methods above, identify **one** that is suitable for collecting sulphur (IV) oxide.
Explain

5. A mixture of hexane and water was shaken and left to separate as shown in the diagram below:



State the identity of;

(i) **P**

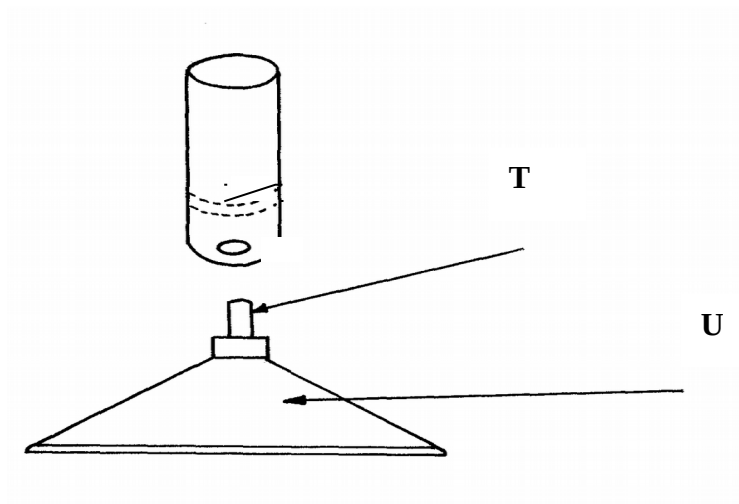
(ii) **W**

6. The diagrams below are some common laboratory apparatus. Name each apparatus and state its use

Diagram	Name	Use
	(½mk)	(½mk)

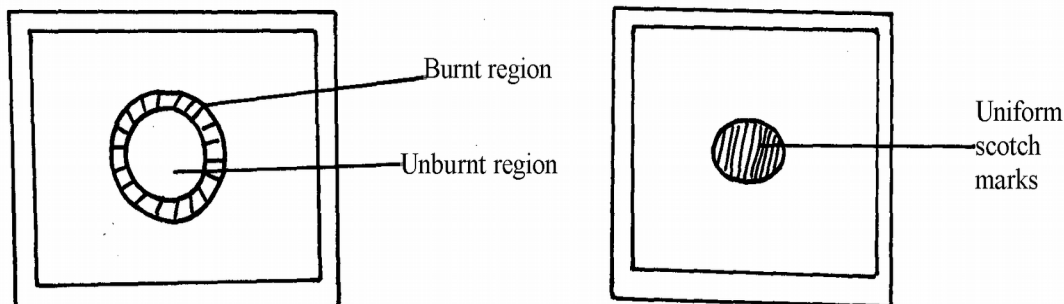
	($\frac{1}{2}$ mk)	($\frac{1}{2}$ mk)
--	---------------------	---------------------

7. The diagram below shows some parts of a Bunsen burner



Explain how the parts labelled **T** and **U** are suited to their functions

8. The diagram below shows the appearance of two pieces of paper placed in different parts of a non-luminous flame of a Bunsen burner and removed quickly before they caught fire.



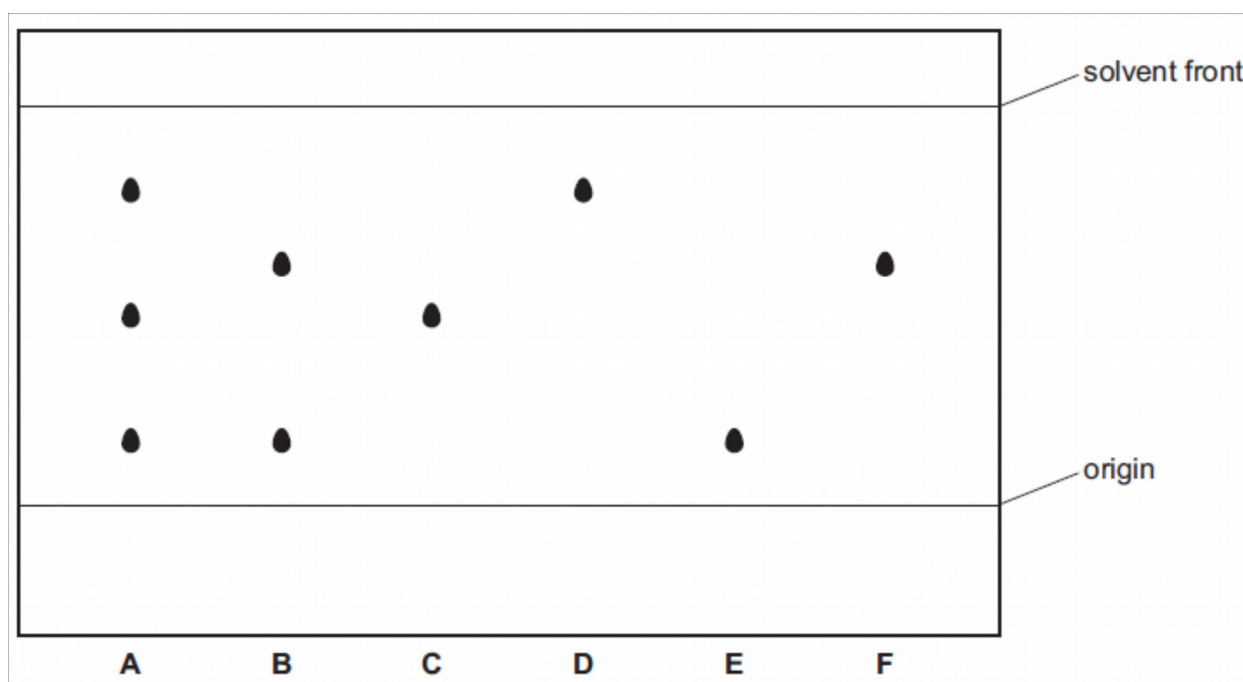
(a) What do the experiments show about the outer region of the flame?

(b) From the above experiment, which part of the flame is better to use for heating? Give a reason

9. 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.

SIMPLE CLASSIFICATION OF SUBSTANCES

1. The diagram shows the results of an experiment to separate and identify the colours present in two coloured mixtures, **A** and **B**. Substances **C**, **D**, **E** and **F** are single colours.



(a) Name this method of separation.

..... [1]

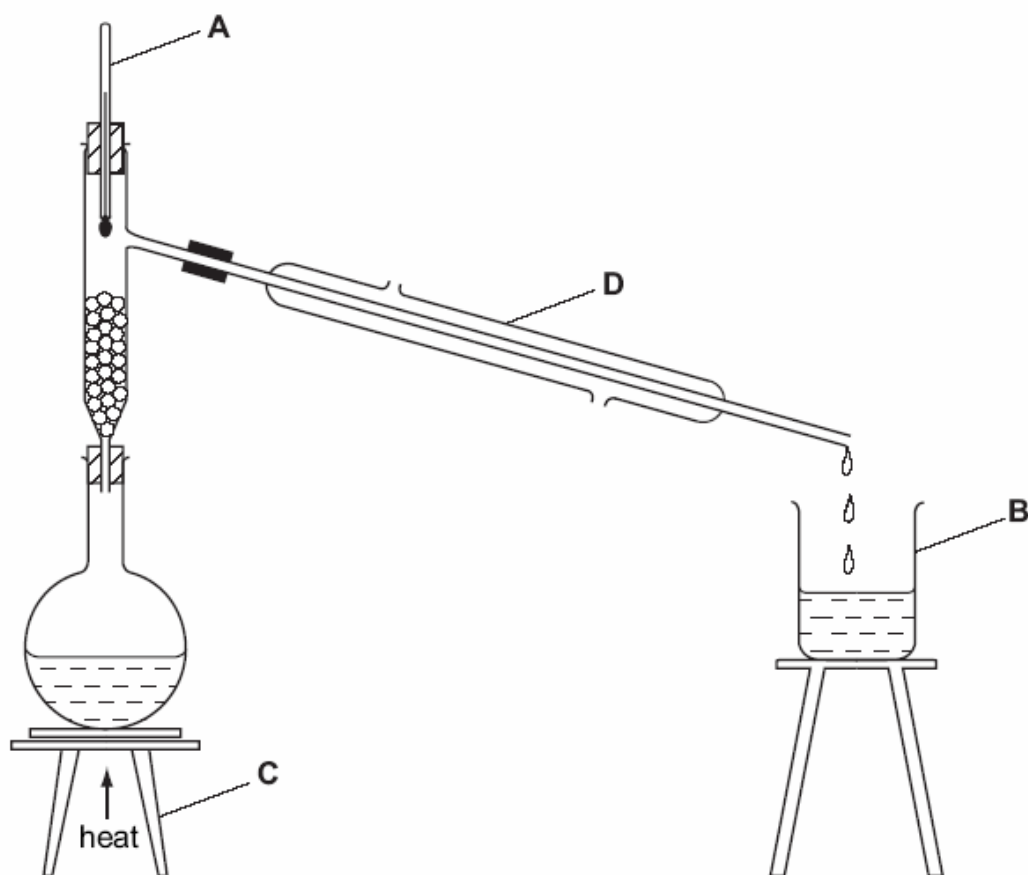
(b) Draw a line **on the diagram** to show the level of the solvent at the beginning of the experiment. [1]

(c) Why should a pencil be used instead of a pen to draw the origin line?

..... [1]

[Total: 3]

2. A mixture of ethanol and water can be separated by fractional distillation. The apparatus below can be used to carry out such a separation in the laboratory.



(a) Name each piece of apparatus.

A

B

C[3]

(b) What is the purpose of D?

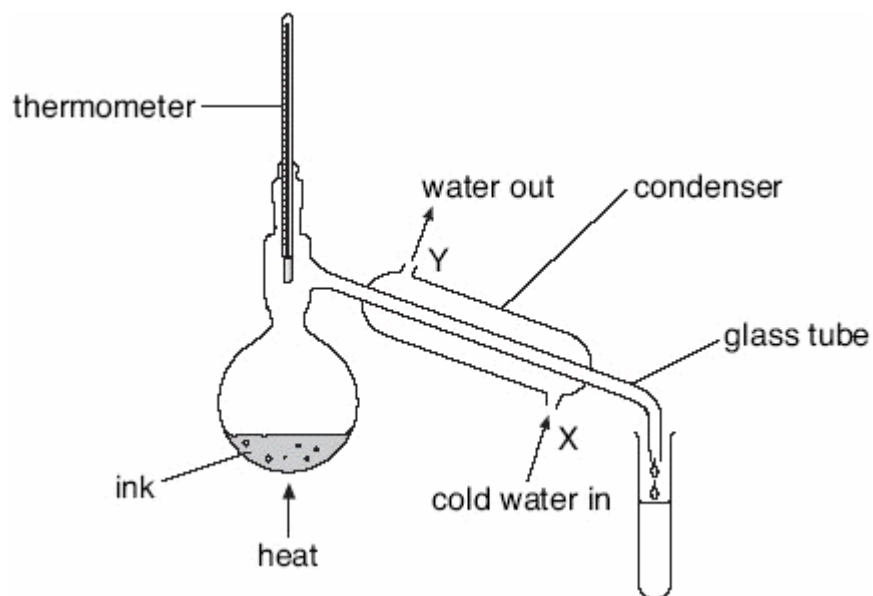
[1]

(c) How could the purity of the ethanol collected be checked?

[1]

[Total: 5]

3. Rema used the apparatus below to distil 100 cm³ of water-soluble ink.



apparatus A

not to scale

- (a) Which processes occur during distillation?
Tick the correct box.

condensation then evaporation
evaporation then condensation
melting then boiling
melting then evaporation

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

1 mark

- (b) Give the name of the colourless liquid that collects in the test-tube.

.....

1 mark

- (c) What would the temperature reading be on the thermometer when the ink has been boiling for two minutes?

.....°C

1 mark

- (d) (i) Water at 15°C enters the condenser at X.
Predict the temperature of the water when it leaves the condenser at Y.

.....°C

Explain this change of temperature.

.....

.....

1 mark

- (ii) Give **two** ways in which the water vapour changes as it passes down the glass tube in the condenser.

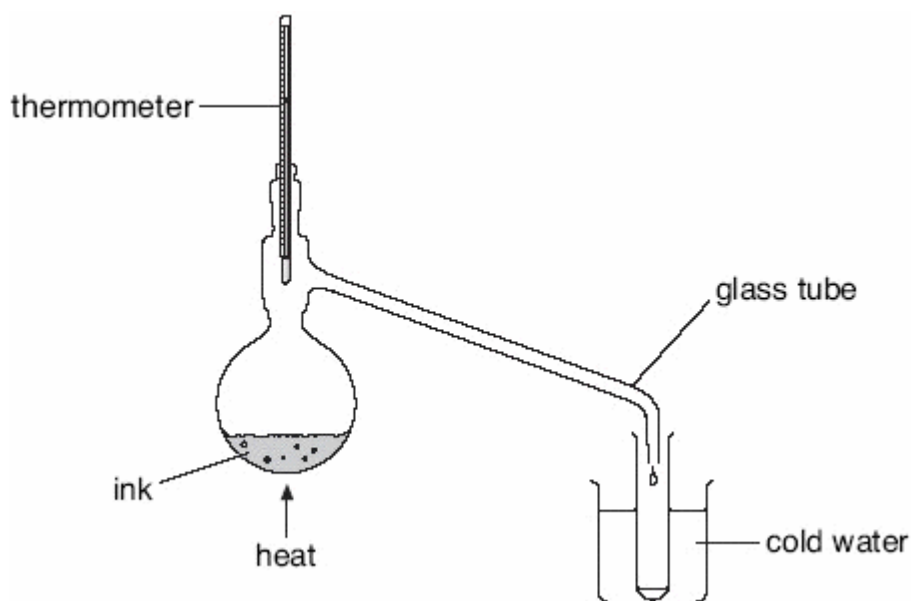
1.

1 mark

2.

1 mark

- (e) Peter used the apparatus below to distil 100 cm³ of water-soluble ink.



apparatus B

not to scale

Why is the condenser in **apparatus A** better than the glass tube and beaker of water in **apparatus B**?

.....

1 mark
 maximum 7 marks

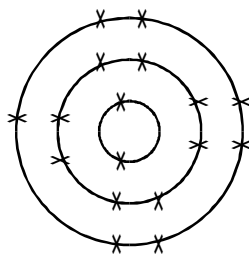
4. Atoms are made of electrons, neutrons and protons.

(a) Complete the table to show the relative mass and charge of an electron, neutron and proton.

particle	relative mass	relative charge
electron		-1
neutron	1	
proton		

(4)

(b) The diagram shows the electronic structure of an atom of an element.



(i) Name the element of which this is an atom.

Explain your answer.

.....

(2)

(ii) What is the atomic number of this element?

.....

(1)

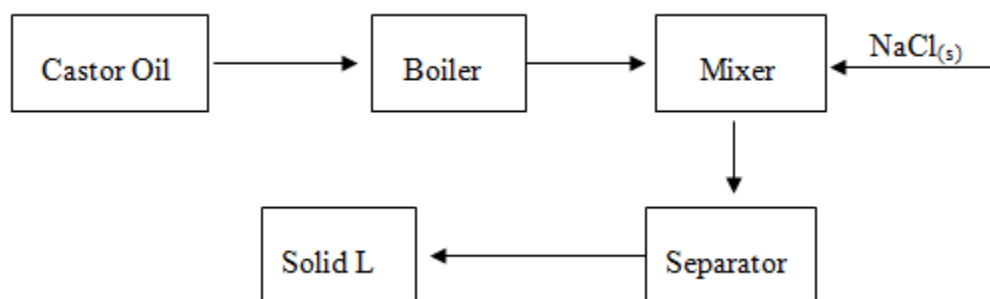
(iii) Describe the colour and physical state of this element at room temperature.

.....

(2)

(Total 9 marks)

5. The flow diagram below was used by a student to obtain solid L. Study it and answer questions that follow.



i) Identify:

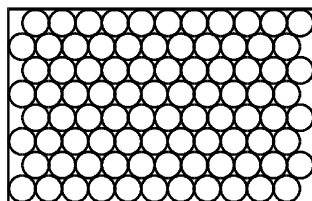
I Solid L (1mk)

II The type of reaction taking place in the boiler. (1mk)

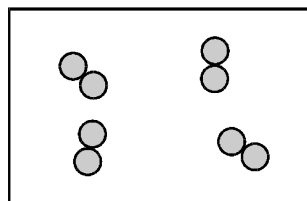
ii) What is the role of sodium chloride in the mixer?

(1mk)

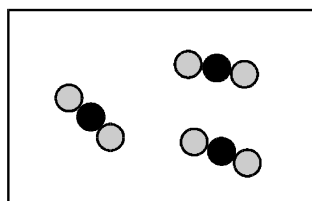
6. The diagrams represent the arrangement of atoms or molecules in four different substances, A, B, C and D.



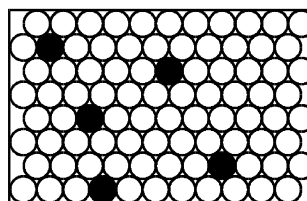
A



B



C



D

not to scale

Each of the circles, ○, ● and ● represents an atom of a different element.

(a) (i) Which substance is a compound?

.....

1 mark

(ii) Which substance is a mixture?

.....

1 mark

(iii) Which **two** substances are elements?

..... and

1 mark

(iv) Which **two** substances could be good thermal conductors?

..... and

1 mark

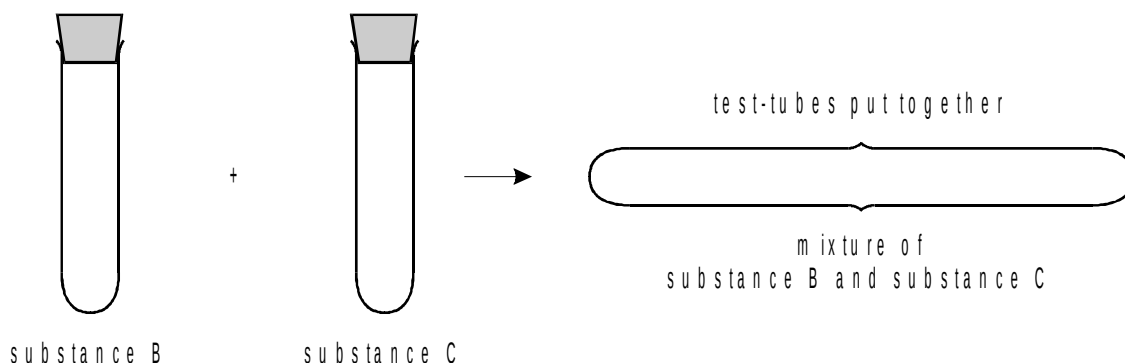
(v) Which substance could be carbon dioxide?

.....

1 mark

(b) The following experiment was set up. Test-tubes containing substances B and C were placed together as shown. The

substances did **not** react.
They were left for five minutes.

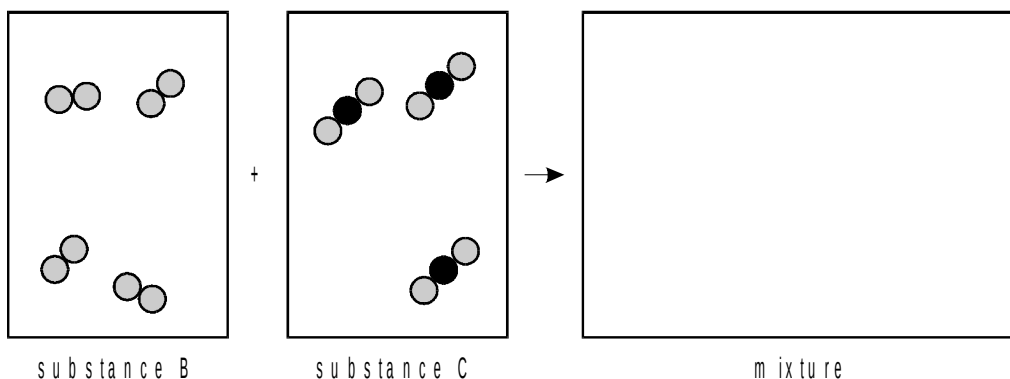


- (i) How many molecules are there in the mixture compared to the total number in substances B and C?

.....

1 mark

- (ii) Complete the diagram which is a model of this experiment.



1 mark

Maximum 7 marks

ACIDS, BASES AND INDICATORS

- Water from red cabbage can be used to find out if a liquid is acidic, alkaline or neutral.

Type of liquid added to the cabbage water	colour of the cabbage water
acidic	red
alkaline	blue
neutral	purple

John added three different liquids to the cabbage water.

- (a) Use the information above to complete the table below.

Liquid added	colour of the	acidic, alkaline or
--------------	---------------	---------------------

	cabbage water	neutral?
water	purple	
lemon juice		acidic
washing up liquid	blue	

3 marks

(b) What word describes chemicals which change colour in acids or alkalis?

Tick the correct box.

filters	<input type="checkbox"/>	indicators	<input type="checkbox"/>
liquids	<input type="checkbox"/>	solids	<input type="checkbox"/>

1 mark

Maximum 4 marks

2. Table 1 below shows ***the colour of universal indicator in acidic, neutral and alkaline solutions.***

	acidic ←			neutral 	alkaline →		
colour	red	orange	yellow	green	blue	dark blue	purple

table 1

Ramy tested different liquids with the indicator solution.

His results are shown in table 2 below.

liquid	colour of indicator solution
Milk	green
lemonade	orange
water	green
fruit juice	red
washing-up liquid	blue

table 2

(a) Use Ramy's results to answer the following questions.

(i) Give the name of **one** acidic liquid in **table 2**.

.....

1 mark

(ii) Give the name of **one** neutral liquid in **table 2**.

.....

1 mark

(b) Ramy dissolved some bicarbonate of soda in distilled water.
This produced an alkaline solution.

(i) Ramy added the indicator to the alkaline solution.

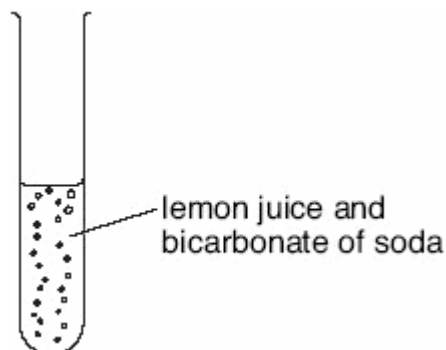
Suggest what colour the indicator became.

Use **table 1** to help you.

.....

1 mark

(ii) Ramy added lemon juice to the solution of bicarbonate of soda.



How could he tell that a gas was produced?

.....

1 mark

(c) Ramy mixed an acid with an alkali and tested the mixture with the indicator solution.

The indicator solution turned green.

What is the name of the reaction between an acid and an alkali?

Tick the correct box.

condensation

crystallisation

evaporation

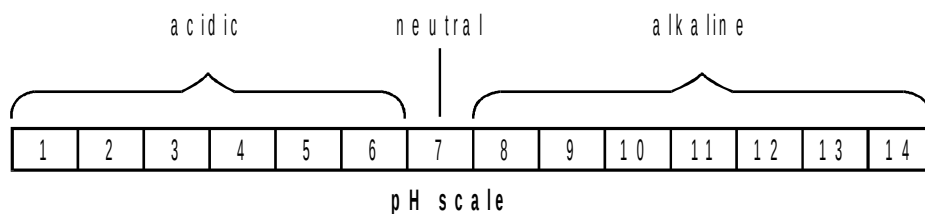
neutralisation

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

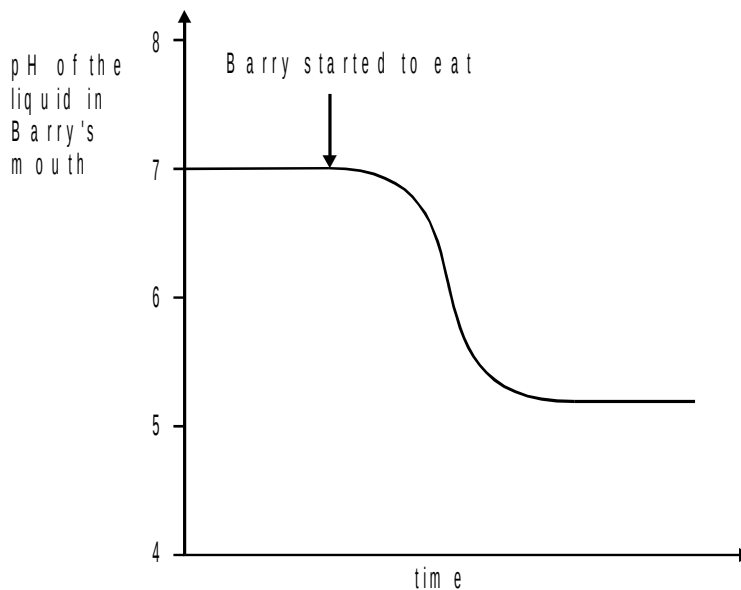
1 mark

maximum 5 marks

3. The pH scale shown below is used to measure how acidic or alkaline a solution is.



The graph below shows how the pH of the liquid in Barry's mouth changed as he ate a meal.



- (a) (i) Use the **graph** to give the pH of the liquid in Barry's mouth before he started to eat.

pH

1 mark

- (ii) What does this pH tell you about the liquid in Barry's mouth before he started to eat?

Use the **pH scale** above to help you.

Tick the correct box.

It was acidic. It was alkaline. It was colourless. It was neutral.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------	--------------------------

1 mark

- (b) Look at the **graph** above.

What happened to the pH of the liquid in Barry's mouth as he ate the meal?

.....

1 mark

- (c) Barry chews special chewing gum after each meal. The chewing gum neutralises the liquid in his mouth.

What type of substance neutralises an acid?

Tick the correct box.

an acid	<input type="checkbox"/>	an alkali	<input type="checkbox"/>
an indicator	<input type="checkbox"/>	a solid	<input type="checkbox"/>

1 mark

Maximum 4 marks

4. The teacher gave two students a set of three colourless solutions, labelled X, Y and Z.

He also gave them solution P which is an indicator. Solution P is colourless in an acidic solution but pink in an alkaline solution.

The students added solution P to samples of the solutions X, Y and Z.
The figure below shows the results.

solution X	solution Y	solution Z
colourless	pink	pink

(a) Decide whether solutions X, Y and Z are acidic or alkaline.

solution X

solution Y

solution Z [2]

(b) The students wanted to deduce the name of the acid. They carried out a test that showed that the acid contained sulphate ions.

(i) Name the reagent that they added to the acid.

.....
[1]

(ii) Describe what they observed when this reagent was added to the acid.

.....

..... [1]

(iii) Name the acid.

.....

[1]

(c) The students placed about 1 cm³ of solution Y in a test-tube and added one drop of solution P.

Then they added solution X, a few drops at a time. After a few drops had been added there was no change in colour, but when more drops of solution X had been added, the colour changed.

(i) There was no change in colour when the first few drops of solution X had been added. Why was this?

.....

.....

[1]

(ii) Suggest how the colour changed when more drops of solution X were added.

The colour changed from

to..... [1]

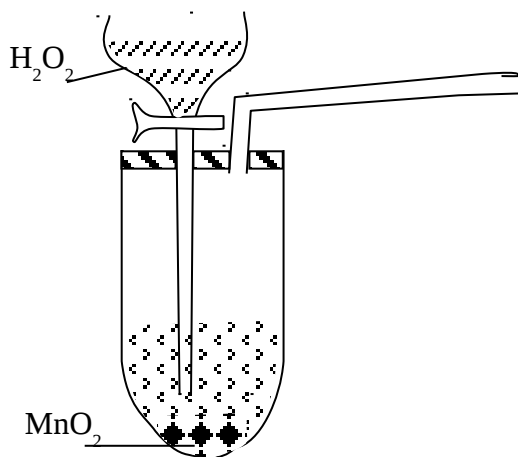
(iii) What kind of reaction took place between solution X and solution Y?

.....
[1]

[Total 8m]

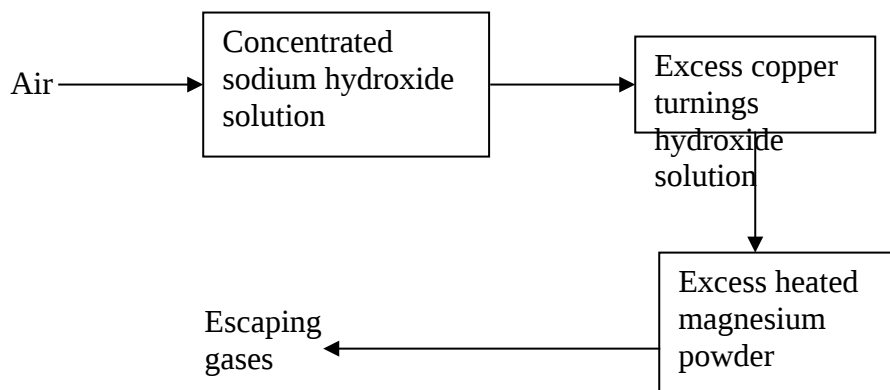
AIR AND COMBUSTION.

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



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

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



(a) Write an equation for the reaction which takes place in the chamber containing

Magnesium powder

(b) Name **one** gas which escapes from the chamber containing magnesium powder.

Give a reason for your answer

3. (a) What is rust?

(b) Give **two** methods that can be used to prevent rusting

(c) 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

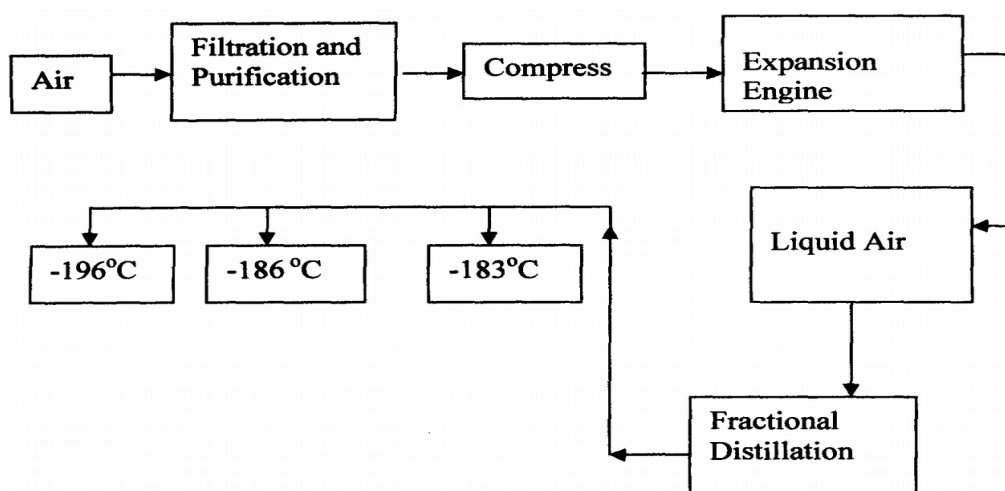
equal volume of air and both metals reacted completely with air;

a) State and explain where there was greater change in volume of air

Mg = 24 Cu = 64

b) 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 below.

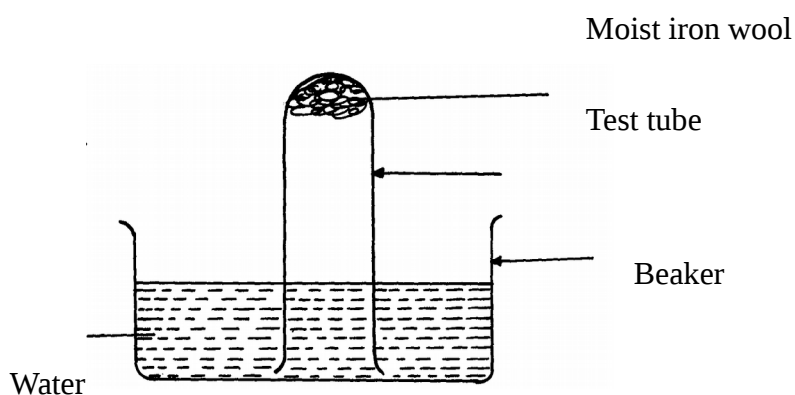


a) Identify the substance that is removed at the filtration stage

b) Explain why Carbon (IV) oxide and water are removed before liquefaction of air

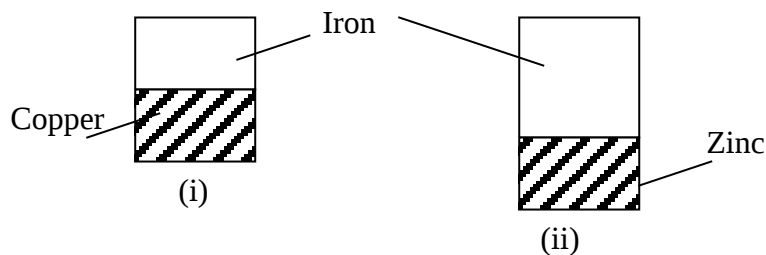
c) Identify the component that is collected at -186°C

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:-



(b) State whether rusting occurred after one week if the set-ups were left out

(b) 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

(c) Explain why it is necessary to clean magnesium ribbon

(d) What observation was made in the crucible after burning magnesium ribbon?

(e) Why was there an increase in mass?

(f) Write an equation for the major chemical reaction which took place in the crucible

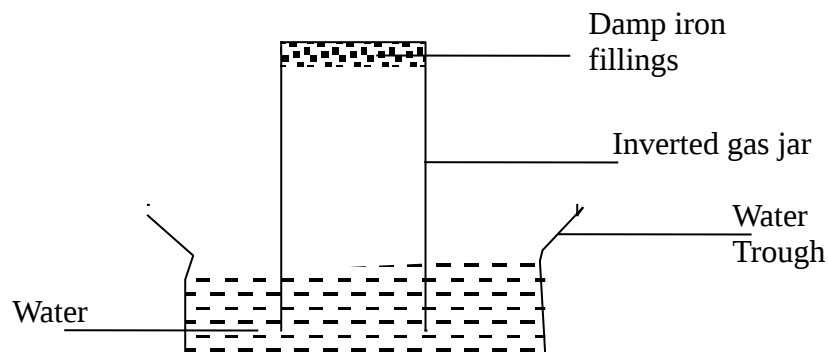
e) The product in the crucible was shaken with water and filtered. State and explain the

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

days. Study it and answer the questions that follow:



(a) Why were the iron filings moistened?

b) State and explain the observation made after three days.

(c) State **two** conclusions made from the experiment.

d) Draw a labelled set-up of apparatus for the laboratory preparation of oxygen using

Sodium Peroxide

(e) State **two** uses of oxygen

10. 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

a) Explain why it is necessary to clean magnesium ribbon

b) What observation was made in the crucible after burning magnesium ribbon?

c) Why was there an increase in mass?

d) Write an equation for the major chemical reaction which took place in the crucible

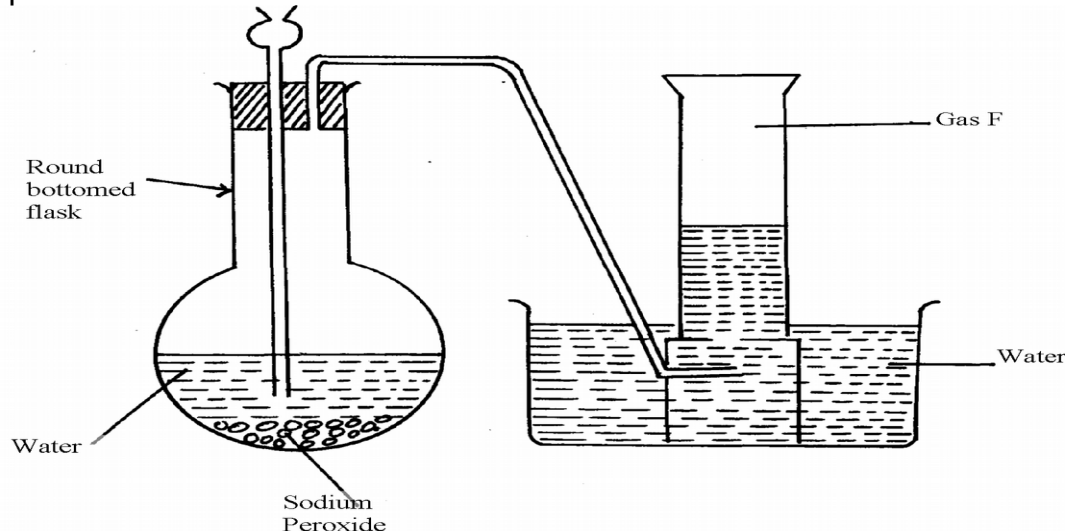
e) The product in the crucible was shaken with water and filtered. State and explain the

observation which was made when red and blue litmus paper were dropped into the filtrate

11. The set-up below was used to collect gas **F** produced by the reaction

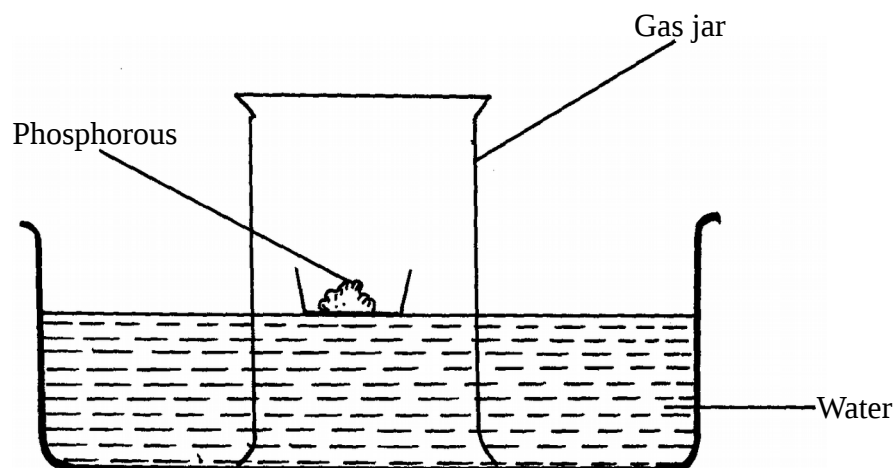
between sodium

peroxide and water



- (i) Name gas **F**.....
- (ii) At the end of the experiment, the solution in the round bottomed flask was found to be
a strong base. Explain why this was so
- (iii) Which property of gas **F** makes it be collected by the method used in the set-up?
- (iv) Give **one** industrial use of gas **F**

12. . The set-up below was used to investigate properties of the components of air:



- (i) State **two** observations made during the experiment

(ii) Write **two** chemical equations for the reactions which occurred

(iii) The experiment was repeated using burning magnesium in place of phosphorous.

There was greater rise of water than in the first case. Explain this observation

(iv) After the two experiments, the water in each trough was tested using blue and red litmus

papers. State and explain the observations of each case.

(a) Phosphorous experiment

b) magnesium experiment

(v) Briefly explain how a sample of nitrogen gas can be isolated from air in the laboratory

13. (a) A group of students burnt a piece of Mg ribbon in air and its ash collected in a Petri dish. The ash was found to comprise of magnesium Oxide and Magnesium nitride

(i) Write an equation for the reaction leading to formation of the magnesium nitride

(ii) A little water was added to the products in the Petri dish. State and explain the observation made.

(iii) A piece of blue litmus paper was dipped into the solution formed in above.

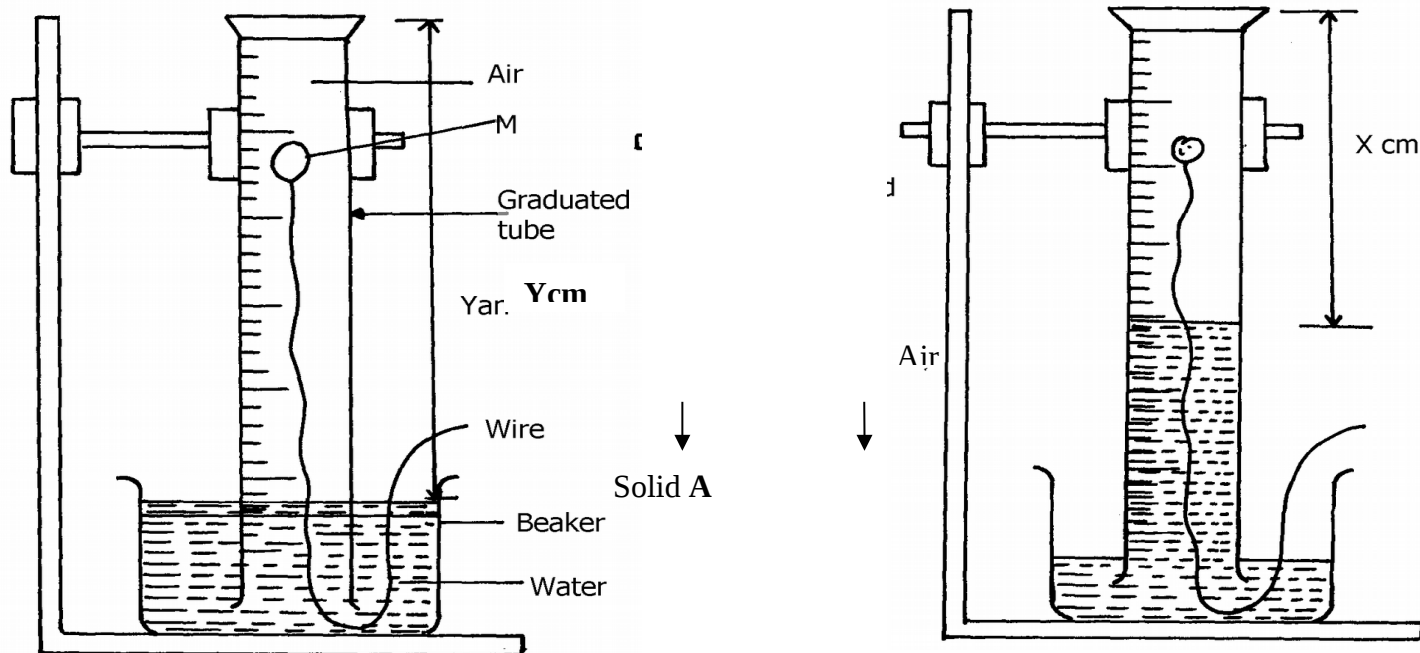
b) State the observation made.

14. A form one class carried out an experiment to determine the active part of air. The diagram

below shows the set-up of the experiment and also the observation made.

(i) At the beginning

(ii) observation at the end



(a) (i) Identify substance **M**

.....

(ii) State **two** reasons for the suitability of substance **M** for this experiment

(b) Write the equation for the reaction of substance **M** and the active part of air

(c) (i) Using the letters **Y** and **X** write an expression for the percentage of the active part of air

(ii) The expression in **(c)(i)** above gives lower value than the expected.

Explain

(d) (i) Explain the observation made when litmus paper is dipped into the beaker at the end of the experiment

(ii) Name the active part of air

.....

(iii) Suggest another method that can be used to determine the active part of air

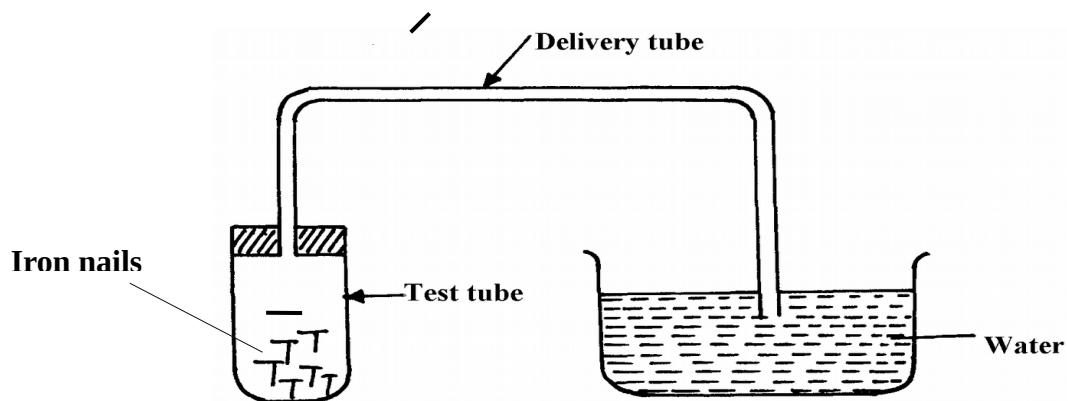
15. A piece of phosphorous was burnt in excess air. The product obtained was shaken with a small

amount of hot water to make a solution

i) Write an equation for the burning of phosphorus in excess air

ii) The solution obtained in (b) above as found to have pH of 2. Give reasons for this observation

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



(a) State **two** observations that would be made after one week. Explain

(b) Write the equation of the reaction taking place in the test-tube

17. Fe_3O_4 and FeO are oxides of iron which can be produced in the laboratory
(a) Write chemical equation for the reaction which can be used to produce each of the oxides

(b) Write an ionic equation for the reaction between the oxide, Fe_3O_4 and a dilute acid.

18. Below is a list of oxides.

MgO , N_2O , K_2O , CaO and Al_2O_3

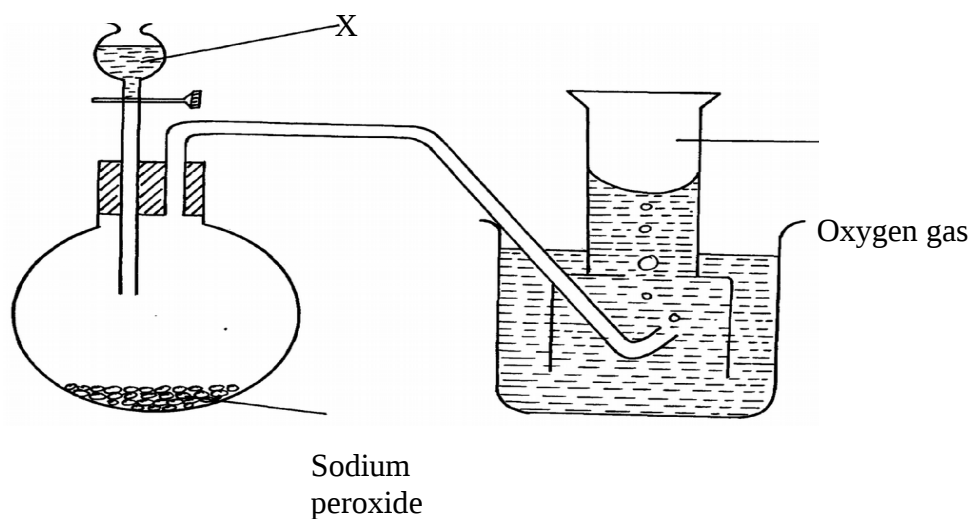
Select:-

a) A neutral oxide.

b) A highly water soluble basic oxide.

c) An oxide which can react with both sodium hydroxide solution and dilute hydrochloric acid.

19. The diagram below shows students set-up for the preparation and collection of oxygen gas



(a) Name substance **X** used

(b) Write an equation to show the reaction of sodium peroxide with the substance named in **1(a)**

WATER AND HYDROGEN - QUESTIONS

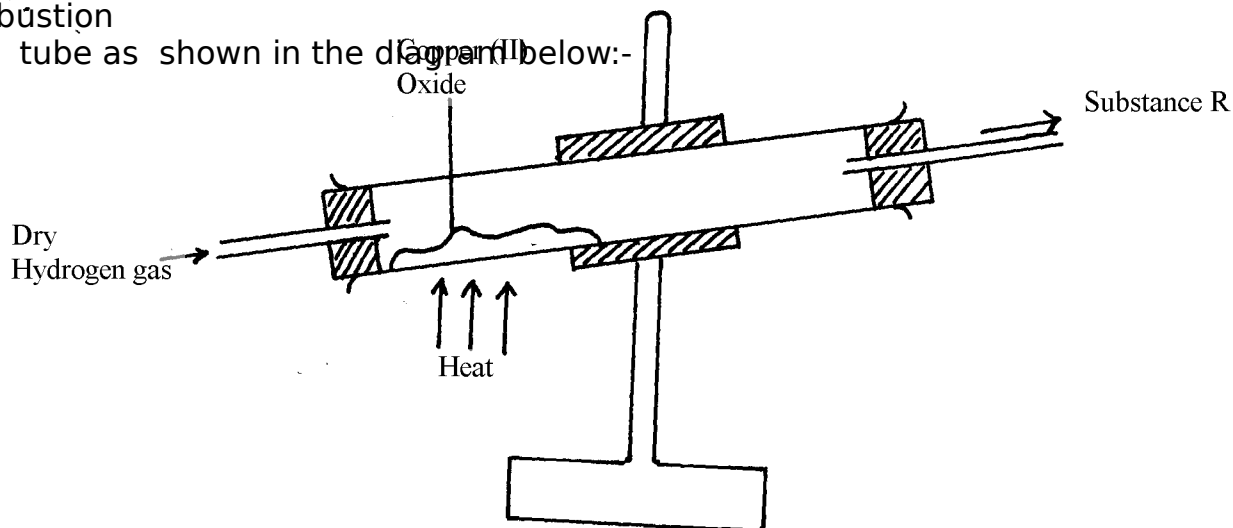
1. (a) Hydrogen can reduce copper(II) oxide but not aluminium oxide. Explain

(b) When water reacts with potassium metal the hydrogen produced ignites explosively on the surface of water.

(d) What causes this ignition?

(ii) Write an equation to show how this ignition occurs

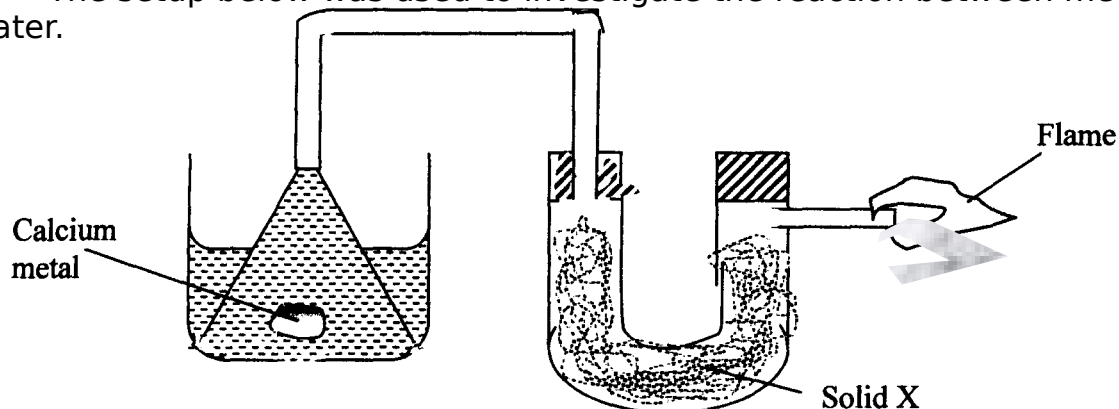
2. In an experiment, dry hydrogen gas was passed over hot copper (II) oxide in a combustion tube as shown in the diagram below:-



(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.



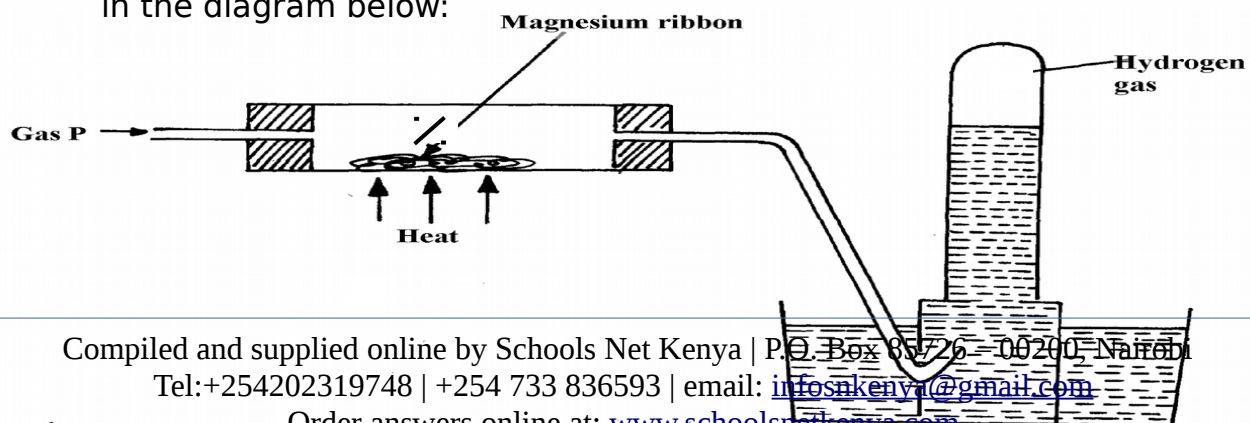
- (a) Identify solid **X** and state its purpose

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:



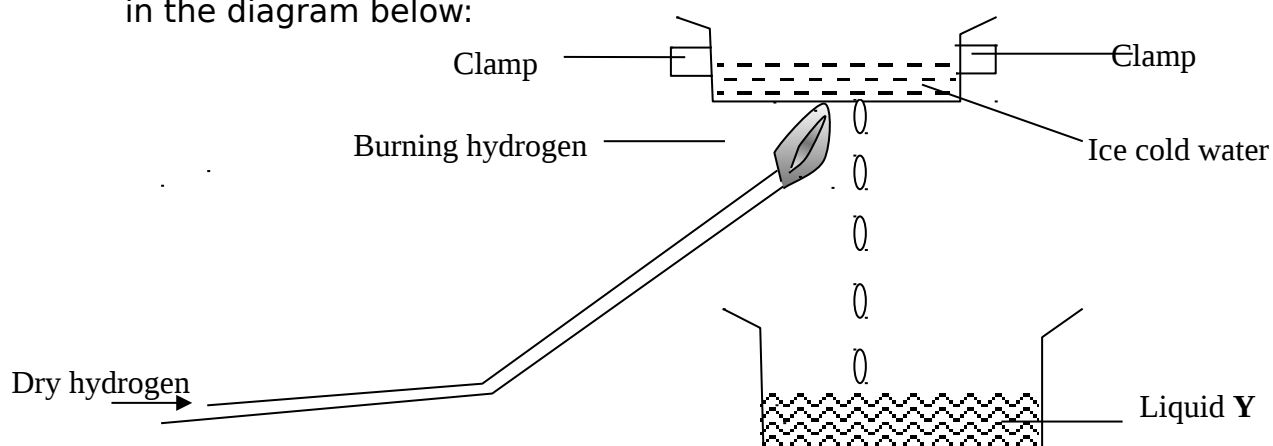
(i) Name gas **P**

.....

(e) Write an equation of the reaction that takes place in the combustion tube

(f) State **one** precaution necessary at the end of this experiment

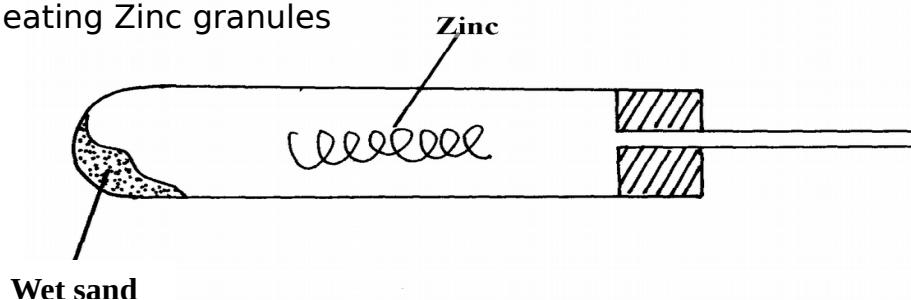
5. When hydrogen is burnt and the product cooled, the following results are obtained as shown in the diagram below:



(c) Write the equation for the formation of liquid **Y**

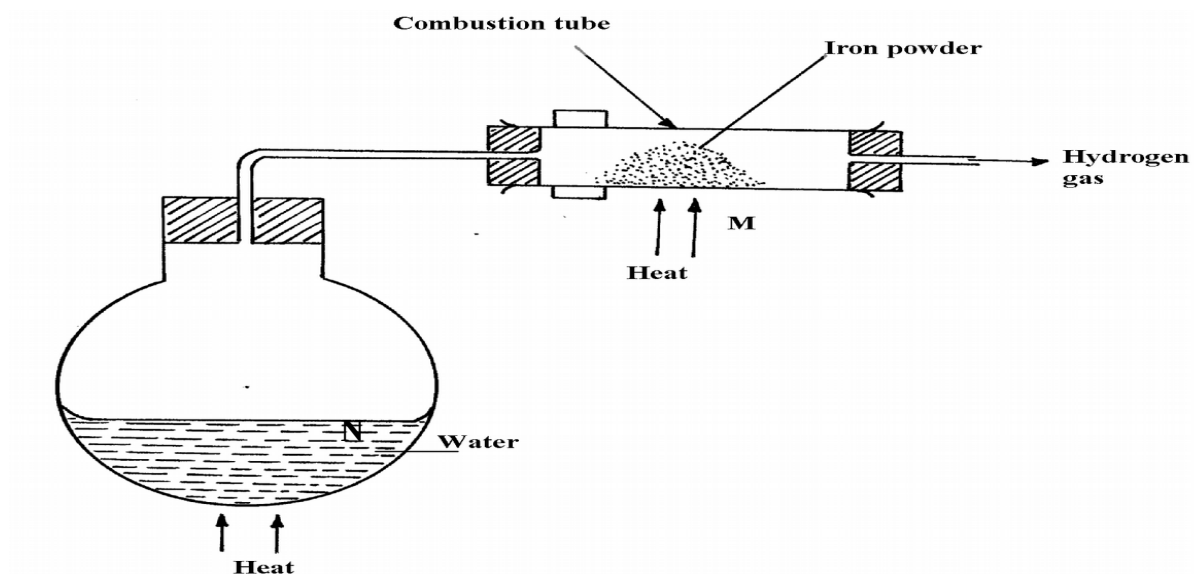
(b) Give a chemical test for liquid **Y**

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.



- (g) Between **N** and **M** which part should be heated first? Explain
 (h) Write a chemical equation for the reaction occurring in the combustion tube.