

INTRODUCTION TO CHEMISTRY

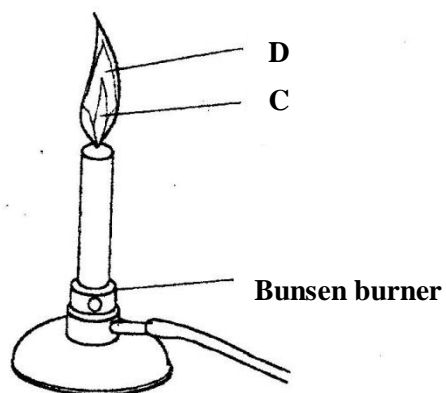
1. 2000 Q 15

State any two differences between luminous and non – luminous flames

(2 marks)

2. 2007 Q 4

The diagram below shows a Bunsen burner when in use.



Name the regions labelled C and D.

(2 marks)

3. 2014 Q1 P1

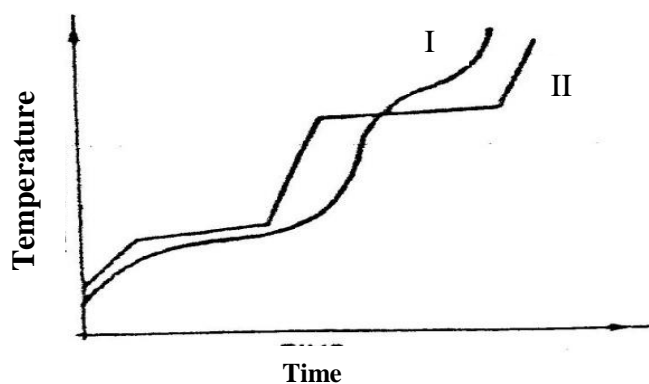
Explain how the hotness of a Bunsen burner flame can be increased

(1 mark)

SIMPLE CLASSIFICATION OF SUBSTANCES

1. 1995 Q 7 P1

The curve below represents the variation of temperature with time when pure and impure samples of a solid were heated separately.



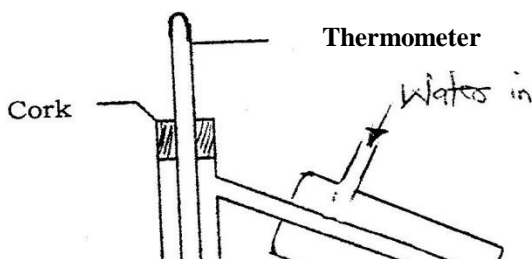
Which curve shows the variation in temperature for the pure solid? Explain (2marks)

2. 1995 Q 15

Explain how you would separate mixture of nitrogen and oxygen gases given that their boiling points are -196°C and 183°C respectively (2 marks)

3. 1997 Q 22 P1

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.



Cork

Waters in

**Mixture of
liquid M and
liquid N**

Water out

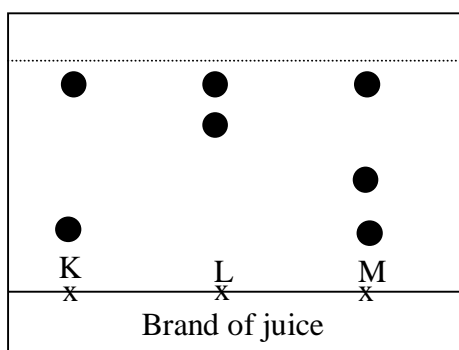
Cork

Distillate

- Identify two mistakes in the set – up (2 marks)
- What method would the student use to test the purity of the distillates obtained? (1 mark)

4. 1998 Q 17 P1

The diagram below represents a paper chromatogram for three brands of juices suspected to contain banned food colorings.



The results showed the presence of banned food colorings in L and M only.

On the same diagram:

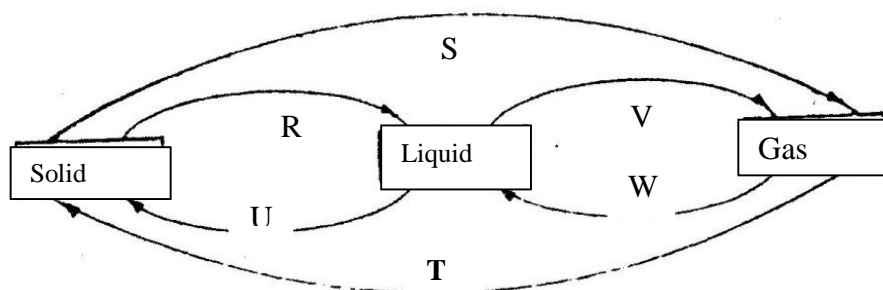
- Circle the spots which show the banned food colorings (2 marks)

b) Shoe solvent front.

(1 mark)

5. 1998 Q 17 P1

The diagram below shows the physical state of matter. Study it and answer the questions that follow.



Identify the processes R, V, w and U

(2 marks)

- (a) Name one substance which can undergo the process represented by S and T.

(1 mark)

6. 2000 Q 1 P1

Explain the change in mass that occurs when the following substances are separately heated in open crucibles

- Copper metal
- Copper (II) nitrate

(3 marks)

8. 2001 Q 4a P2

- a) Fraction distillation of liquid air usually produces nitrogen and oxygen as the major products.

i) Name one substance that is used to remove carbon dioxide from the air before it is changed into liquid.

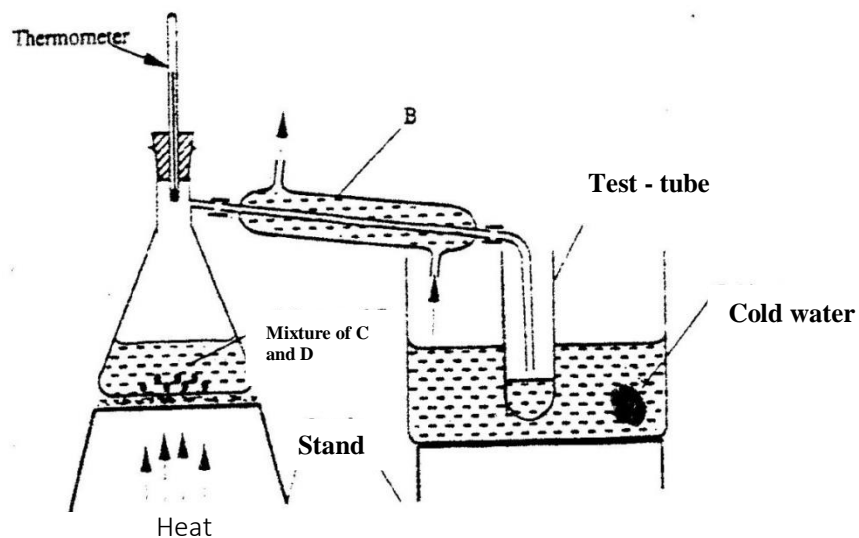
ii) Describe how nitrogen gas is obtained from the liquid air.

(Boiling points nitrogen = -196°C , oxygen = -183°C)

9. 2003 Q 9

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

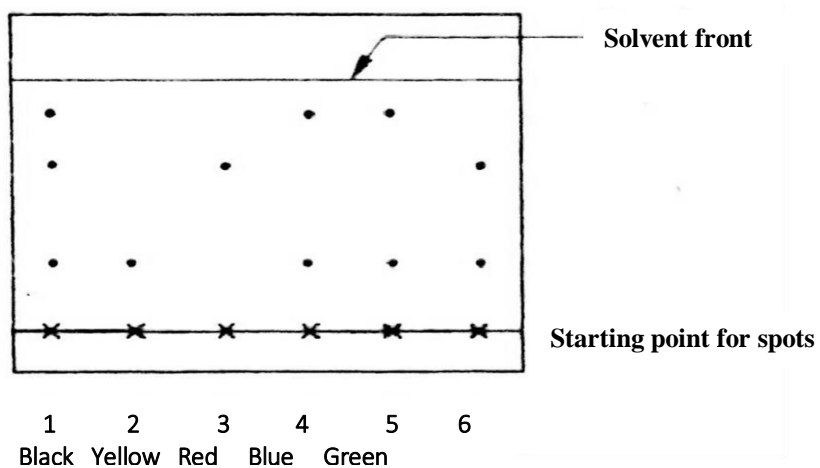
Thermometer



- (a) name B
- (b) What is the purpose of the thermometer (1 mark)
- (c) Which liquid was collected in the test tube? (1 mark)

10. 2004 Q 27

A piece of chromatography paper was spotted with coloured inks obtained from pens labelled 1 to 6. The diagram below shows the spots after the chromatogram was developed.



- a) Which two pens contained in the same pigment? (1 mark)
- b) Which pens contained only one pigment (1 mark)

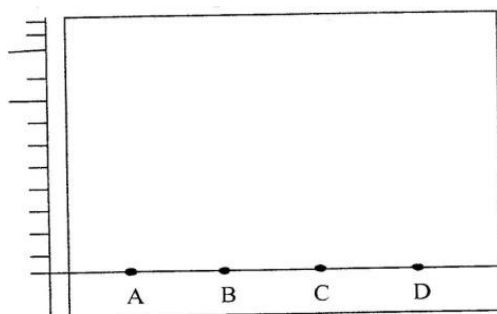
- c) According to the chromatogram, which pigments are present in the ink of pen number 6. (1 mark)

11. 2004 Q 6a P2

- a) Crude oil is a source of many compounds that contain carbon and hydrogen only.
- (i) Name the processes used to separate the components of crude Oil (1 mark)
- (ii) On what two physical properties of the above components does the separation depend? (2 marks)

12. 2005 Q 1 P2

- (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 (2marks)
- (c) The table shows liquids that are miscible and those that are immiscible

Liquid	L ₃	L ₄
L ₁	Miscible	Miscible
L ₂	Miscible	Immiscible

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

(1 mark)

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

(2 marks)

13. 2006 Q25 P1

Study the properties of substances V1 to V4 in the table below and answer the questions that follow.

Substance	Solubility in water	Solubility	Melting Point(°C)	Boiling point(°C)
V1	Insoluble	Soluble	-30	250
V2	Insoluble	Insoluble	1535	3000
V3	Insoluble	Soluble	16.8	44.8
V4	Insoluble	Soluble	75	320

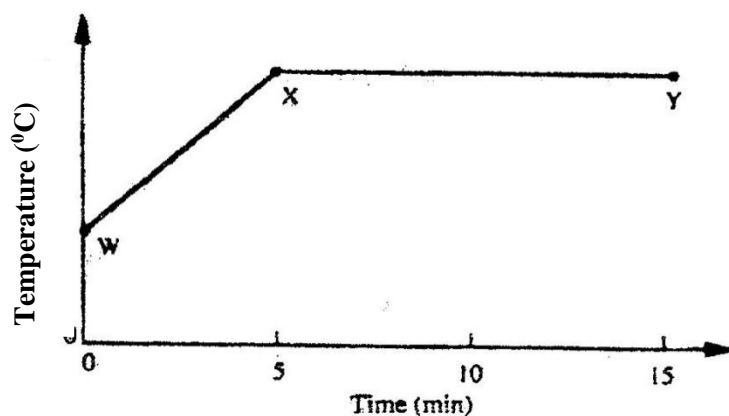
a) Which of the substances are liquids at 240C?

b) Describe how a mixture containing V2 and V4 can be separated

(2marks)

14. 2006 Q26 P1

The graph below shows a curve obtained when water at 20oC was heated for 15 minutes.



Time (min)

- a) What happens to the water molecules between points W and x? (1mark)
 b) In which part of the curve does a change of state occur? (1mark)
 c) Explain why the temperature does not rise between points X and Y. (1mark)

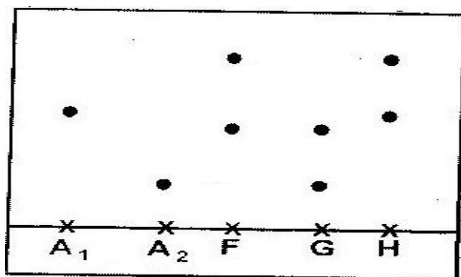
15. 2006 Q 10a P1

Name the process which takes place when:

- a) Solid carbon (IV) oxide (dry ice) changes directly into gas (1 mark)

16. 2008 Q 14 P1

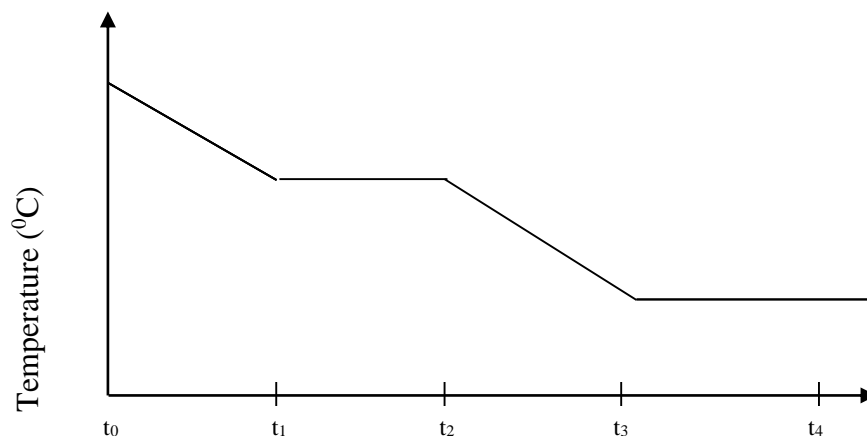
Samples of urine from three participants F, G and H at an international sports meeting were spotted onto a chromatography paper alongside two from illegal drugs A_1 and A_2 . A chromatogram was run using methanol. The figure below shows the chromatogram.



- a) Identify the athlete who had used an illegal drug. (1 mark)
 b) Which drug is more soluble in methanol? (1 mark)

17. 2008 Q 25 P1

The graph below is a cooling curve of a substance from gaseous state to solid state.



Time (minutes)

Give the name of the:

- a) Process taking place between t_0 and t_1 . (1mark)
 b) Energy change that occurs between t_3 and t_4 (1mark)

18. 2008 Q 1a P2

a) Biogas is a mixture of mainly carbon (IV) oxide and methane.

(i) Give a reason why biogas can be used as a fuel. (1mark)

(ii) Other than fractional distillation, describe a method that can be used to determine the percentage of methane in biogas. (3 marks)

19. 2009 Q 20

Classify the following processes as either chemical or physical. (3 marks)

Process	Type of change
(a) heating copper(II) sulphate crystals	
(b) Obtaining kerosene crude oil	
(c) souring of milk	

20. 2009 Q 5a,b P2

(a) Figure 3 shows the changes that take place between state of matter.

Some of them have been identified and others labelled.

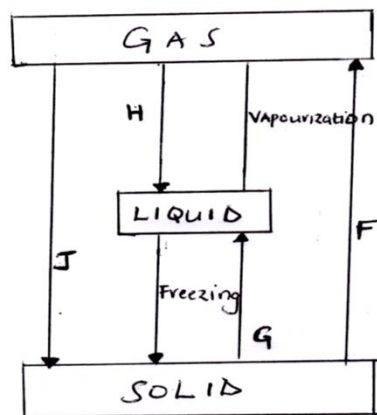


FIGURE 3.

(i) Give the names of the process:

I

H

(1 mark)

II

G

(1 mark)

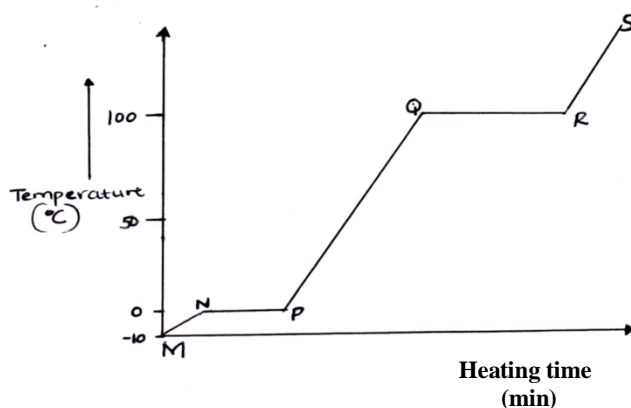
(ii) Name one substance that can undergo process F When left in an open Container in the laboratory

(1 mark)

(iii) The process J is called deposition. Using water is an example; write an equation that represents the process of deposition.

(1 mark)

(b) Figure 4 shows the heating curve for water



(i) Give the names of the intermolecular forces of attraction in the segments.

I

MN

(1 mark)

II

RS

(1 mark)

Hydrate cobalt(II) chloride exists as pink crystals and anhydrous cobalt(II) chloride is a blue powder. Describe a laboratory experiment that can be used to show that the action of heat on hydrated cobalt(II) chloride is a reversible reaction.

(3 marks)

22. 2011 Q3 P1

A mixture contains ammonium chloride, copper (II) oxide and sodium chloride.

Describe how each of the substances can be obtained from the mixture (3 marks)

23. 2012 Q5 P1

A sample of water in a beaker was found to boil at 101.5 °C at 1 atmosphere pressure. Assuming that the thermometer was not faulty, explain this observation.

(1 mark)

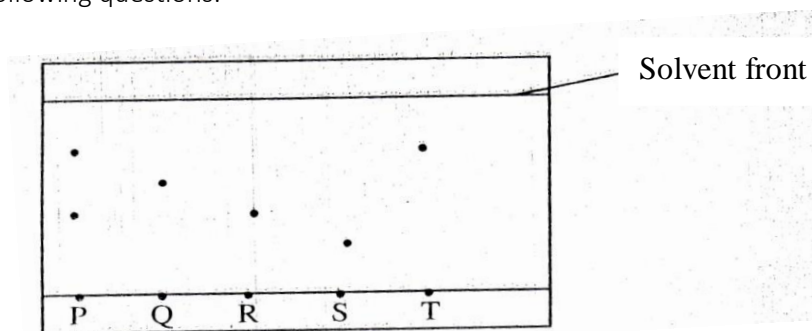
24. 2012 Q2 P1

Iron (III) oxide was found to be contaminated with copper (II) sulphate.

Describe how a pure sample of iron (III) oxide can be obtained. (3 marks)

25. 2013 Q15 P1

The chromatogram below was obtained from a contaminated food sample P. Contaminants Q, R, S and T are suspected to be in P. Use it to answer the following questions.



a) Identify the contaminants in mixture P. (1 mark)

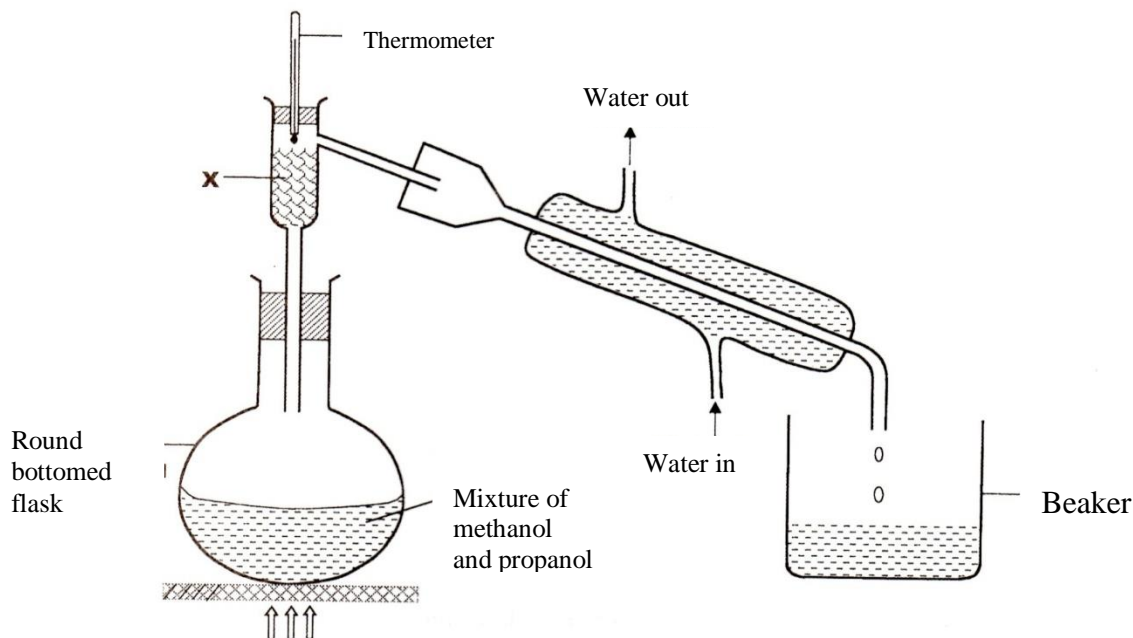
b) Which is the most soluble contaminant in P.? (1 mark)

26. 2014 Q19 P1

Draw a set up that can be used to separate a mixture of sand and iodine (3 marks)

27. 2014 Q22 P1

The set up below was used to separate a mixture of methanol and propanol. Study it and answer the question that follow.



- a) State the function of X (1 mark)
- b) Which liquid will collect first in the beaker? give a reason. (2 marks)

28. 2015 Q3 P2

- (a) Name the method that can be used to obtain pure iron (III) chloride from a mixture of iron (III) chloride and sodium chloride. (1 mark)
- (b) A student was provided with a mixture of sunflower flour, common salt and a red dye. The characteristics of the three substances in the mixture are given in the table below.

Substance	Solubility in water	Solubility in ethanol
Sunflower flour	Insoluble	Insoluble
Common salt	Soluble	Insoluble
Solid red dye	Soluble	Soluble

The student was provided with ethanol and any other materials needed.

Describe how the student can separate the mixture into its three components

(3 marks)

28. 2016 Q10 P1

Iron (III) oxide was found to be contaminated with copper (II) sulphate.

Describe how pure sample of iron (III) oxide can be obtained.

28. 2016 Q27 P1

Describe an experimental procedure that can be used to extract oil from nut seeds.

(2 marks)

28. 2016 Q28 P1

A mixture contains ammonium chloride, copper (II) oxide and sodium chloride.

Describe how each of the substances can be obtained from the mixture (3 marks)

ACIDS, BASES AND INDICATORS

1. 1990 P1A Q 21

Explain why concentrated Sulphuric acid is a weaker acid than dilute Sulphuric acid

2. 1992 P1A Q 6

Solution may be classified as strongly basic, weakly basic, neutral. Weakly acid, strongly acidic. The information below gives solutions and their PH values. Study it and answer the questions that follow.

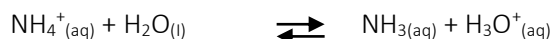
Solution	PH value
B	0.5
C	6
D	14.5

Classify the solutions in the table above using the stated classifications.

(3 marks)

3. **1994 P1A Q 9**

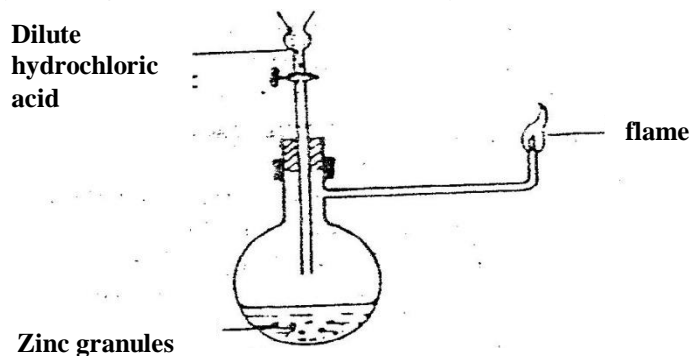
In the equation below, identify the reactant that acts as an acid and explain how you arrive at our choice.



(2 marks)

4. **1995 P1A Q18**

Study the diagram below and answer the questions that follow.

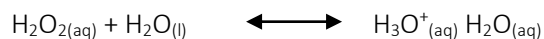


Write an equation for each of the two reactions that take, place in the experiment represented by the diagram above (2marks)

5. **1997 P1A Q17**

In the equation below, identify the reagent that acts as a base. Give a reason

(2 marks)



6. **1998 PP1A Q12**

Distinguish between a strong and weak acid. Give an example of each

(2 marks)

7. **1998 PP1A Q24**

A beekeeper found that when stung by a bee, application of a little solution of sodium hydrogen carbonate helped to relieve the irritation from the affected area. Explain

(2 marks)

8. 1999 P1A Q3

State and explain the observations that would be made when a few drops of concentrated Sulphuric acid are added to a small sample of hydrated copper (II) sulphate.

(2 marks)

9. 1999 P1B Q1a

The table below gives the volume of the gas provided when different volumes of 2M hydrochloric were reacted with 0.6g of magnesium powder at room temperature

Volume of 2M hydrochloric acid (cm ³)	Volume of gas (cm ³)
0	0
10	240
20	480
30	600
40	600
50	600

Write an equation for the reaction between magnesium and hydrochloric acid

10. 2000 Q 27 PP1

State and explain the function of tartaric acid in baking powder

11. 2001 Q 8 PP1

10gm of sodium hydrogen carbonate were dissolved in 20cm³ of water in a boiling tube. Lemon juice was then added drop wise with shaking until there was no further observable change.

a) Explain the observation, which was made in the boiling tube when the reaction was in progress

(2 marks)

b) What observation would have been made if the lemon juice had been added to copper turnings in a boiling tube? Give reason?

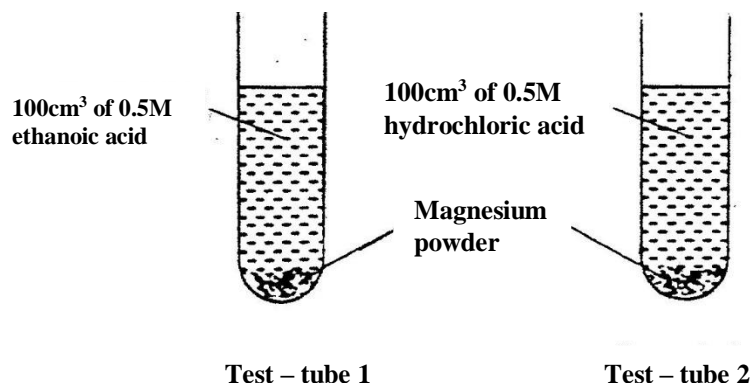
(2 marks)

12. 2001 Q 26 PP1

The Ph of a sample of soil was found to be 5.0. An agricultural office recommended the addition of calcium oxide in the soil. State two functions of the calcium oxide in the soil.

13. 2003 Q 7 PP1

In an experiment equal amounts of magnesium powder were placed into test – tube 1 and 2 as shown below



Explain why the amount of hydrogen gas liberated in test – tube 2 is greater than in test- tube 1 before the reaction is complete.

14. 2003 Q 18 PP1

The table below shows the tests carried out on a sample of water and the results obtained.

	Tests	Results
I	Addition of sodium hydroxide solution	White precipitate which dissolves in excess
II	Addition of excess aqueous ammonia	Colourless solution obtained
III	Addition of dilute hydrochloric acid and barium chloride	White precipitate

- Identify the anion present in the water
- Write an ionic equation for the reaction in III
- Write the formula of the complex ion formed in II

15. 2003 Q 1d PP2

Write two ionic equations to show that aluminium hydroxide is amphoteric

(2 marks)

16. 2004 Q 8

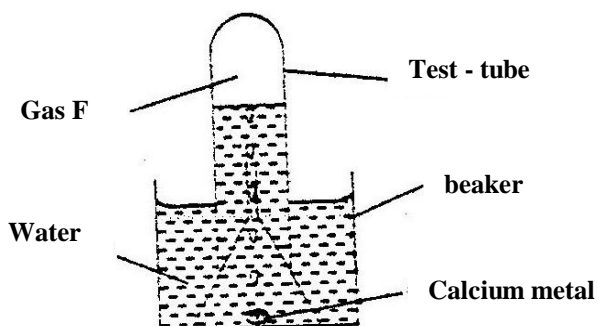
When wood is burnt, a grey powder called ash remains. The ash is stirred with water and filtered, a colourless solution is obtained.

- What is the main component of the colourless solution? (1mark)

b) Explain your answer in (a) above (2marks)

17. 2004 Q 2a PP2

a) The set-up below was used to collect gas F, produced by the reaction between water and calcium metal.



(i) Name gas f

(ii) At the end of the experiment, the solution in the beaker was found to be a weak base. Explain why the solution is a weak base. (2 marks)

(iii) Give one laboratory use of the solution formed in a beaker. (1 mark)

18. 2006 Q 19

Give one use of magnesium hydroxide. (1 mark)

19. 2006 Q 24

a) Complete the table below to show the colour of the given indicator in

Indicator	Colour in	
	Acid solution	Basic solution
Methyl orange	Yellow
Phenolphthalein	Colourless

b) How does the pH value of 0.1 M potassium hydroxide solution compare with that of 0.1M aqueous ammonia? Explain. (2 marks)

20. 2007 Q 5

When a student was stung by a nettle plant, a teacher applied an aqueous solution of ammonia to the affected area of the skin and the student was relieved of pain Explain. (2 marks)

21. 2007 Q 16

The table below shows the tests that were carried out on solid N and the observations made.

I	Test	Observations
II	Dilute hydrochloric acid was added to solid N.	A colourless solution was formed.
III	To the colourless solution obtained in test II, excess sodium hydroxide solution was added.	A white precipitate was formed which dissolved to form a colourless solution.

Write the formula of the anion in;

a) Solid N

(1 mark)

b) The colourless solution formed in test III

(1 mark)

22. 2008 Q 3

Complete the following table by filling in the missing test and observations

(3 marks)

No.	Gas	Test	Observation
I	Chlorine	Put a moist red litmus paper into the gas	
II	Sulphure (IV) oxide		Paper turns green
III	Butane	Add a drop of bromine water	

23. 2008 Q 10 P1

When magnesium was burnt in air, a solid mixture was formed. On addition of water to the mixture a gas which turned moist red litmus paper blue was evolved. Explain these observations.

24. 2009 Q 22 P1

A student added very dilute sulphuric (VI) acid to four substance and recorded the observations shown in the table below

Test	Substance	Gas given off
1	Sodium	Yes
2	Iron	No
3	Carbon	Yes
4	Copper	No

For which tests chart below to answer the questions that follow.

25. 2009 Q 30 P1

Starting with red roses, describe how;

- i. A solution containing red pigment may be prepared; (1 mark)
- ii. The solution can be shown to be an indicator (2 marks)

26. 2011 Q 20 P1

Describe how the PH of anti- acid (Actal) powder can be determined in the Laboratory

(2 marks)

27. 2014 Q27 P1

- a) Name a suitable solvent for extracting an indicator form flowers: (1 mark)
- b) Give a reason why the solvent named in (a) above is used (1 mark)

28. 2015 Q15 P1

Given the following substances: wood ash, lemon juice and sodium chloride.

- (a) Name one commercial indicator that can be used to show whether wood ash, lemon juice and sodium chloride are acidic, basic or neutral. (1 mark)
- b) Classify the substances in 15(a) above as acids, bases or neutral (2 marks)

A cid	Base	Neutral

29. 2016 Q23 P1

Given the following substances: wood ash, lemon juice and sodium chloride.

(a) Name one commercial indicator that can be used to show whether wood ash, lemon juice and sodium chloride are acidic, basic or neutral. (1 mark)

b) Classify the substances in 15(a) above as acids, bases or neutral (2 marks)

Acid	Base	Neutral

29. 2016 Q29 P1

When a student was stung by a nettle plant, a teacher applied an aqueous solution of ammonia to the affected area of the skin and the student was relieved of pain. Explain.

(2 marks)

AIR AND COMBUSTION

1. 1989 Q 11

Explain why a mixture of copper oxide and magnesium reacts when heated while there is no reaction when a mixture of copper and magnesium oxide is heated.

(2 marks)

2. 1992 Q 18

(a) Write the formula for the oxide of

(i) Magnesium

(1 mark)

(ii) Chlorine

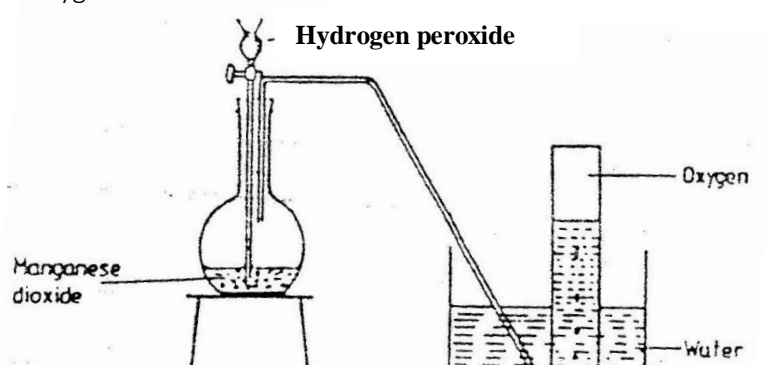
(1 mark)

(b) Write an equation for the reaction between the oxide of chlorine and water

(1 mark)

3. 1995 Q8 P1

The diagram below represents a set – up that can be used to prepare and collect oxygen.

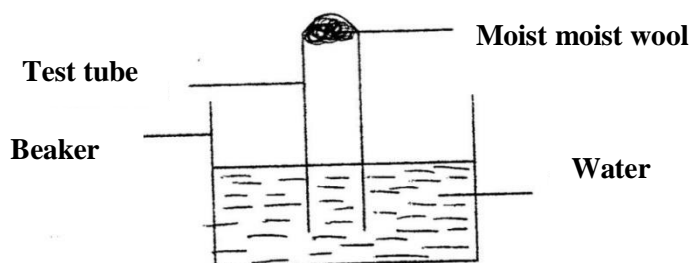


oxygen

**Manganese
dioxide**

water

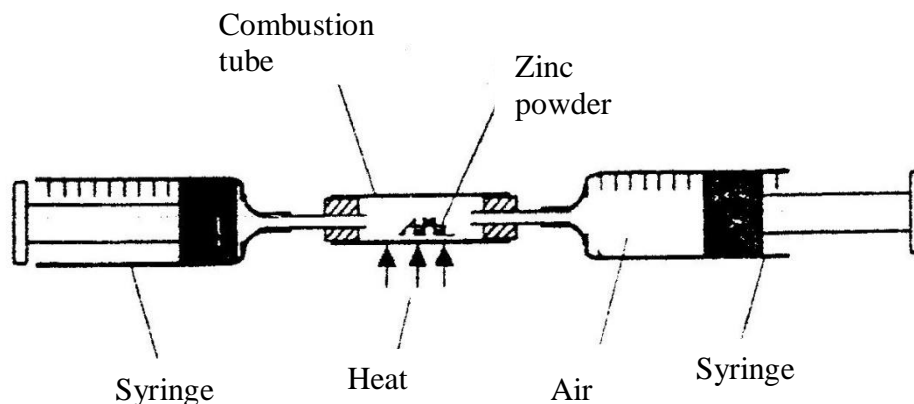
- a) Write an equation for the reaction that takes place (1mark)
 - b) What property of oxygen makes it possible for its collection as indicated by the diagram (1mark)
 - c) Explain why it is important not to collect any gas for the first few. Seconds of the experiment. (1mark)
4. **1995 Q15 P1**
 Explain how you would separate mixture of nitrogen and oxygen gases given that their boiling points are -196°C and 183°C respectively (2marks)
5. **1996 Q12 P1**
 When magnesium metal is burnt in air, it reacts with both oxygen and nitrogen gases giving a white ash. Write two equations for the reactions that take place. (2marks)
6. **1997 Q1 P1**
 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. 1999 Q17 P1

In an experiment a certain volume of air was passed from syringe to syringe over heated zinc powder as shown in the diagram below



The experiment was repeated using excess magnesium powder. In which of two experiments was the change in volume of the air greatest. (Give reasons)

(3 marks)

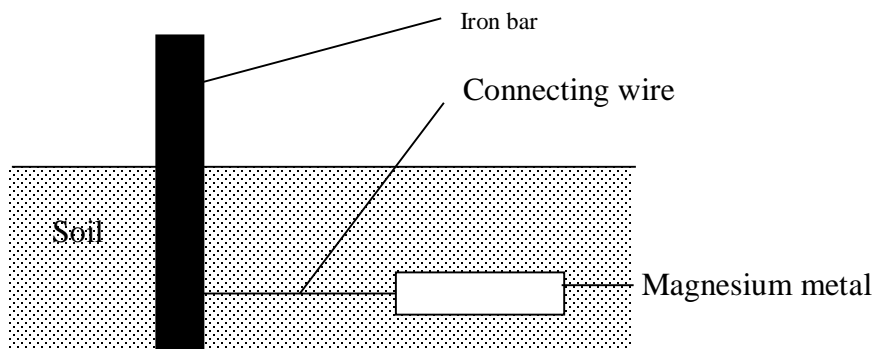
8. 2000 Q21 P1

Name another gas, which is used together with oxygen in welding

(1 mark)

9. 2001 Q16 P1

The diagram below shows an iron bar, which supports a bridge. The Iron bar is connected to a piece of magnesium metal.



Explain why it is necessary to connect the piece of magnesium metal to the iron bar.

10. 2001 Q 19 P1

Explain why burning magnesium continue to burn in a gas jar full of sulphur

dioxide while a burning splint would be extinguished.

(3 marks)

11. 2002 Q3 P1

The oxides of elements A and B have the properties shown in the table below. (the letter do not represent the actual symbols of elements)

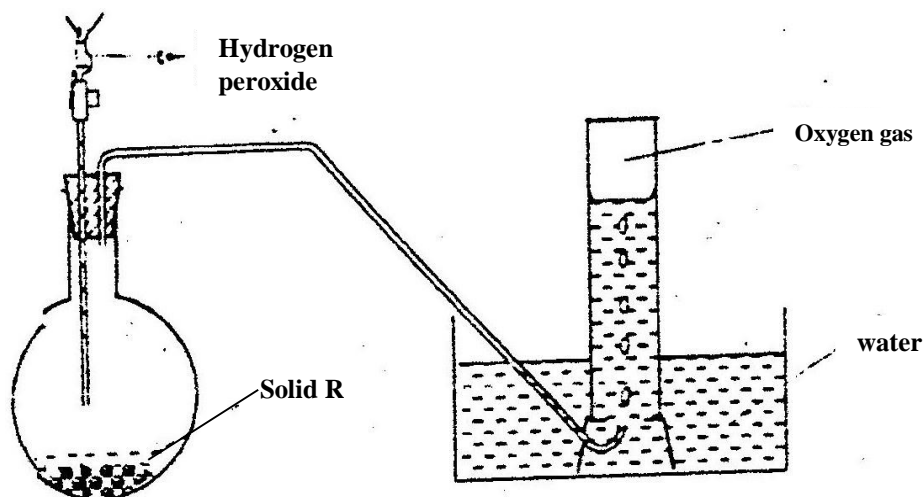
A	B
Gaseous at room temperature	Solid at room temperature
Dissolves in water to form an acidic solution	Dissolves in water to form an alkaline solution

Give one example of elements A and B

(3 marks)

12. 2002 Q22 P1

The diagram below is set – up for the laboratory preparation of oxygen gas



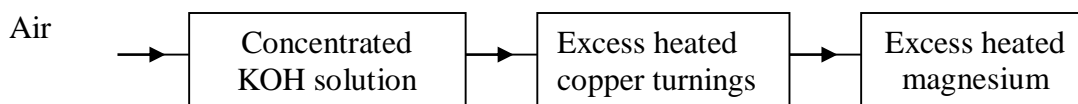
(a) Name solid R

(b) Write an equation for the reaction that takes place in the flask

(c) Give one commercial use of oxygen

13. 2003 Q 16 P1

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



- (a) Write an equation for the reaction which takes place in the chamber with magnesium powder (1 mark)
- (b) Name one gas, which escapes from the chamber containing magnesium powder. Give a reason for your answer (2 marks).

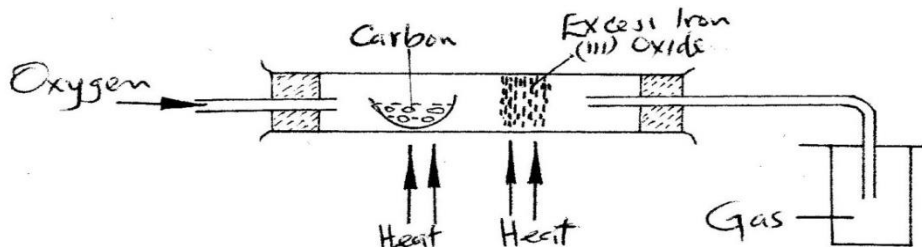
14. 2004 Q8 P1

When wood is burnt, a grey powder called ash remains. The ash is stirred with water and filtered, a colourless solution is obtained.

- a) What is the main component of the colourless solution? (1 mark)
- b) Explain your answer in (a) above (2 marks)

15. 2005 Q 23

The set – up below was used to obtain a sample of iron



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

16. 2005 Q 5 PP2

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

- (a) Explain why it was necessary to clean the magnesium ribbon (1 mark)
- (b) What observation was made in the crucible after burning (1 mark)
- (c) Why was there an increase in mass? (1 mark)
- (d) Write the equation for the reaction which took place in the crucible (1 mark)
- (e) The product in the crucible was shaken with water and filtered.
 Explain the observation which was made when blue and red litmus

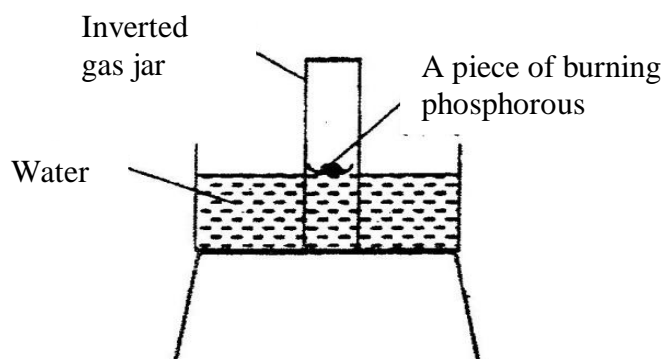
papers were dropped into the filtrate.

(3 marks)

(f) Calculate the volume of oxygen gas used during the burning. (O=16.0; Molar volume of gas = 24,000cm³ a room temperature)

17. 2006 Q 2

The diagram below represent a set-up that was used to show that part of air is used during burning.



a) Given that phosphorus used was in excess, draw a diagram of the set-up at the end of the experiment (when there was no further observable change).

(1 mark)

b) Suggest one modification that should be made on the apparatus if the percentage of the air used is to be determined.

(1 mark)

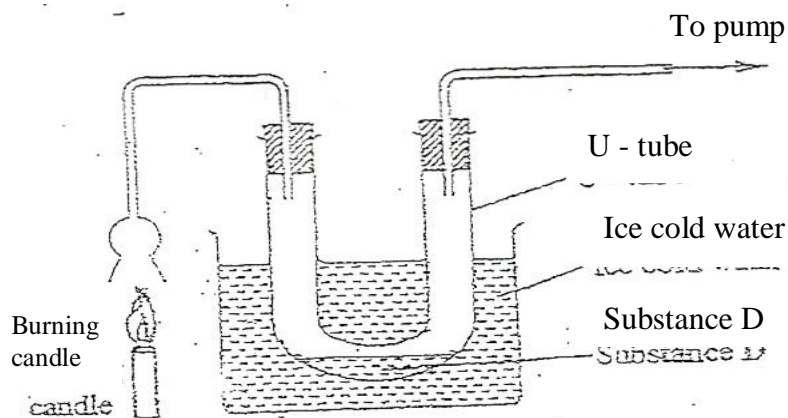
18. 2007 Q 1a

State two factors that should be considered when choosing fuel for cooking

(2 marks)

19. 2009 Q 4

An experiment was set up shown in the diagram below.



(a) Identify substance **D**.

.....

(1 mark)

(b) Describe how the other product of the burning candle could be prevented from getting into the environment

(2 marks)

20. 2009 Q 21

Give the name of the product formed when magnesium reacts with phosphorus.

(1 mark)

21. 2012 Q1 P1

Charcoal is a fuel that is commonly used for cooking. When it burns it forms two oxides.

(a) Name the **two** oxides

(2 marks)

(b) State **one** use of the two oxides

(1 mark)

22. 2010 Q26 P1

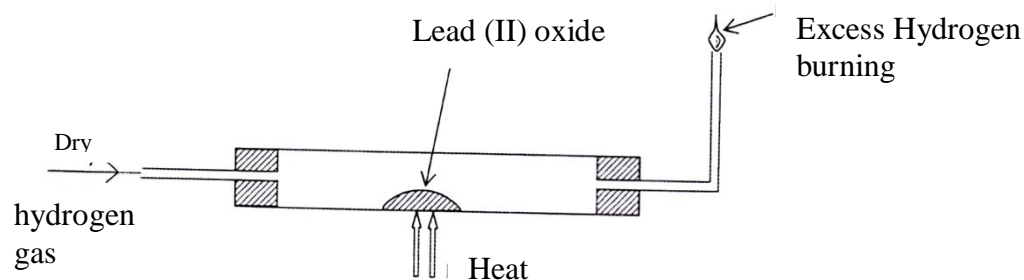
A water trough, aqueous sodium hydroxide, burning candle, watch glass and a graduated gas jar were used in an experimental set up to determine the percentage of active part of air. Draw a labeled diagram of the set up at the end of the experiment.

(3 marks)

23. 2012 Q3 P1

In an experiment, dry hydrogen gas was passed over heated Lead (II) Oxide

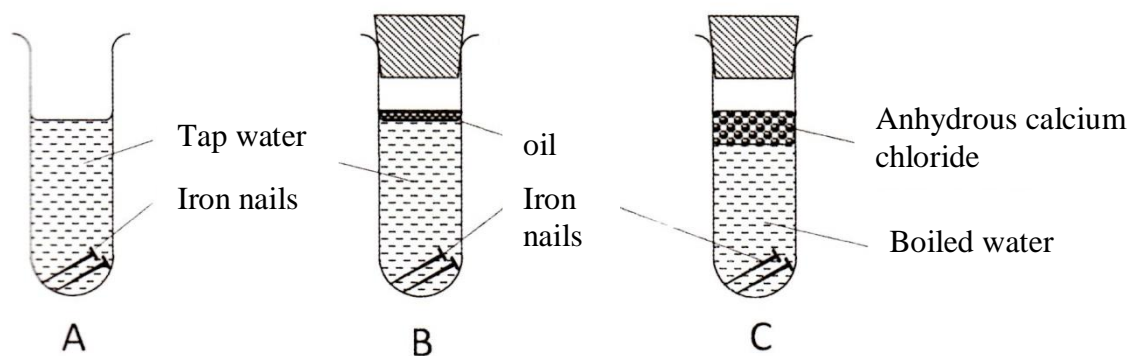
as shown in the diagram below.



State and explain the observations made in the combustion tube (3 marks)

24. 2012 Q24 P1

The following set up of three-tubes was used to investigate rusting of iron. Study it and answer the questions that follow.

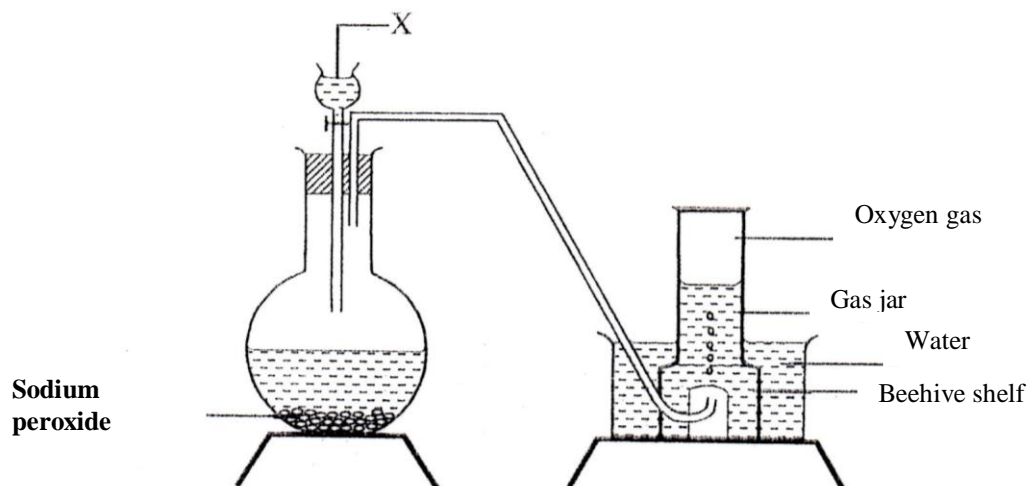


(a) Give a reason why rusting did not occur in test-tube C. (1 mark)

(b) Aluminium is used to protect iron sheets from rusting. Explain **two** ways in which aluminium protects iron from rusting. (2 marks)

25. 2013 Q1 P1

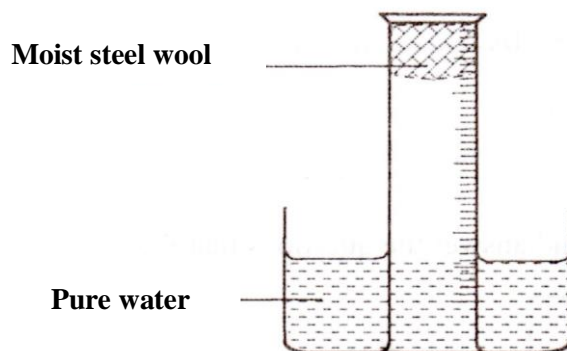
The set up below can be used to prepare oxygen gas. Study it and answer the questions that follow.



- (a) Identify X (1 mark)
- (b) What property of oxygen makes it possible for it to be collected as shown in the above set up? (1 mark)
- (c) State **two** uses of oxygen (1 mark)

26. 2014 Q16 P1

A measuring cylinder fitted with moist steel wool was inverted in a trough of water as shown in the diagram below



- (a) State and explain the observations made on the;
- Moist steel wool after four days. (1 mark)
 - Water level in the measuring cylinder after four days. (1 mark)
- (b) What would be the effect of using steel wool moistened with salty water?

(1 mark)

27. 2016 Q18 P1

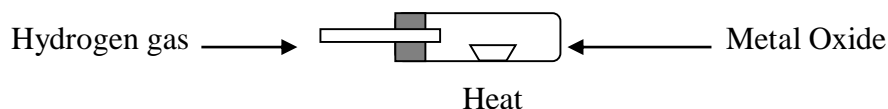
A water trough, aqueous sodium hydroxide, burning candle, watch glass and a graduated jar were used in an experimental set up to determine the percentage of active part of air. Draw a labelled diagram of the set up at the end of the experiment.

(3 marks)

WATER AND HYDROGEN

1. 1990 P1A Q 25

Use the information shown in the diagram below to answer the question that follows?

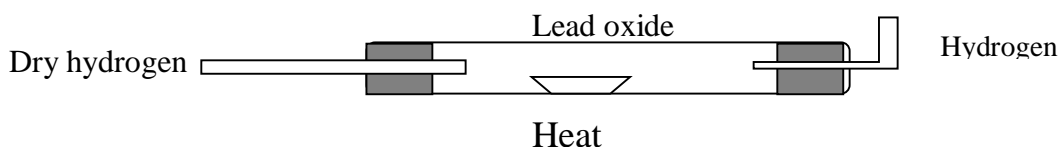


- (i) Explain why it is important to pass the hydrogen for some time before lighting it at point Z.
- (ii) Write an equation for reaction that takes place when hydrogen burns at point Z.

2. 1991 P1A Q 3

When hydrogen gas is passed over heated lead (II) oxide a

reaction occurs. The diagram below shows a set up that could be used for this reaction.



(a) What observation would be made in the combustion tube? (2 marks)

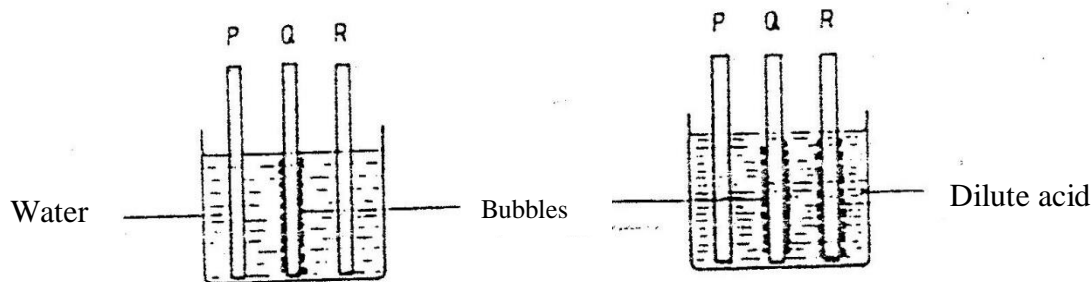
3. **1991 P1A Q 11**

A solution of hydrogen chloride gas in water liberates hydrogen when reacted with Zinc metal while a solution of the same gas in methylbenzene does not. Explain

(2 marks)

4. **1995 Q 10 P1**

In an experiment, rods of metals P, Q and R were cleaned with sand paper and placed in a beaker containing water. Another set of rods was also cleaned and placed in a beaker containing dilute acid. After placing the rods in the two liquids bubbles of gas were seen around some of the rods as shown in the diagrams below.



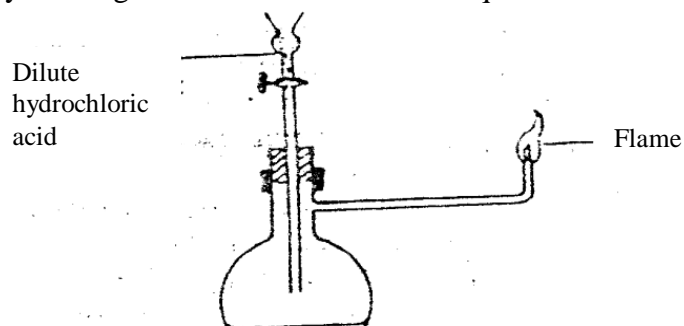
a) Why is it necessary to clean the rods with sand paper before dipping them into the liquids.

(1mark)

b) Arrange the three metals in order of their reactivity starting with the most reactive.

5. **1995 Q 18**

Study the diagram below and answer the questions that follow.

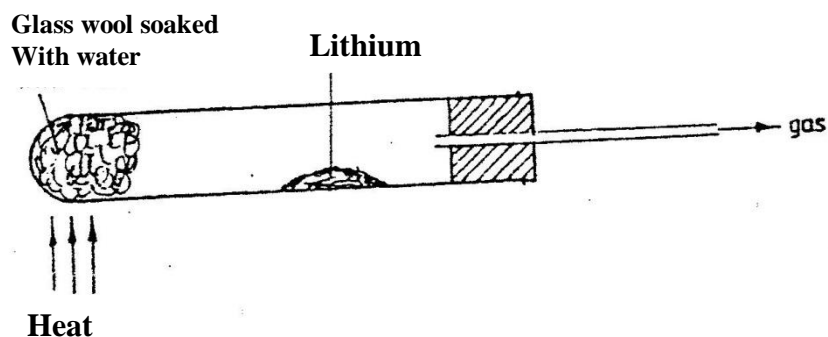


Zinc granules

Write an equation for each of the two reactions that take place in the experiment represented by the diagram above (2 marks)

6. 1996 Q 22 P1

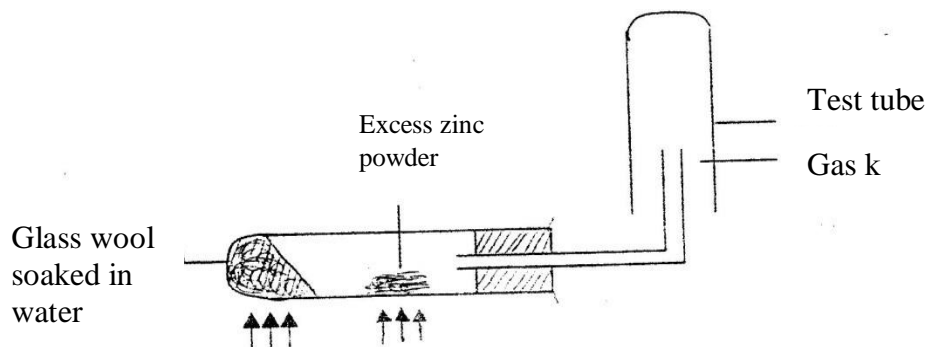
The diagram below represents a set-up that was used to react lithium with water study it and answer the questions that follow:



- Write an equation for the reaction that takes place; given that the atomic number of lithium is 3. (1 mark)
- Why would it not be advisable to use potassium in place of lithium in the above set-up? (1mark)

7. 1997 Q 21 P1

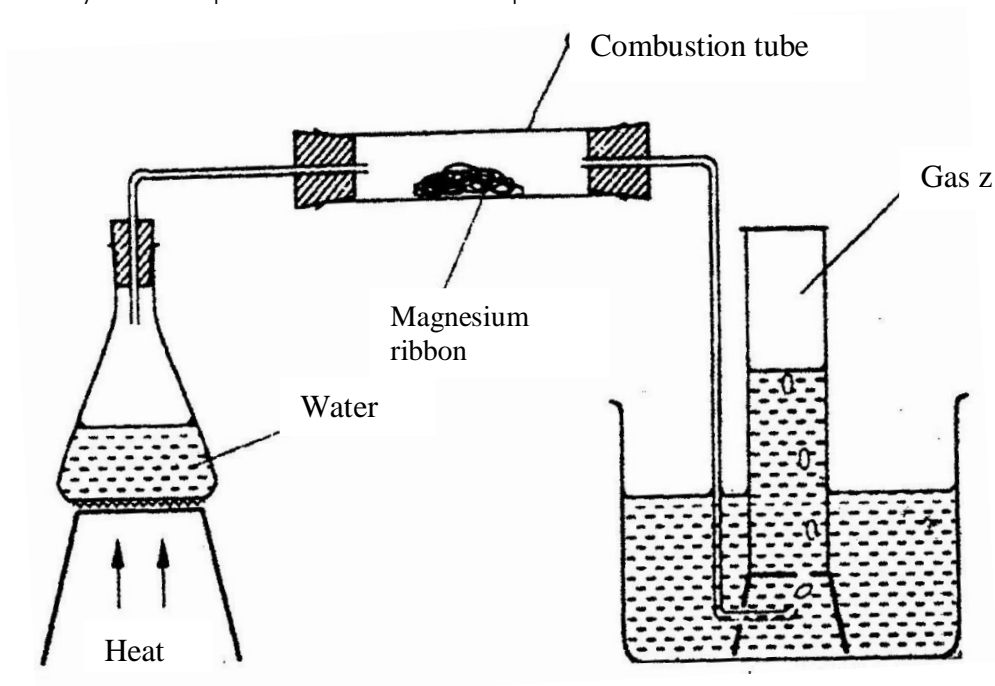
A student set up the experiment below to collect gas K the glass wool was heated before heating the Zinc powder.



Why was it necessary to heat the moist glass wool before heating zinc powder

8. 2000 Q 17 P1

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

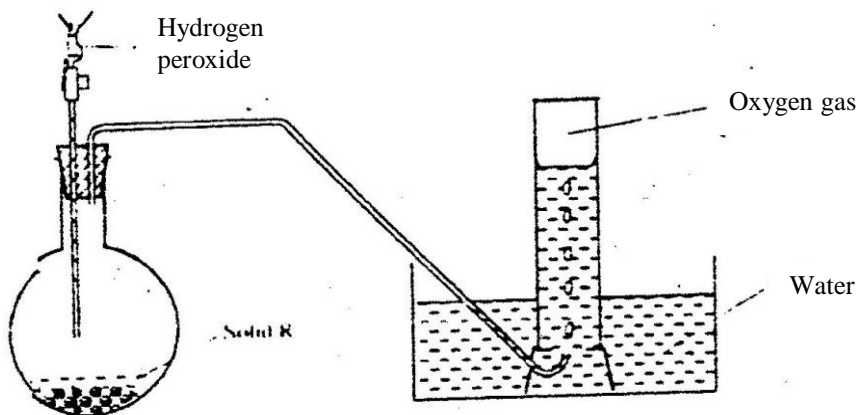


(a) Write an equation for the reaction, which take place in the combustion tube

(b) What property of gas Z allows it to be collected as shown in the diagram

9. 2002 Q 22

The diagram below is set – up for the laboratory preparation of oxygen gas



Solid R

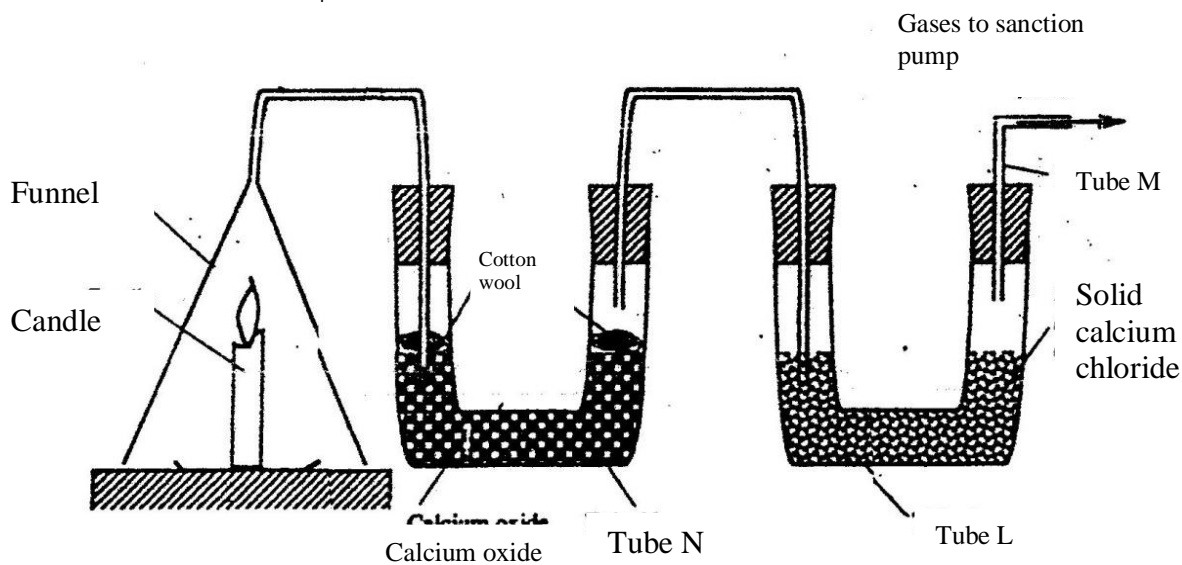
- Name solid R
- Write an equation for the reaction that takes place in the flask
- Give one commercial use of oxygen

10. 2002 Q 2 P2

- Candle wax is mainly a compound consisting of two elements.
Name the two elements

(2 marks)

- The set-up below was used to investigate the burning of a candle study it and answers the questions that follow



- What would happen to the burning candle if the pump was turned off?
Give reasons

- State and explain the changes in mass that are likely to occur in tube N by the end of the experiment

(3 marks)

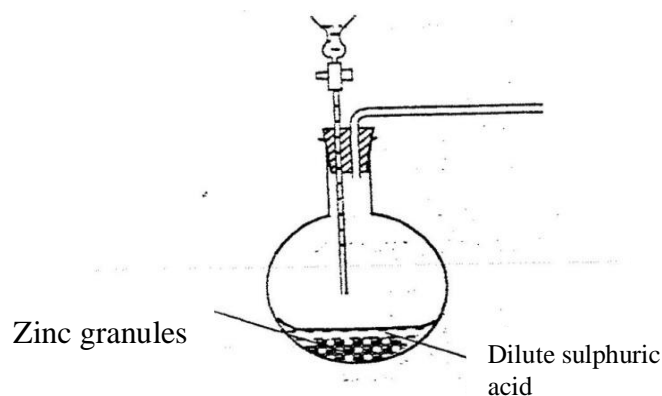
- Name two gases that come out through tube M

(2 marks)

(iv) Name another substance that could be used in the place of calcium oxide in tube N

11. 2003 Q 6 P2

The set – up below was used to prepare hydrogen gas



- Complete the diagram to show how a dry sample of hydrogen gas can be collected (3 marks)
- Write an equation for the reaction, which takes place when hydrogen gas burns in air. (1 mark)

c) i) 1.2 litres of hydrogen gas produced at room temperature and pressure when 3.27g of zinc was used. Determine the relative atomic mass of zinc. (Molar gas volume is 24 litres) (4 marks)

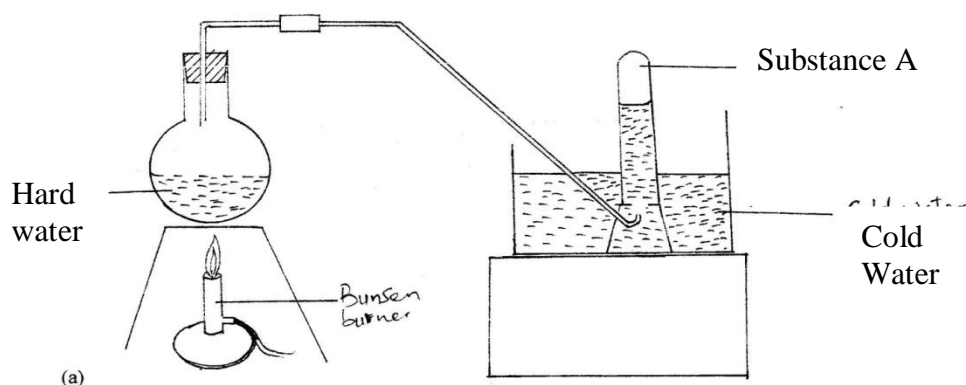
d) State two industrial uses of hydrogen gas.

12. 2004 Q 1 P1

When a candle was burnt completely. The total mass product was found to be greater than the original mass of the candle. Explain

13. 2005 Q 3

The set-up below was used to demonstrate the effect of heat on hard water

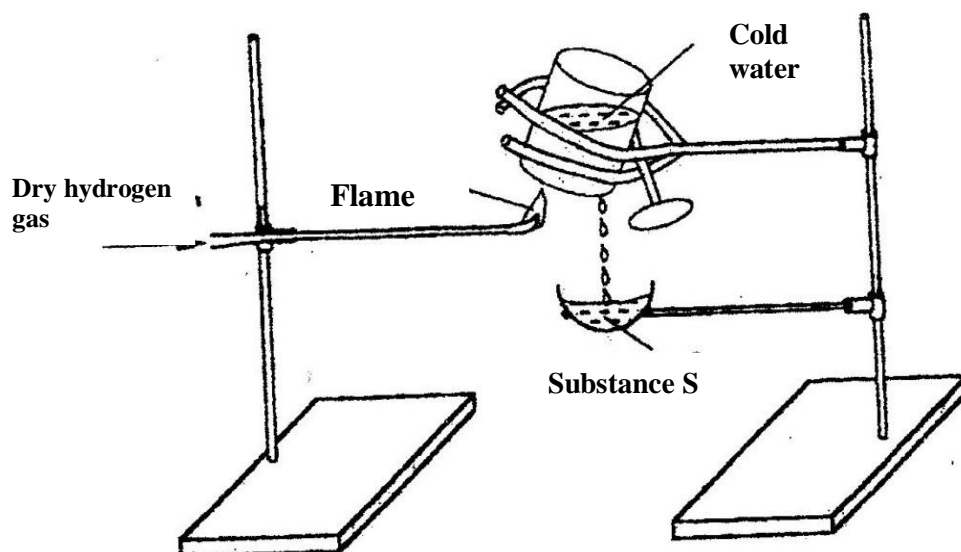


Bunsen
burner

- a) Name substance A. (1 mark)
b) Explain why the heating of hard water produced substance A. (2 marks)

14. 2006 Q 18

Study the diagram below and answer the question that follows.



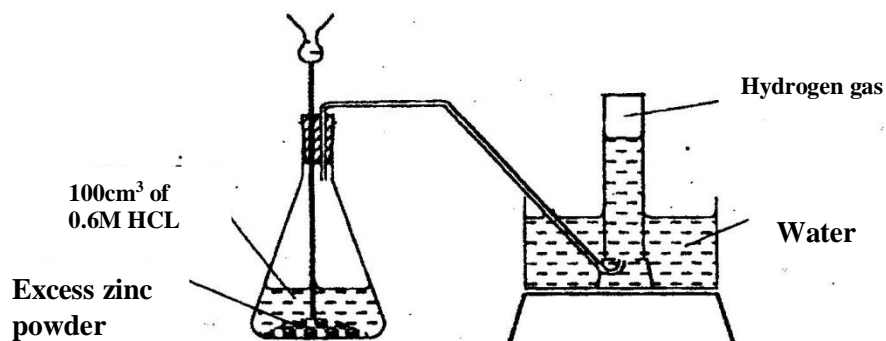
Describe one chemical test that can be carried out to identify substance s. (2 marks)

15. 2006 Q 19

- a) Starting from solid magnesium hydroxide, describe how a solid sample of magnesium hydroxide can be prepared (2 marks)
b) Give one use of magnesium hydroxide. (1 mark)

16. 2007 Q 25a

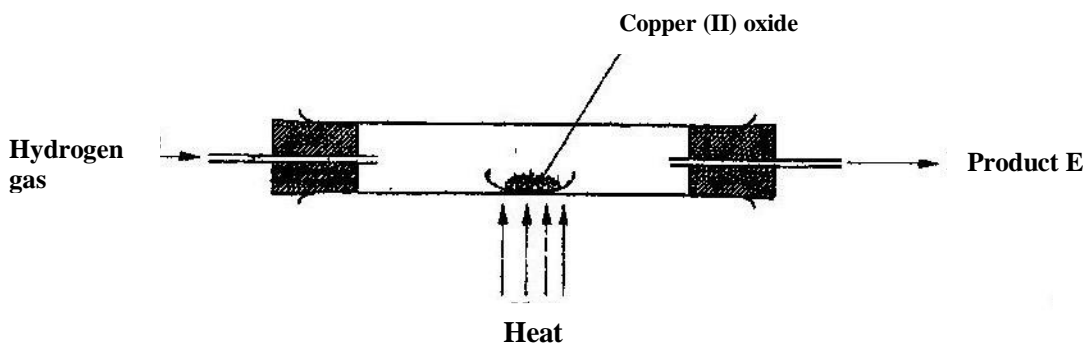
The diagram below shows a student's set-up for the preparation and collection of hydrogen gas.



- (a) How would the final volume of hydrogen gas produced be affected if 80cm^3 of 0.75 M hydrochloric acid was used? (1 mark)

17. 2008 Q 13 P2

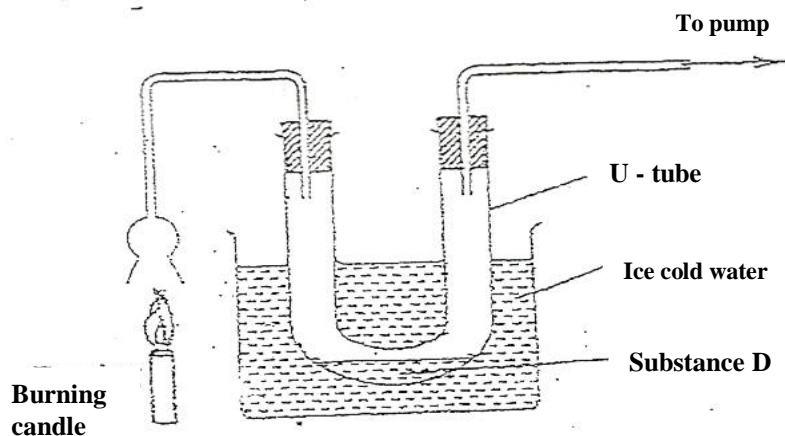
In a laboratory experiment hydrogen gas was passed over heated copper (II) oxide as shown the diagram below.



Describe a chemical test that can be used to identify the product e. (2marks)

18. 2009 Q 4 P1

An experiment was set up shown in the diagram below.

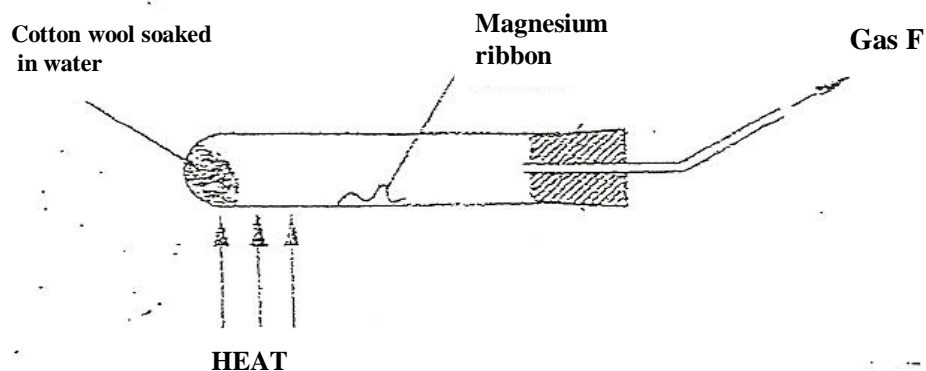


(a) Identify substance D..... (1 mark)

(b) Describe how the other product of the burning candle could be prevented from getting into the environment (2 marks)

19. 2009 Q 15 P1

A student used the set up shown in the diagram below in order to study the reactions of some metals with steam. The experiment was carried out for ten minutes.



(a)

What observation would be made if gas F is ignited?

(b) When the experiment was repeated using iron powder instead of

magnesium ribbon, very little gas F was obtained.

- (i) Give a reason for this observation (1 mark)
- (ii) What change in the conditions of the experiment should the student have made in order to increase the volume of gas F produces. (1 mark)

20. 2009 Q 5c P2

Coal, oil and natural gas are major sources of energy. They are known as fossil Hydrogen is also a source of energy.

- (i) State and explain two reasons why hydrogen is a very attractive fuel compared to fossil fuels (3 marks)
- (ii) State one disadvantage of using hydrogen fuel instead of fossil fuel. (1 mark)

21. 2011 Q 9

State two reasons why hydrogen is not commonly used as a fuel. (2 marks)

22. 2011 Q 12

Sodium hydroxide can be prepared by the following methods; I and II.

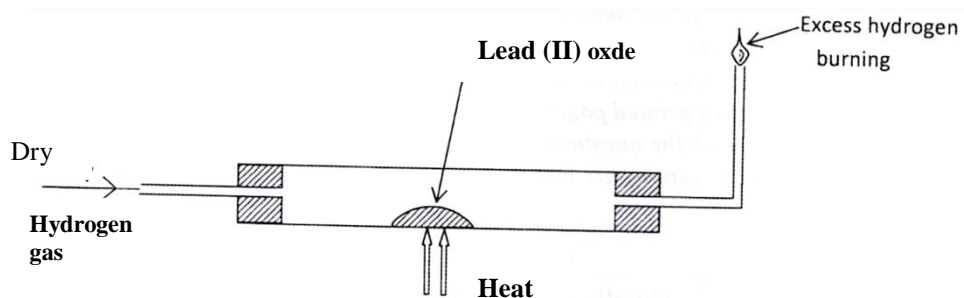
- I. Sodium metal $\xrightarrow{\text{cold water}}$ Sodium hydroxide + Hydrogen
- II. Concentrated Sodium chloride $\xrightarrow{\text{process A}}$ Sodium hydroxide+chlorine+hydrogen

- a) Name one precaution that needs to be taken in method 1. (1 mark)
- b) Give the name of process A. (1 mark)
- c) Give one use of sodium hydroxide. (1 mark)

23. 2012 Q3 P1

In an experiment, dry hydrogen gas was passed over heated Lead (II) Oxide as shown in the diagram below.

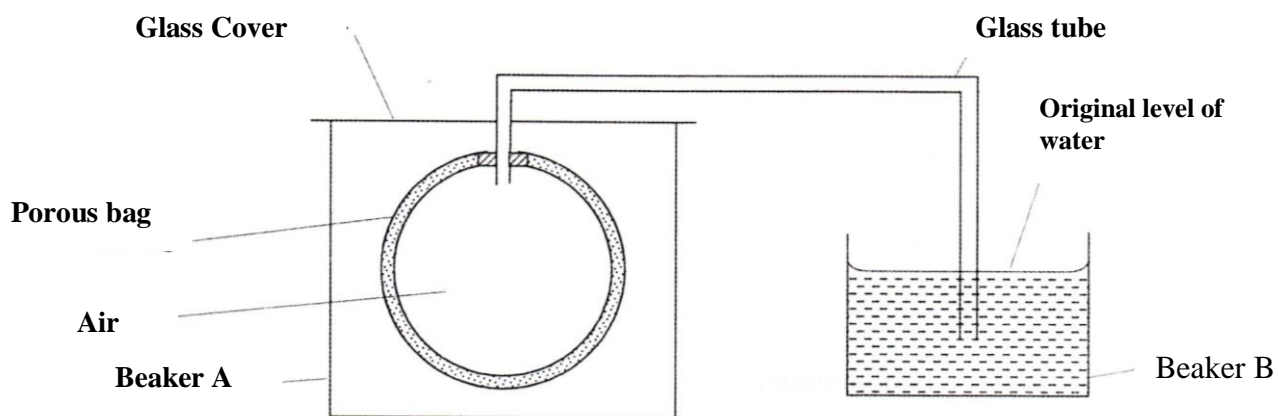
Excess hydrogen
burning



State and explain the observations made in the combustion tube (3 marks)

24. 2012 Q19 P1

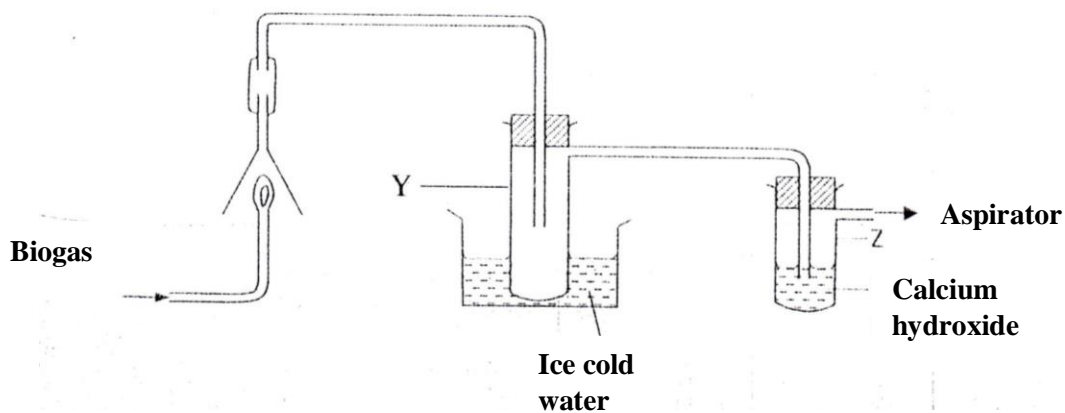
The set up shown below was used to investigate a property of hydrogen gas.



State and explain the observation that would be made in the glass tube if beaker A was filled with hydrogen gas. (3 marks)

25. 2013 Q18 P1

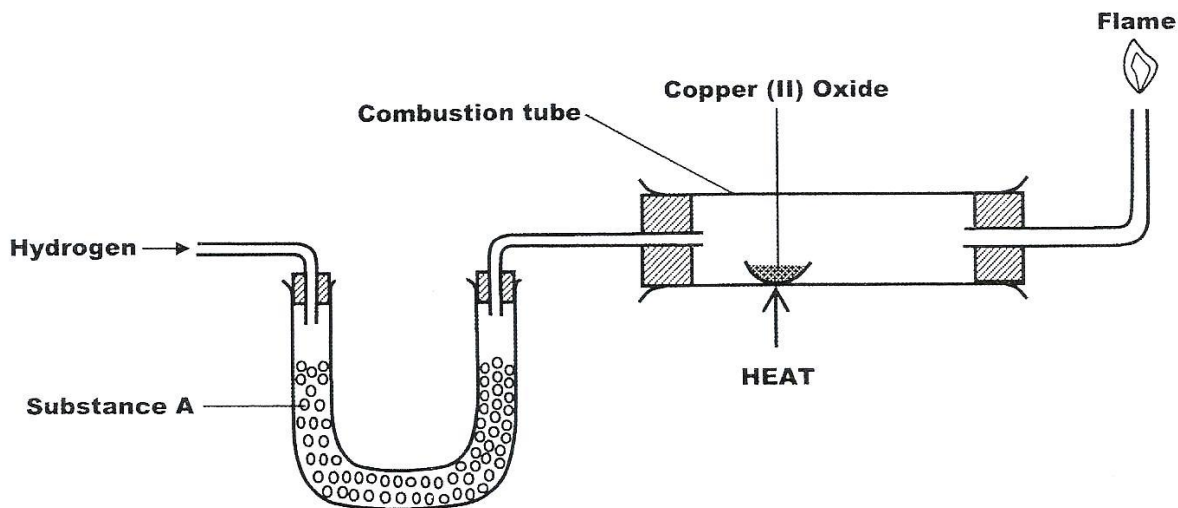
The set-up below was used to investigate the products of burning biogas (methane). Study it and answer the questions that follow.



- What product will be formed in test- tube Y? (1 mark)
- State and explain the observations which would be made in Z? (2 marks)

26. 2015 Q9 P1

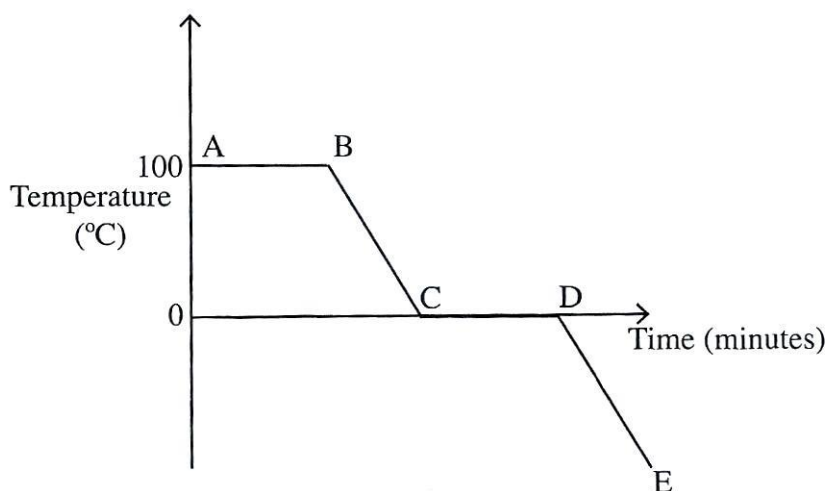
The set up below was used to investigate the reaction between dry hydrogen gas and copper (II) oxide



- Name substance A (1 mark)
- state the observation made in the combustion tube (1 mark)
- Explain the observation stated in (b) above. (1 mark)

27. 2015 Q24 P1

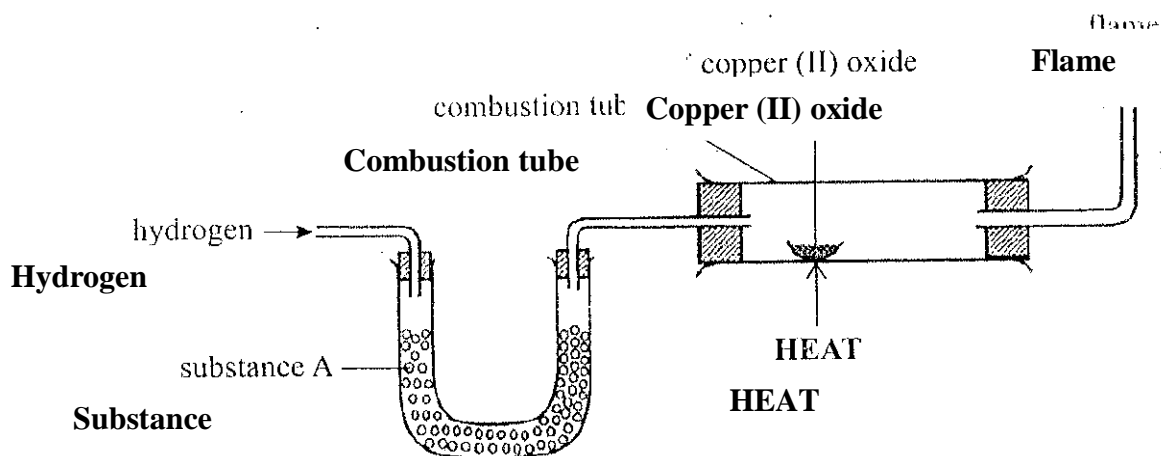
The graph below is a cooling curve for water. Study it and answer the questions that follow



- (a) Explain what happens to the molecules of water in the region BC in terms of kinetic theory. (2 marks)
- (b) In what state is the water in the region DE?

28. 2016 Q4 P1

The set up below was used to investigate the reaction between dry hydrogen gas and copper (II) oxide



- a) Name substance A (1 mark)



b) State the observation made in the combustion tube

(1 mark)

c) Explain the observation made in (b) above

(1 mark)