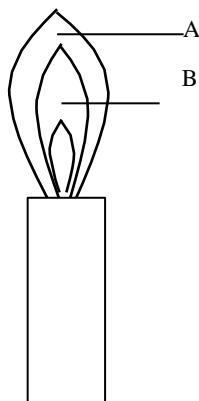


**FORM 1 CHEMISTRY TOPICAL EXAMS****INTRODUCTION TO CHEMISTRY**

1.

The following represents a Bunsen Burner flame.



(a) Name the parts of the flame labeled A and B.

(2 marks)

(b) Identify the hottest part of the flame. Give a reason.

(1 mark)

2. State **one** use of each of the following apparatus in the laboratory. (3mks)

(i) Desiccator.

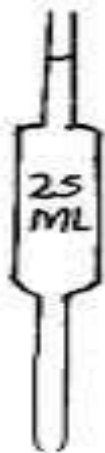
(ii) Crucible.

(iii) Deflagrating spoon.

3. The diagram below represents an apparatus found in a chemistry laboratory.

Give its name.

(1 mark)



4. Give **two** reasons why most laboratory apparatus are made of glass.

(1mk)

5. a) Give **two** differences between luminous and non-luminous flames. (2 marks)

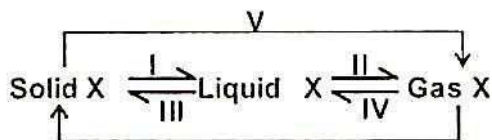
6. State one use of a luminous flame.

(1mark)

b) How is the non-luminous flame produced?

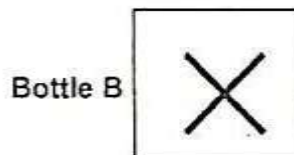
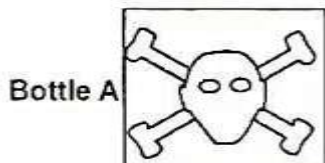
(1 mark)

7. a) The figure below shows some changes in state for a substance X. Study the diagram and answer the questions.



Each of the changes can be speeded up by heating or by cooling. Which changes are speeded up by cooling and which ones by heating. (2marks)

- b) Magnesium sulphate may be used as a laxative. What does this term laxative mean? (1mark)
8. The labels of two reagent bottles contained the following safely symbols.

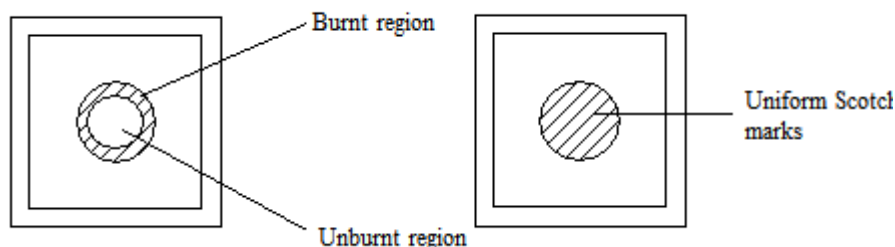


- a) What do the symbols mean? Explain. (2 marks)
- b) Which of the reagent is more harmful? (1 mark)
9. (a) The diagram below shows a non-luminous flame. Use it to answer the questions that follow:

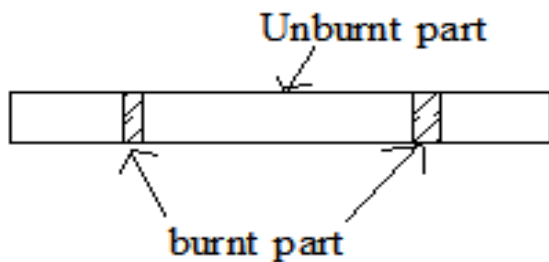


Two wooden splints were placed across regions X and Y respectively. Draw labelled diagrams to show the effects observed on the wooden splint placed across each region. (2 marks)

- (i) Region X.
 (ii) Region Y.
 (iii) (b) It is advisable to leave your flame in the luminous state when not in use. Give a reason why. (1mark)
10. 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? (1mk)
- b. From the above experiment, which part of the flame is better for use in heating? Give a reason. (2mks)
11. A wooden splint was slipped through a region of a particular flame in that laboratory and was burnt as shown in the diagram below.



- a) Name the type of flame the splint was slipped through. (1mk)
 b) Explain why the splint was burnt the way it is shown in the diagram. (1mk)

ACIDS, BASES AND INDICATORS (16 LESSONS)

1. Your lab technician noted that the reagent bottles of sodium carbonate, sodium chloride and sugar have lost their labels. Your chemistry teacher requested you to prepare and test aqueous solutions of each sample as shown below.

Bottle	PH	Electrical conductivity	
1	7	Conducts	
2	7	Does not conduct	
3	10	Conducts	

Complete the table by filling the correct label for each bottle. (3mks)

2. Study the table below and use it to answer the question that follow

Solution	PH
A	3.5
B	14
C	8.5

- i) In which of the solution will phenolphthalein indicator be colourless. (1mark)
 ii) Which of the solutions could be used to relieve heartburn? Explain. (2marks)

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

Solution	PH
A	3.0
B	13.0
C	8.5
D	7.0

- (a) Identify a solution which is (½ mark)
 (i) Strongly acidic. _____
 (ii) Strongly basic _____ (½ mark)

- (b) Which two solutions would react with lead (II) oxide? Explain. (2 marks)

4. The table below shows pH values of some solutions.

Solution	A	B	C	D
pH values	13	7	1	6.5

- a) Which solution reacts vigorously with magnesium metal? (1mk)
 b) Which solution is likely to be lemon juice? (1mk)
 c) Which solution forms complex ions with zinc (II) oxide? (1mk)

SIMPLE CLASSIFICATION OF SUBSTANCES

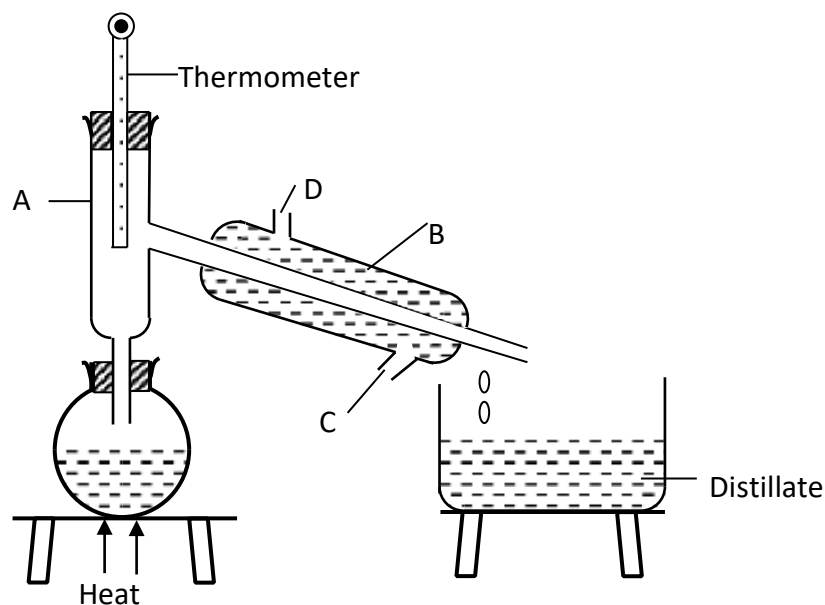
1. Study the information in the table and answer the questions below.

Substance	Solubility g/100g water
V	126
W	2

Describe how a solid sample of substance V could be obtained from solid mixture of V and W. (3 marks)

2.

(a) A form one student crushed banana leaves with water and left the mixture for some days. He found that the mixture had fermented. He suspected that the mixture had been contaminated with ethanol which has a boiling point of 78°C while water has a boiling point of 100°C . The student then set up the apparatus below to separate the mixture.



- (b) Name the piece of apparatus labelled B. (1 mark)
 (c) What is the purpose of the thermometer in the set up? (1 mark)
 (d) At what point of apparatus B should the tap water be connected. Explain. (2 marks)
 (e) Name the part labelled A and state its function (2 marks)
 (f) Which liquid was collected first? Explain (1 mark)
 (vi) What is the name given to the above method of separating mixtures? (1 mark)
 (vii) What property of the components of the mixture makes it possible for the components to be separated by the method? (1 mark)
 (viii) State two applications of the above method of separation. (2 marks)
- (b) A form two student was supplied with a liquid suspected to be water.
 i Describe one chemical test that would be carried out to show that the liquid was water.
 ii How would it have been proved that the liquid is pure water? (1 mark)

3. Classify the following as either compounds or mixtures. (3mks)

Substance	Type of substance
-----------	-------------------

(a) Air	
(b) Salt solution	
(c) Sugar	

4. Study the information in the table below and answer the questions that follow:

Salt	Solubility (g/100g water)	
	at 50°C	at 80°C
G	43	58
Y	82	138

A mixture containing 40g salt G and 120g salt Y in 100g of water at 80°C was cooled to 50°C.

- (a) Which salt crystallized out? Give reason. (2mks)
 (b) Calculate the mass of the salt that crystallized out. (1mk)

5. The diagram below shows spots of pure substances **A**, **B** and **C** on a chromatography paper. Spot **D** is that of a mixture.



After development **A**, **B**, **C** were found to have moved 4cm, 1.5cm and 3cm respectively. **D** had separated into two spots which had moved 3cm and 4cm.

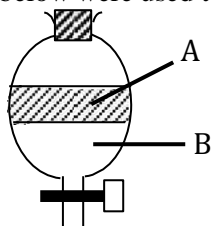
- (i) On the diagram show the positions of all the spots after development. (3mks)
 (ii) Identify the substances present in the mixture **D**. (1mk)

6. Name the most suitable method you can use to separate;

- (a) Xanthophyll and chlorophyll in green leaves. (1 mark)
 (b) Oil from simsim seeds. (1 mark)

7. Ethanol and pentane are miscible liquids. Explain how water can be used to separate a mixture of ethanol and pentane. (2 marks)

8. (a) The apparatus below were used to separate a mixture of liquid A and B.



State *two* properties of liquids that make it possible to separate using such apparatus. (2 marks)

(b) Give the name of the above apparatus. (1 mark)

9.

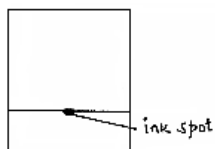
(a) Explain why solid Carbon (IV) oxide is preferred over ordinary ice for use by ice cream venders. (1 mark)

(b) Name one piece apparatus used to measure volume of gases. (1 mark)

(c) Draw a diagram of a deflagrating spoon. (1 mark)

10. A given sample of ink is a mixture of red dye, blue dye and orange dye. The blue dye is least absorbed than the rest and the red dye is most sticky.

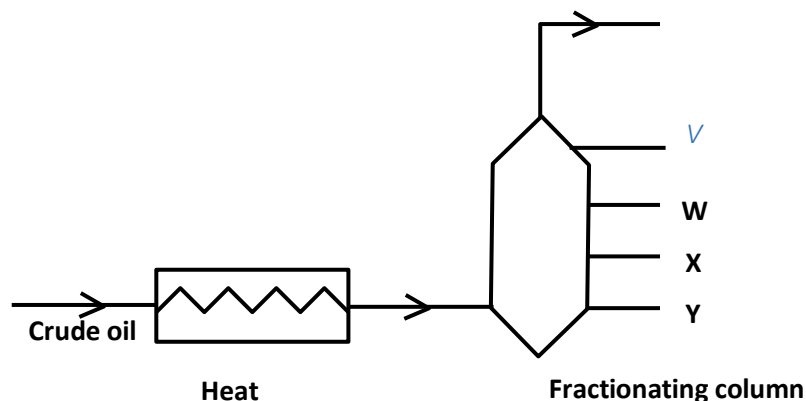
(a) Complete the paper chromatogram below showing their separation. (1½mks)



(b) The above dyes are soluble in water. Describe how a pure sample of blue dye can be obtained. (1mk)

(c) Name the solvent used in paper chromatography. (½mk)

11. Study the crude oil fractionating column in the diagram below. U

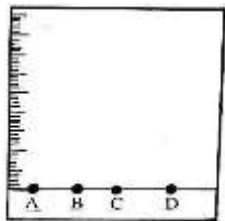


(i) How would you expect the temperature to vary from U to Y? (½mk)

(ii) For each fraction given below, state at what position U, V, W, Z and Y it will be collected. (2½mks)

Compound with	Position collected
$C_{15} \rightarrow C_{25}$ atoms
$C_4 \rightarrow C_{15}$ atoms $C_{20} \rightarrow$ Upwards
$C_8 \rightarrow C_{16}$ atoms	
$C_1 \rightarrow C_4$ atoms	

12. The diagram below shows spots of pure substances 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 9cm, 4cm and 7cm respectively D has separated into two spots which moved 7cm and 9cm.



a. On the diagram

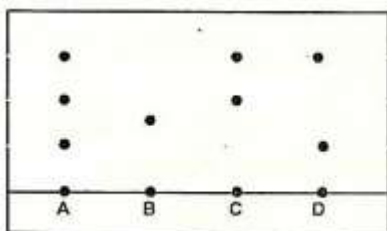
- i. Using 5 units in the alongside scale to represent 1cm Show the position of all the spots after development.

(2 marks)

- ii. Identify the substances present in mixture D.

(1 mark)

13. The following chromatogram was obtained in an experiment to investigate the components present in certain dyes.



- a) Which two dyes when mixed would produce A?
 b) Which dye is pure?
 c) Indicate on the diagram the solvent front.

(1 mark)

(1 mark)

(1 mark)

14. Name the method of separation that can most suitably be used to separate the following mixtures

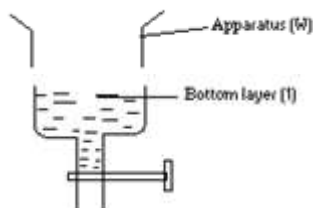
- a) Gasoline from petroleum.
 b) Benzoic acid and potassium carbonate.
 c) Oil from cashew nuts.

(1mark)

(1mark)

(1mark)

15. A mixture of substance K (density 0.626g/cm^3) and Z (density 0.85g/cm^3) was allowed to settle in a container as shown below.



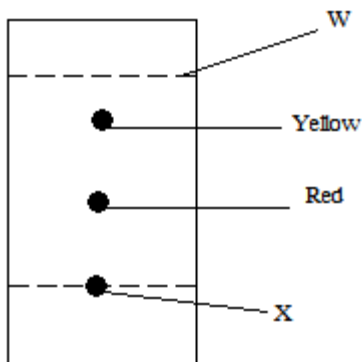
- a. Which liquid forms layer (I)

(1mk)

- b. Explain your answer in (a) above.

(1mk)

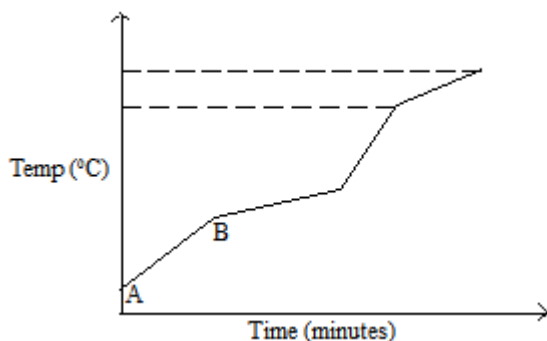
- c. The chromatogram below shows the constituents of a flower extract. Study it and answer the question that follows.



Give a reason to explain the different positions of red and yellow pigments.

(1mk)

16. Study the diagram shown below and answer the questions that follow. The graph shows the heating curve of water.



a. Is the curve for pure water or impure water? Give a reason for your answer.

(2mks)

b. Stat the role of each of the following parts during fractional distillation of a mixture of water and ethanol.

i) Glass beads in the fractionating column.

(1mk)

17. (a) A student wrongly categorised air as a compound and not as a mixture. Give two reasons as to why the student was wrong.

(2mks)

(b) The table below shows the results obtained when four solvents were used to separate a dye. Study the results and use them to answer the questions that follow.

Solvent	Number of Solute components
A	5
B	1
C	0
D	2

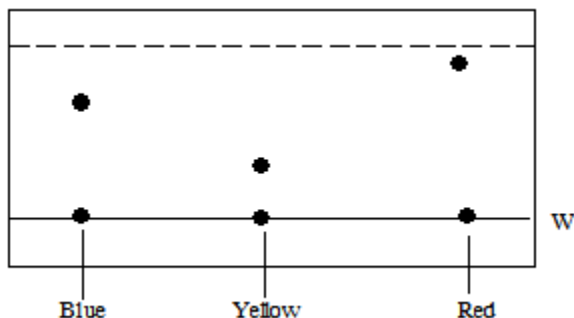
i) Identify the most suitable solvent for this separation. Give a reason for your answer.

(2mks)

ii) What does the result of the solvent C tell us about the dye?

(1mk)

c) The chromatogram below was obtained from a plant extract. Use it to answer the questions that follow.



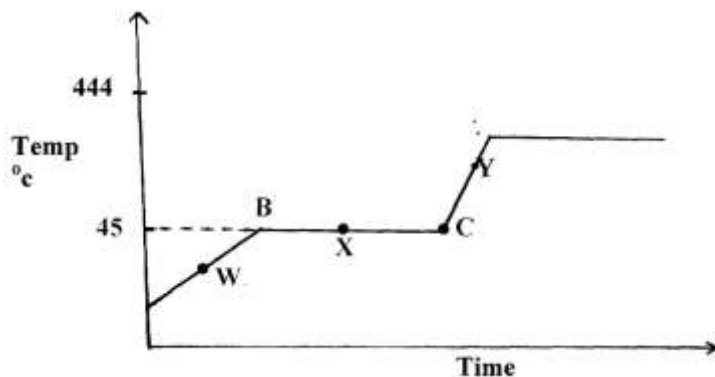
- Name line W (1mk)
- What does the dotted line represent? (1mk)
- State with a reason the least soluble dye in the moving solvent. (1mk)
- Below is a list of major component of crude oil and their boiling points.

Component	Boiling point ($^{\circ}\text{C}$)
Bitumen	Above 400
Lubricating oil	350 - 400
Petrol	40 - 175
Gases	Below 40

- What is the name of the process by which the constituents of crude oil can be separated? (1mk)
- Give one use of the gases component. (1mk)
- Give the order by which the components are obtained from the mixture, starting with the first. (1mk)

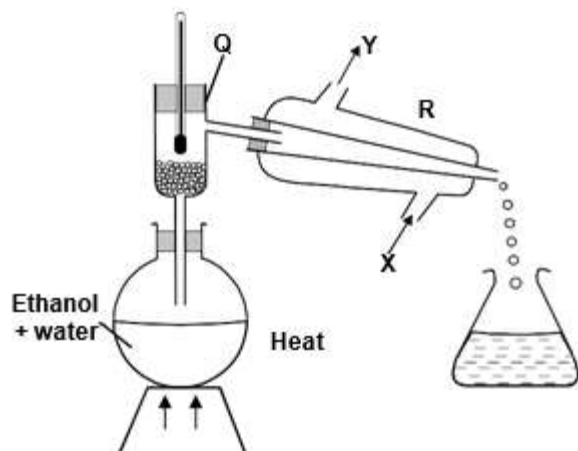
18. Draw a set-up that can be used to separate a mixture of sand and ammonium chloride. (3 marks)

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



- What are the physical states of the substances at points W and Y. (1marks)
- Explain why the temperature remains constant between points B and C. (2marks)

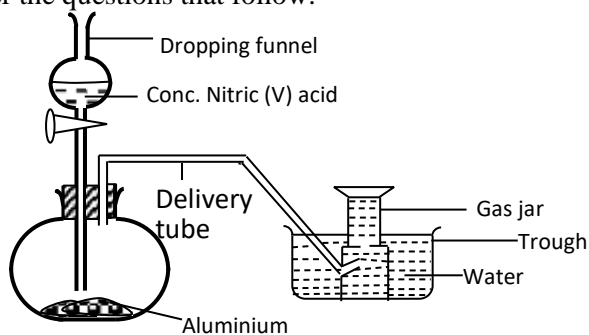
20. The diagram below shows a set-up of apparatus used to separate a mixture of ethanol (B.P= 78.0°C) and water (B.P = 100.0°C)



- Name the parts labelled Q and state its function. (2 marks)
- Name the apparatus R. (1 mark)
- At what point should apparatus R be connected with water? (1 mark)
- Name the distillate that was collected first. (1 mark)
- State the purpose of the thermometer. (1 mark)
- What property of the mixture makes it possible to be collected as shown above? (1 mark)
- Why is a round-bottomed flask preferred for the experiment instead of the flat-bottomed flask? (1 mark)
- Name three industrial applications of the above process. (3 marks)

WATER AND HYDROGEN

- In order to prepare hydrogen gas in the laboratory a student set-up the apparatus shown in the diagram below. Study it and answer the questions that follow.

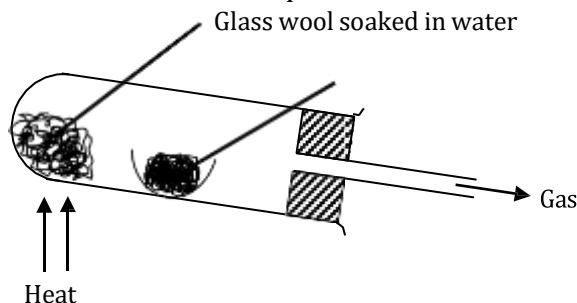


- Suggest why the student did not collect hydrogen gas.
 - In a separate experiment the student reacted iron and hydrochloric acid to prepare hydrogen gas.
 - Write an ionic equation for the reaction. (1 mark)
 - The hydrogen gas produced was found to have a foul smell. Suggest an explanation for this. (1 mark)
- A form on student was supplied with a colourless liquid suspected to be water.
 - Describe one chemical test that could be carried out to show that the liquid was water. (1 mark)
 - How could it have been shown that one liquid was pure water? (1 mark)
 - When hydrogen gas was passed over heated lead (II) oxide in a combustion tube and the gaseous products cooled, a colourless liquid was obtained.
 - Which chemical test would you use to confirm the colourless liquid above? (1 mark)
 - What observations were made in the combustion tube? (1 mark)

(iii) Write an equation for the reaction between hydrogen and lead (II) oxide.

(1mk)

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



(a) Write an equation for the reaction that take place in the combustion tube.

(1 mark)

(b) Why would it not be advisable to use potassium in place of iron in the set-up?

(1 mark)

(c) Glass wool should be heated before heating iron. Explain.

(1 mark)

5. The table below shows the tests carried out on separate sample of water drawn from a well and the results.

Test	Results
i) Addition of excess aqueous ammonia	White precipitate
ii) Addition of a few drops of dilute sulphuric VI acid	No precipitate formed
iii) Addition of dilute hydrochloric acid followed by few drops of barium chloride	White precipitate

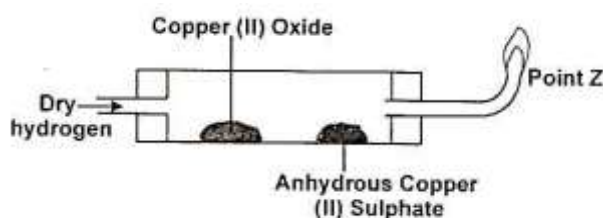
a) Identify the possible cations and anions present in the water.

(2marks)

Write an ionic equation for the reaction which takes place in test tube (iii).

(1mark)

6. The following diagram was used to study a property of hydrogen gas. Study it and answer the questions that follow.



a) Name the missing condition in the above set up.

(1 mark)

b) Explain why the combustion tube is clamped in a slanting position.

(1 mark)

c) Before lighting the gas at the end of delivery tube, hydrogen must be let to pass through until all the air is driven out. Explain.

(1 mark)

d) State three observations that occur in the combustion tube.

(3 marks)

e) Why was hydrogen gas burnt at point Z.

(1 mark)

f) Why should the supply of hydrogen gas be continued while the apparatus cool.

(1mark)

g) What would be observed if the experiment was repeated using lead (II) oxide.

(1 mark)

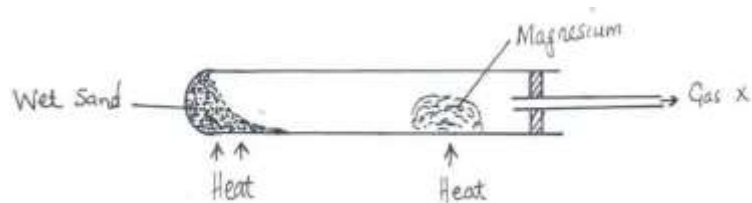
h) Other than the property investigated above, name two other chemical properties of hydrogen gas.

(2 marks)

i) State two industrial use of hydrogen gas.

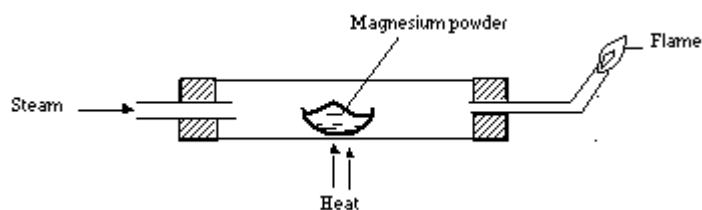
(2 marks)

7. The diagram below illustrates how magnesium would react with steam. Study it then answer the questions that follow.

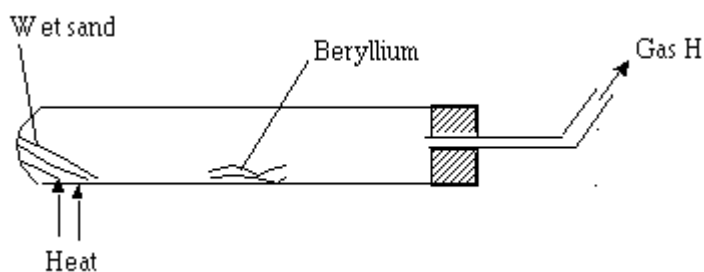


- (a) Write the equation for the reaction that takes place. (1 mark)
 (b) Explain why this experiment cannot be carried out with potassium in the same way as shown. (1 mark)
8. Zinc metal can be used in the laboratory to prepare hydrogen gas from an appropriate mineral acid while copper metal cannot. Explain. (1 mark)

9. Steam is passed over heated magnesium as shown in the diagram below.

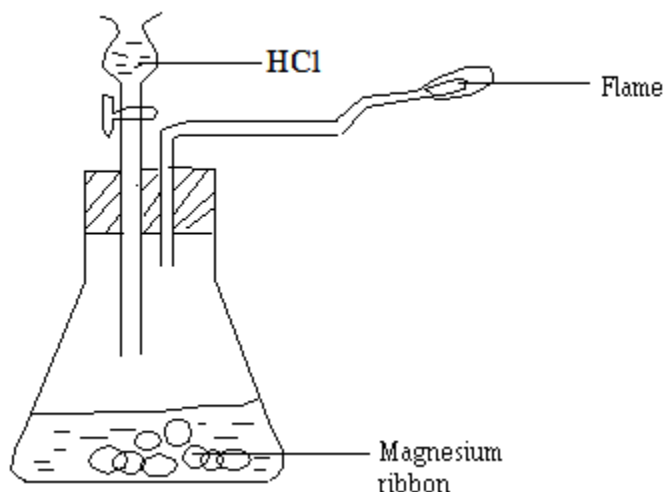


- a) State one observations that will be made in the tube as heating is carried out. (1mk)
 b) What substance is being burnt at A? (1mk)
 c) Write a balanced chemical equation to show the reaction which takes place in the combustion tube. (1mk)
10. A student used the set-up shown in the diagram below 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 H was ignited. (1mk)
 b) When the experiment was repeated using lead powder instead of Beryllium very little of gas H was obtained. Give a reason for this observation. (1mk)
 c) Name another gas which is used together with hydrogen in welding. (1mk)

11. The diagram below was used by a student to prepare a certain gas.



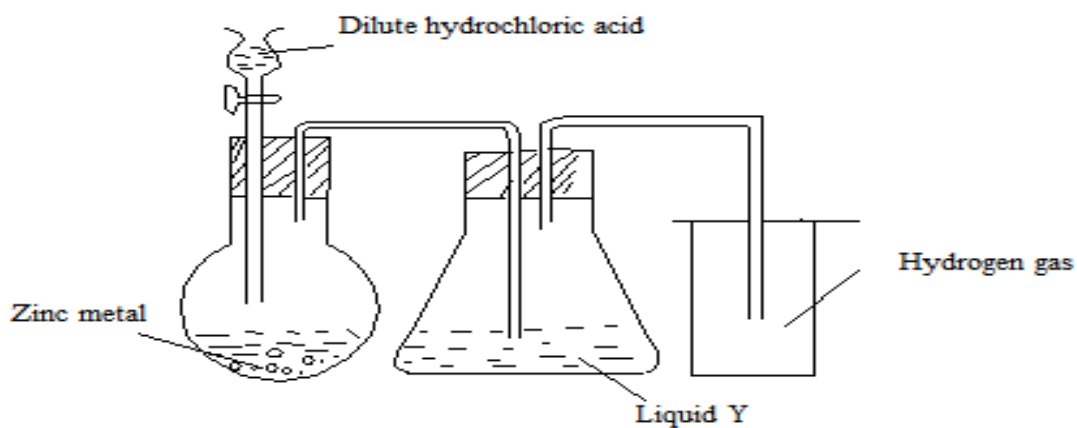
a) Write equation taking place in the experiment.

(2mks)

b) State why it is advisable to burn the gas.

(1mk)

12. The set up below was used to prepare dry hydrogen gas. Study it and answer the questions that follow.



a) Identify one mistake in the set up

(1mk)

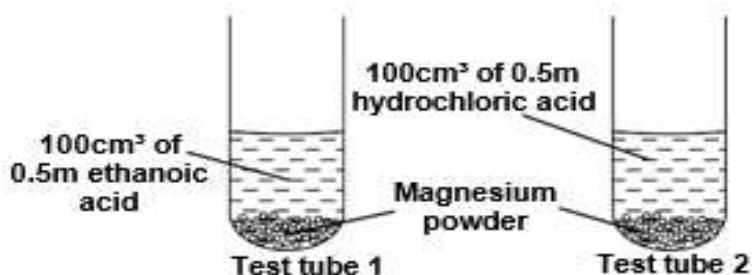
b) Name liquid Y.

(1mk)

c) Explain why helium gas is preferred in weather balloons to hydrogen gas.

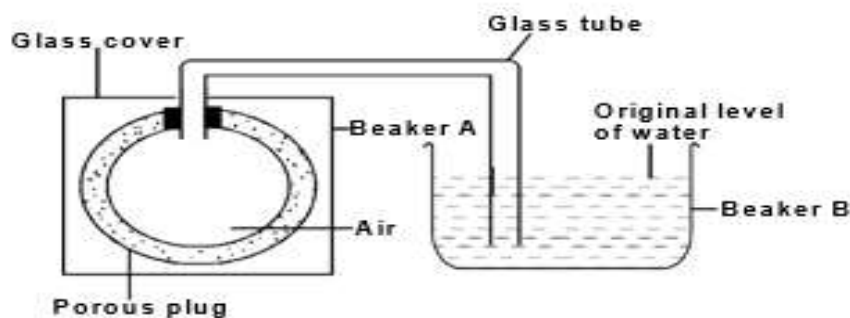
(1mk)

13. In an experiment, equal amounts of magnesium powder were placed into test-tube 1 and test-tube 2 as shown below.



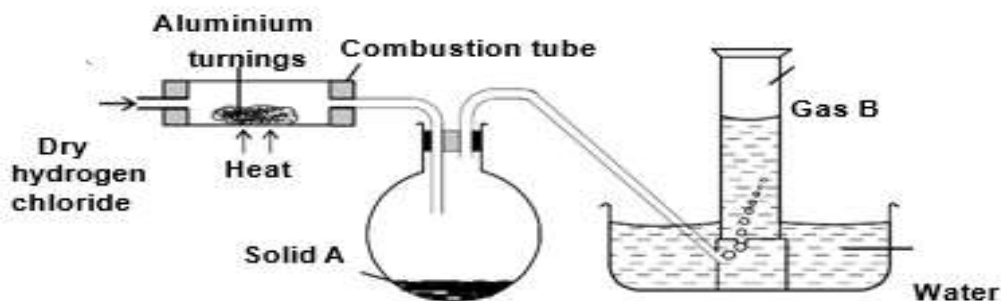
Explain why the amount of hydrogen gas liberated in test-tube 2 is greater than that in test-tube 1 before the reaction is complete. (3 marks)

14. 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)

15.



- Name two reagents that are commonly used to prepare hydrogen chloride gas and write an equation for the reaction. Reagents
Equation (1 mark)
- Name two reagents that would be used to dry hydrogen chloride gas.
- Name
Solid A (½ mark)
Gas B (½ mark)
- Explain why it is possible to collect solid A using the method shown. (1 mark)
- Give an equation for the reaction that takes place in the combustion tube. (1 mark)
- After the reaction has gone on for some time, the water in the trough turns blue litmus paper red. Explain. (1 mark)
- State and explain the observation that would be made if Aluminium was replaced with copper in the combustion tube. (2 marks)