**CHEMISTRY FORM 3 PP1 MARKING SCHEME**

1. Give two reason why helium is used in weather ballons. (2mks)

**(i)It is lighter than air**

**(ii)It isnot flammable**

2. Starting with copper metal describe how a solid sample of copper (II) carbonate can be prepared. (3mks)

½ mk

½ mk

½ mk

½ mk

½ mk

**Heat copper in presence of oxygen to form copper (II) oxide.React copper (II)oxide with dilute sulphuric (vi) acid to form copper(ii) sulphate.React copper(ii) sulphate with sodium carbonate or potassium carbonate to form copper(ii) carbonate filter and dry the residue between filter papers.**

½ mk

3. A Hydrocarbon P was found to decolourlisebromine water. On complete combustion 2 moles of P forms 6 moles of carbon(IV)oxide and 6 moles of water (3mks)

a)Write the structural formula of P.

**H H**

**H C C C (1mk)**

**H H H**

b)Give the name of P

**Propene (1mk)**

c)Name one industrial source of P

**Cracking of alkanes (1mk)**

4.Study the information below and answer the questions that follows. The letters do not represent the actual symbols of the elements

|  |  |  |  |
| --- | --- | --- | --- |
| Element | Electrical conductivity | Ductility | Action of water |
| A | Good | Good | No reaction |
| B | Good | Poor | No reaction |
| c | Good | Good | Reacts |

Select an element which.

1. Likely to be in group II of the periodic table

**C**

1. Could be used to make electric cables

**A**

1. Is likely to be graphite

**B**

5. 20cm3 of a solution containing 0.1M of sodium hydroxide was neutralized by 8.0cm3 of dilute sulphuric (VI) acid. Calculate the concentration of sulphuric (VI) acid in moles per litre(Na= 23.0, O=16.0 H= 1.0) (3mks)

**H2SO4+2NaoH(aq) Na 2S04(aq)+ 2H2O(l) (1mk)**

**Moles of NaOH = 20 X 0.1 = 0.002 Moles ½mk**

**1000**

**Moles of H2SO4 = 0.002 = 0.001 Moles ½mk**

**2**

**8CM3 of H2SO4 0.001 Moles**

**1000cm3 0.001x 1000 ½ mk**

**8**

**= 0.125 moles ½ mk**

6. a) What is a flame. (1mk)

**A mass of burning gases**

b) . State any two differences between luminous and non luminous flames. (2mks)

|  |  |
| --- | --- |
| **Luminous** | **Non-Luminous** |
| **Yellow**  **Produces soot**  **Refect 4 regions** | **Blue**  **No soot or any other**  **Refect 3 regions** |

7. a)Why is concentrated sulphuric (VI) acid unsuitable as a drying agent for ammonia gas. (1mk)

Reacts with ammonia to form ammonium sulphate

b)give a suitable drying agent for ammonia gas. (2mks)

**-Calcium oxide (quick lime)**

8a) State and explain the change in mass that occur when Copper (II)nitrate is heated in an open crucible . (2mks)

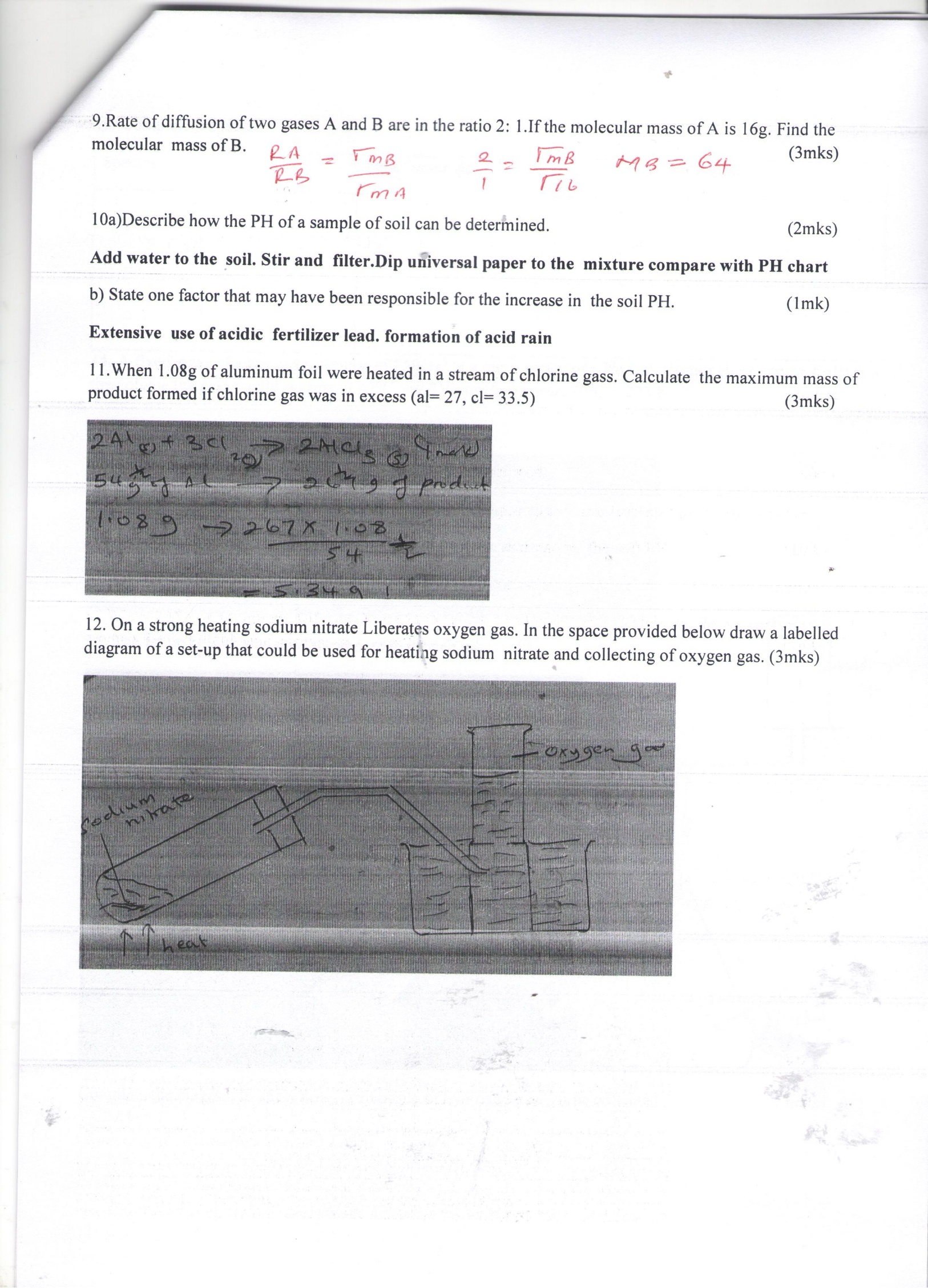
**Mass reduces as No2 and O2are lost to the air**

**(1mk) (1mk)**

b) Is the reaction a temporary chemical change or a permanent chemical change. (1mk)

**Permanent chemical change (1mk)**

9.Rate of diffusion of two gases A and B are in the ratio 2: 1.If the molecular mass of A is 16g. Find the molecular mass of B. (2mks)



½ mk

1mk

1mk

10a)Describe how the PH of a sample of soil can be determined. (2mks)

½ mk

½ mk

½ mk

**Add water to the soil. Stir and filter. Dip universal paper to the filtrate compare with PH chart**

b) State one factor that may have been responsible for the decrease in the soil PH. (1mk)

**(i) Extensive use of acidic fertilizer lead.**

**(ii) Formation of acid rain.**

11.When 1.08g of aluminum foil were heated in a stream of chlorine gass. Calculate the maximum mass of product formed if chlorine gas was in excess (AL= 27, Cl= 33.5) (3mks)

**Workable set up – 1mk**

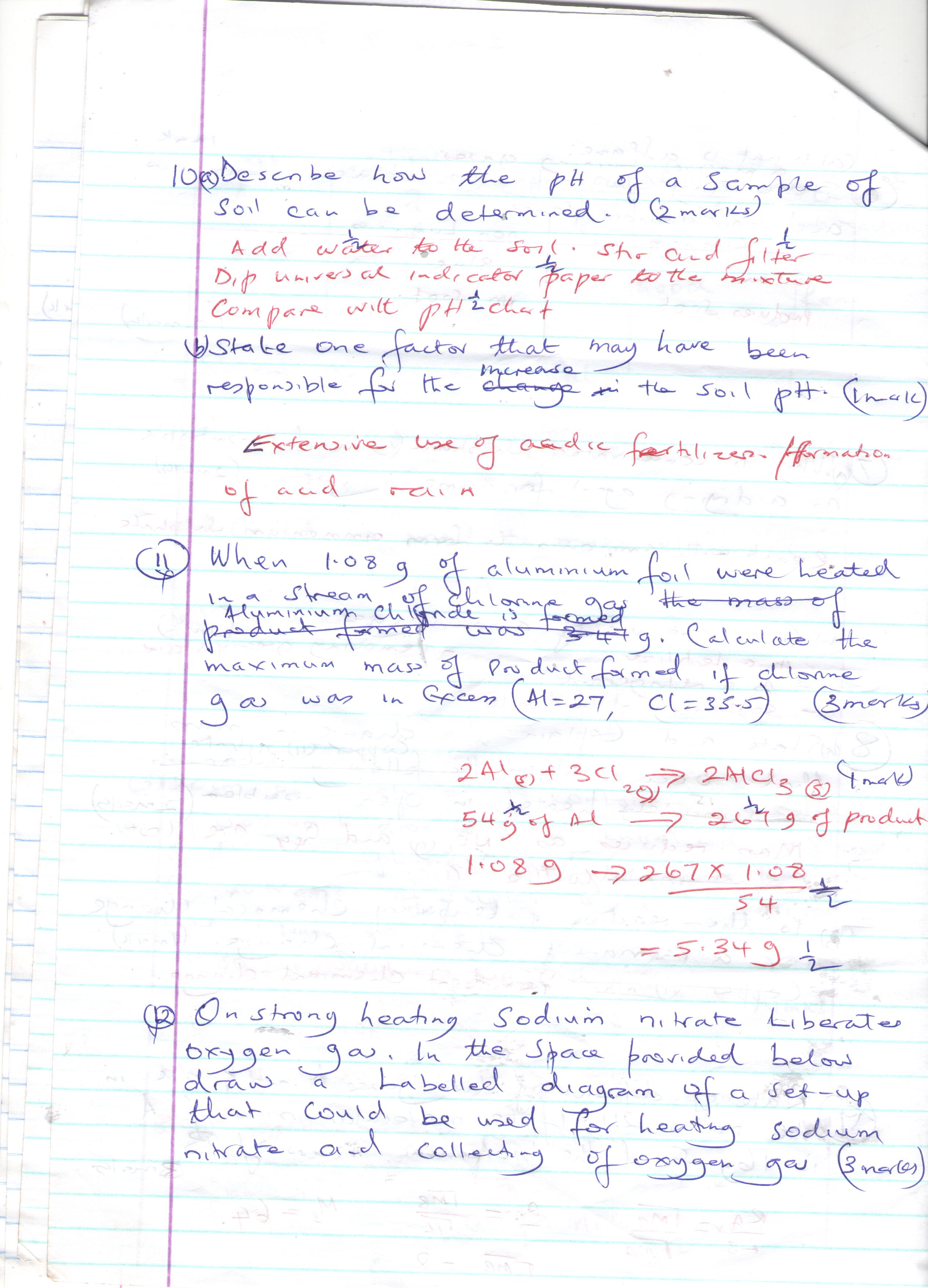
**Heating – 1mk**

**Method of collection – 1mk**

**Workable set up – 1mk**

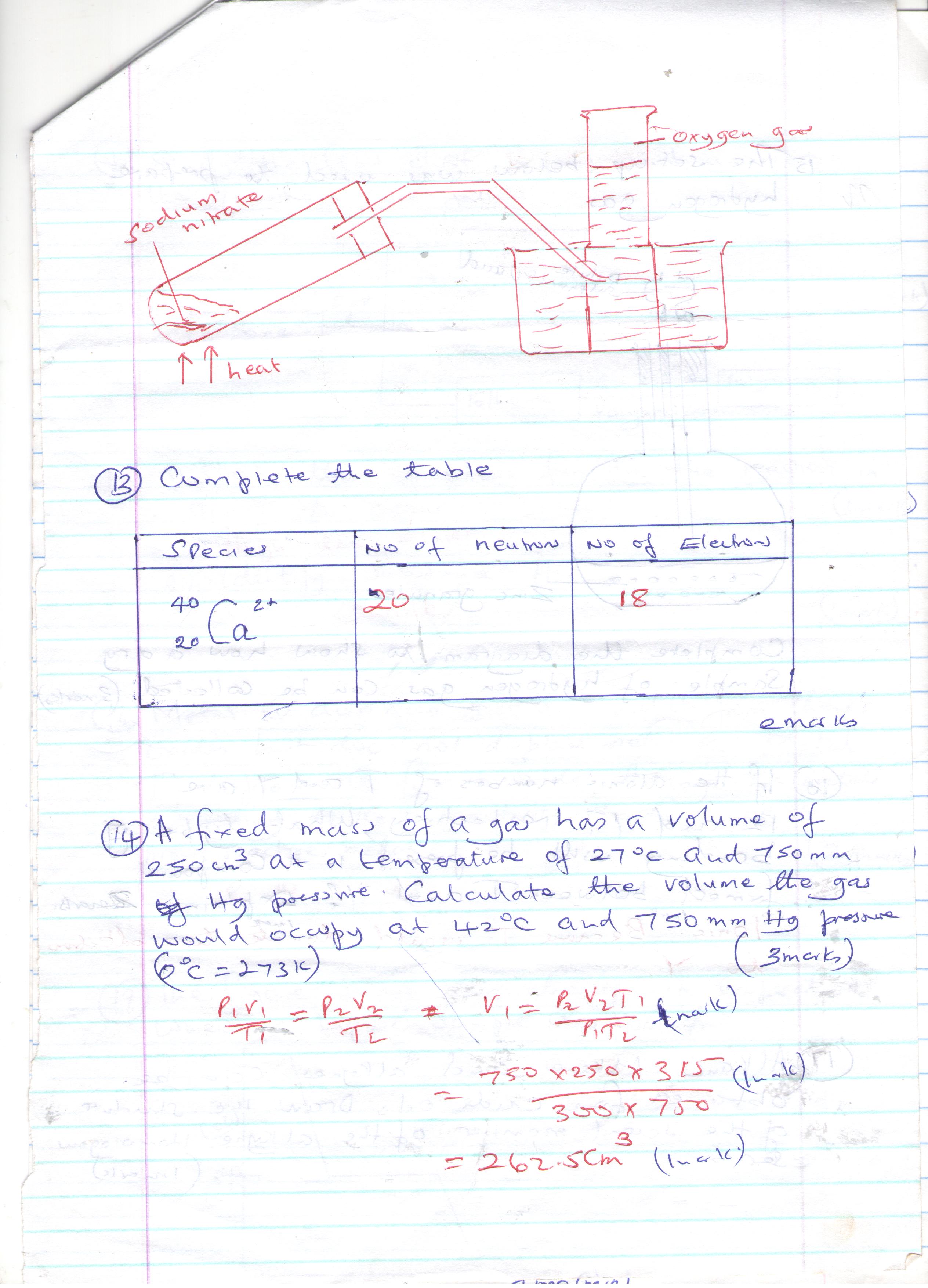
**Heating – 1mk**

**Method of collection – 1mk**



½ mk

12. On a strong heating sodium nitrate Liberates oxygen gas. In the space provided below draw a labelled diagram of a set-up that could be used for heating sodium nitrate and collecting of oxygen gas. (3mks)



13. Complete the table (2mks)

|  |  |  |
| --- | --- | --- |
| Species | No of neutrons | No of Electrons |
| 40C a 2+  20 | **20** | **18** |

14. A fixed mass of a gas has a volume of 250cm3 at a temperature of 270c and 750mm Hg pressure. Calculate the volume the gass would occupy at 420C and 750mmHg pressure (3mks)

**Drying agent – 1mk**

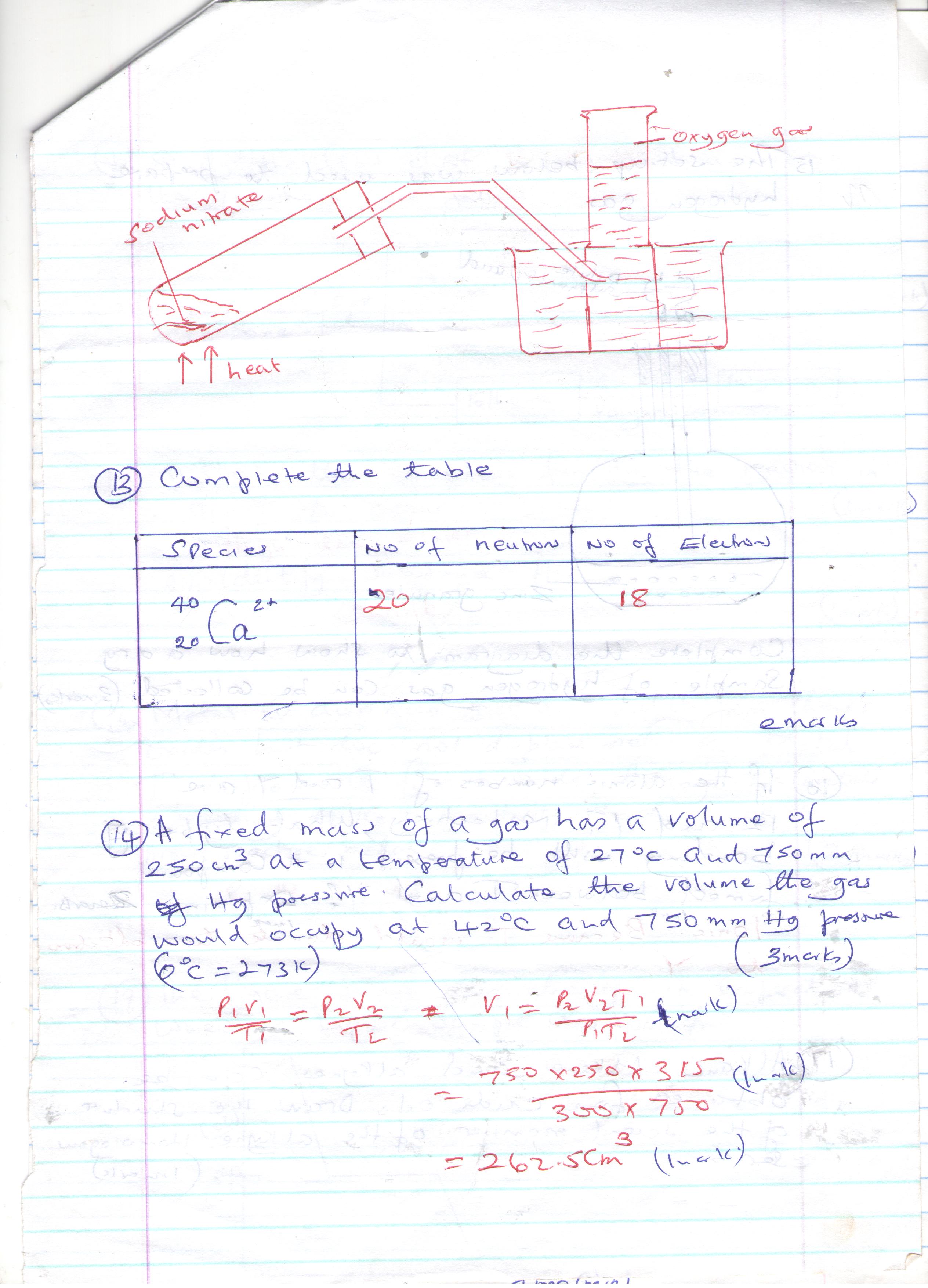
**Method of collection – 1mk**

**Workability – 1mk**

**Substitution – 1mk**

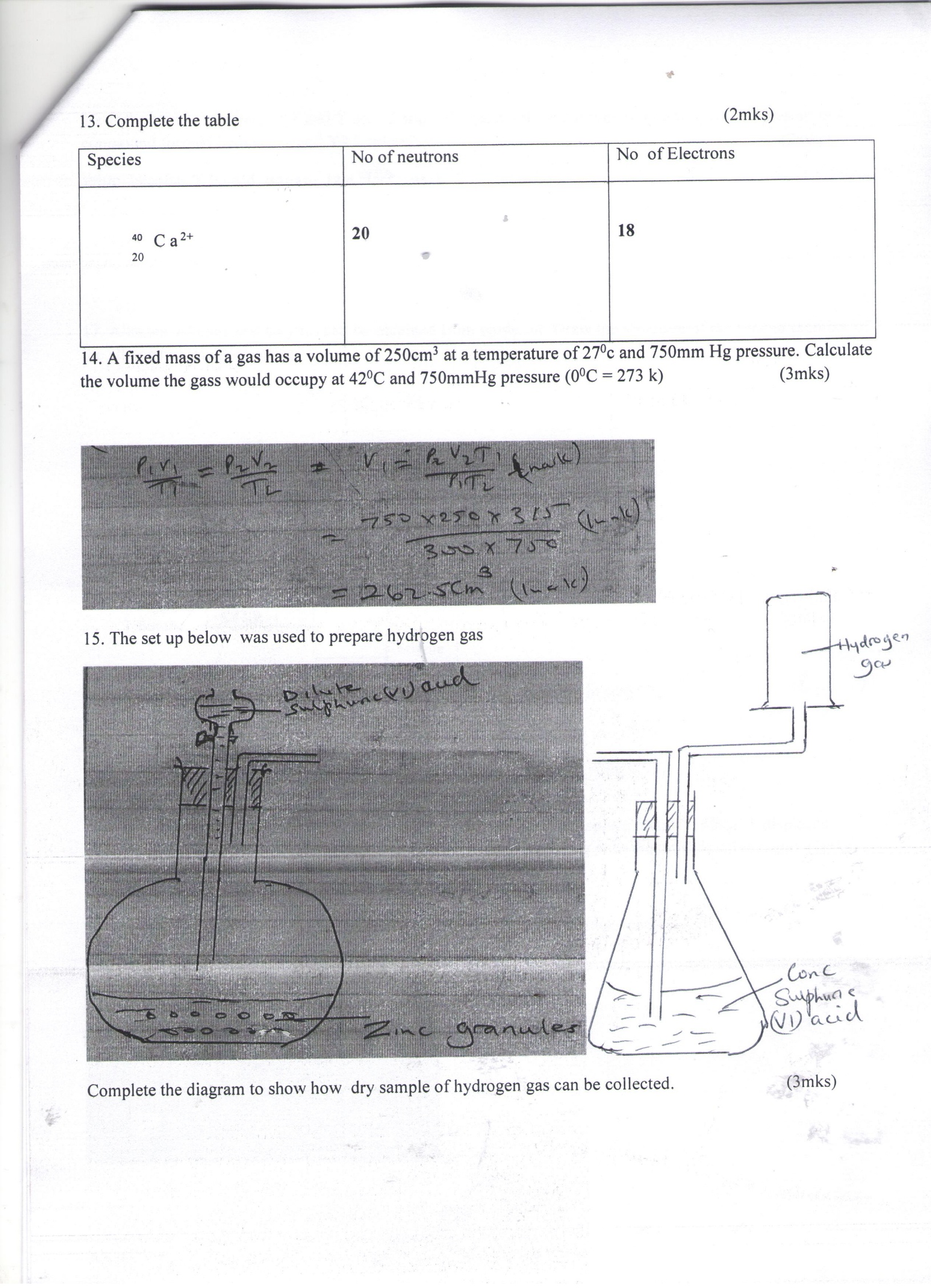
**Conversion of temperature – 1mk**

**Correct ans – 1mk**



**2mks**

15. The set up below was used to prepare hydrogen gas

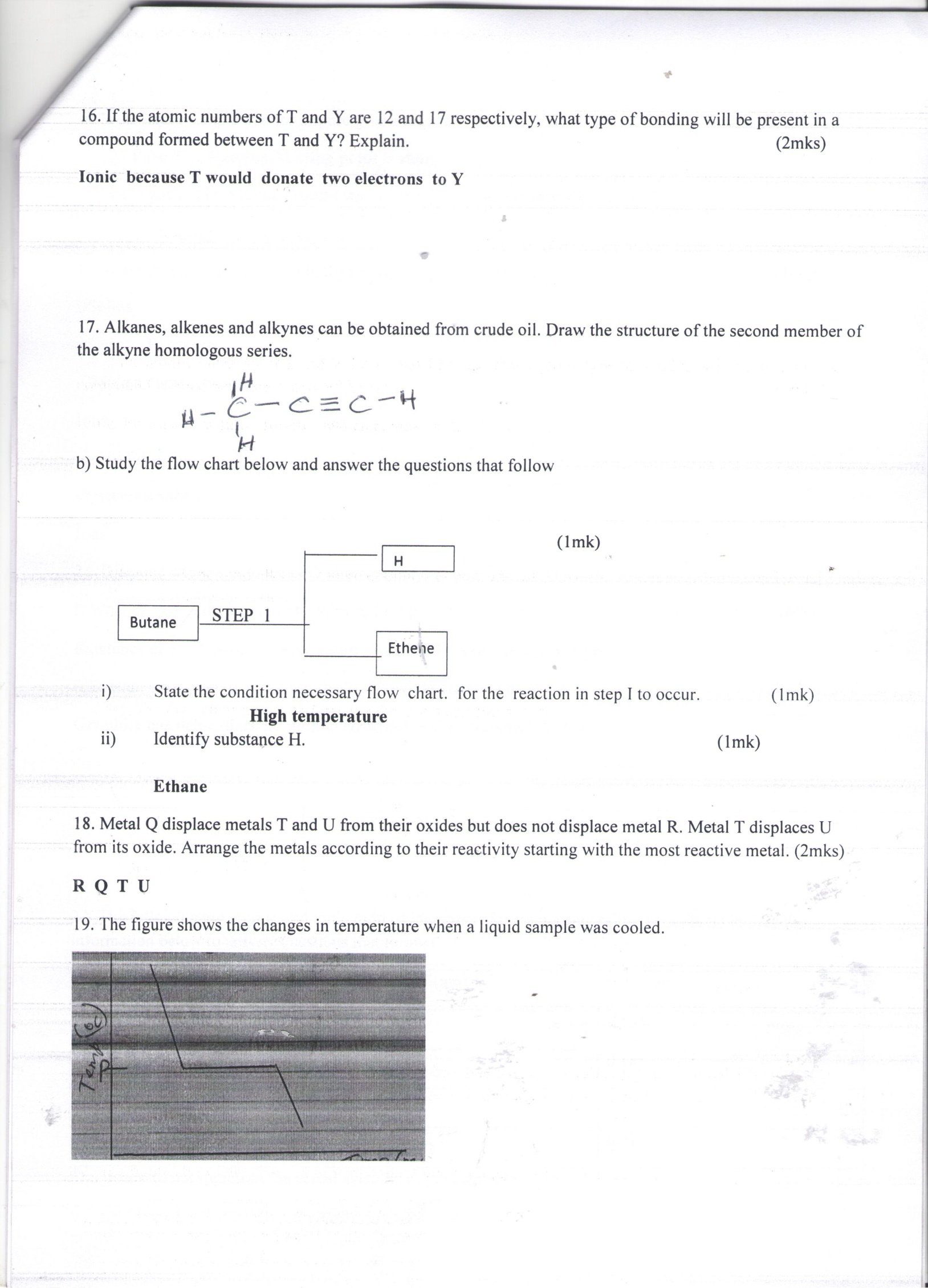


Complete the diagram to show how dry sample of hydrogen gas can be collected. (3mks)

16. If the atomic numbers of T and Y are 12 and 17 respectively, what type of bonding will be present in a compound formed between T and Y? Explain. (2mks)

**Ionic becauseT would donate two electrons to two atoms of Y. (electrovalent)**

17. Alkanes, alkenes and alkynes can be obtained from crude oil. Draw the structure of the second member of the alkyne homologous series.



b) Study the flow chart below and answer the questions that follow

STEP 1

Butane

Ethene

H

1. State the condition necessary. for the reaction in step I to occur. (1mk)

**High temperature/ moderately high temperature and catalyst.**

1. Identify substance H. (1mk)

**Ethane**

18. Metal Q displace metals T and U from their oxides but does not displace metal R. Metal T displaces U from its oxide. Arrange the metals according to their reactivity starting with the most reactive metal. (2mks)

**R Q T U**

**Decreasing reactivity**

19. The figure shows the changes in temperature when a liquid sample was cooled.

**Temp 0C**

**P**

**Temp (mins)**

p

(i) Is the liquid sample pure or impure give a reason. (2mks)

**Pure-The freezing point is sharp**

ii)What name is given to the process that takes place at the temperature at point P

**Freezing**

20.Name the particles responsible for conduction of electricity in (3mks)

i)Solids

**Electrons or Delocalised electrons**

ii)Molten compounds

**Ions/mobile ions**

iii)aqueous solutions

**Ions/mobile ions**

21. Diamond and graphite are both allotropes of carbon.

i) What do you understand by the term “allotropy” (1mk)

**Existence of an element in more than one form in same physical state**

ii)Explain why graphite conducts electricity while diamond does not. (2mks)

**Graphite has delocalized or mobile electrons while diamond does not**

22. The following are atomic and ionic radii of members of certain group of the periodic table. Use the information below to answer questions that follow.

|  |  |  |
| --- | --- | --- |
| Element | Atomic radius(nm) | Ionic radius |
| W | 0.072 | 0.136 |
| X | 0.099 | 0.181 |
| Y | 0.114 | 0.195 |
| z | 0.133 | 0.216 |

The letters do not represent the actual symbols of the elements

i)Is this a group of metals or non metal Explain. (2mk)

**Non metal-Ionic radii is greater than atomic radius**

1 mk

1 mk

1. Which element would you expect to be more reactive? Explain. (2mks)

**W smallest atomic radius gains electrons more easily**

23. Study the information below and answer the questions that follows. A mixture contains three solids alum, camphor and sugar. The solubility of these solids in different liquids is shown in the table below

|  |  |  |  |
| --- | --- | --- | --- |
| Liquids  Solids | Water | Alcohol | ether |
| Alum | Soluble | Insoluble | Insoluble |
| Camphor | Insoluble | Soluble | Very soluble |
| Sugar | soluble | Soluble | Insoluble |

Explain how you would obtain a solid sample of sugar from the mixture.

(3mks)

½ mk

½ mk

½ mk

½ mk

½ mk

½ mk

**Add water to the mixture camphor is insoluble filter to get a solution of alum and sugar**

**To alum and sugar solution add alcohol, alum is insoluble**

**Filter to obtain sugar solution from alum**

**To the sugar solution add ‘ether’, sugar separates out as a solid**

**Filter to get the sugar solid**

24. Use the scheme to answer the questions that follow.

Solid N changes from Yellow to white on cooling

H 2 SO4 (aq)

Solution Q

Step II HCl (aq)

Solution L

a)Identify solid N (1MK)

**ZnO**

B) Write a balanced equation for the formation of Q. (1mk)

ZnO(g) + H2SO4(aq) Zn SO4(aq) +H2O(l)

C)Name the process that takes place in step II. (1mk)

**Neutralization**

25. Determine the relative atomic mass of Neon whose isotopic compositions are (3mks)

20 21 22

10 e 90.92 % 10 e 0.26% 10 e 8.82%

**RAM=20x90.92+21x0.26+22x8.82 (1mk)**

**100**

**=1818.4+5.464+194.04 (1mk)**

|  |
| --- |
| **100** |

**=20.179 (1mk)**

26. Write an equation to show the effect of heat on the nitrate of

i)Sodium

**2NaNO3(g) 2NaNO2(s) + O2(g) (1mk)**

ii)Copper

2Cu(NO3)2(S) 2CUO(S) + 4NO2(g) + O2(g)

b) Give one use of ammonium nitrate

**As fertilizer**

**As an explosive**

27.a) Give the formula of compound formed between Aluminium (atomic number 13) and carbon (Atomic number 6) (1mk)

**Al4C3**

b) Explain the difference in melting point between magnesium and sodium. (2mks)

1. **Melting point of magnesium is higher than that of sodium.Effective nuclear charge on magnesium is higher .**
2. **Magnesium contributes more electrons to the metallic bond as compared to sodium which contributes one electron**

28. A clean knife is left in the open overnight and found to be coated with a reddish brown substance.

a) Name the reddish brown substance. (1mk)

**Hydrated iron (III) oxide. (1mk)**

b) Give one condition necessary for the brown substance to be formed. (1mk)

**Mosture/oxygen**

1. Suggest a method that can be used to prevent the formation of the reddish brown substance. (1mk)

**Oiling, greasing, electroplating, painting etc**