PAPER 1 MARKING SCHEME CHENISTRY

1a. To magnesium oxide (MgO) add excess hydrochloric acid (HCl) or sulphuric acid (H2SO4). Add sodium hydroxide (NaOH) solution or potassium hydroxide (KOH) solution to the mixture. Filter and dry the residue

b.Anti-acid (treatment of acid indigestion )

2a.Energy change that results in the formation of an ion when an atom gain an electron

b.B, B releases the highest amount of energy so it has the strongest attraction of electron to its nuclear

3a.Polythene

b.n-4956÷28=177

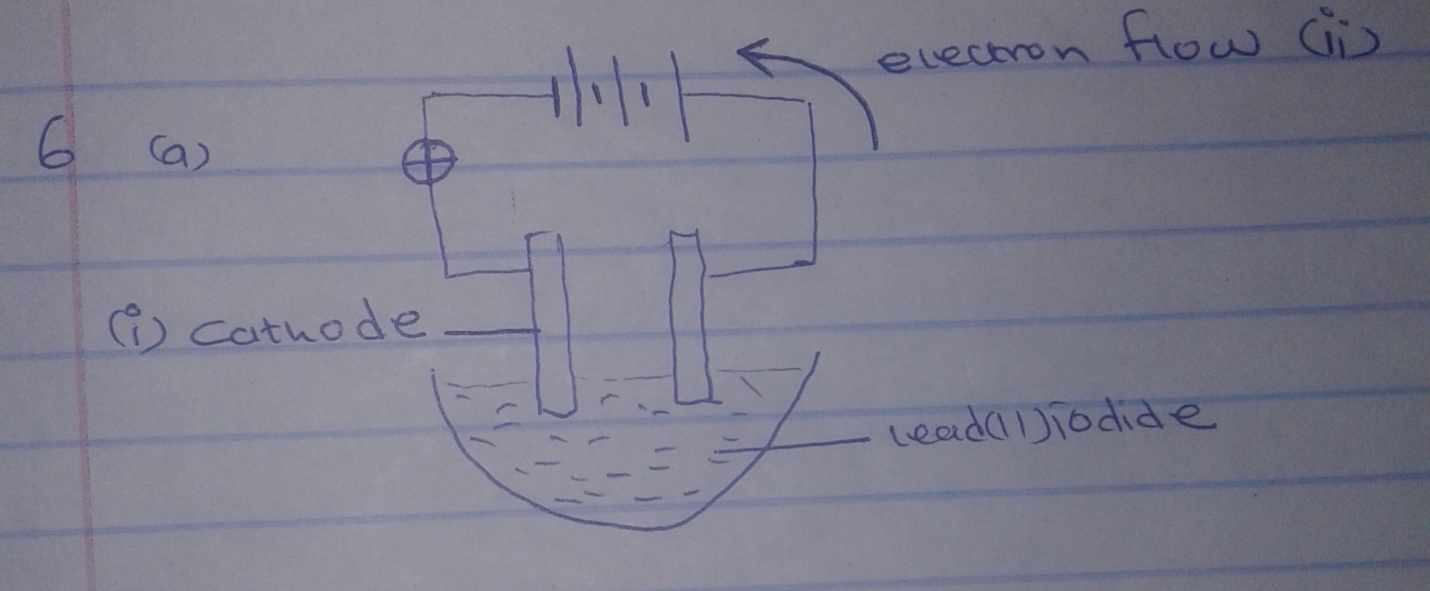
4a.Cooling curve

b.BC

c.The kinetic energy of the molecules decreases as heat energy is lost to the surrounding leading to drop in temperature

5.Mass of NH3=1000x0.88x0.35=308

Molarity =308/17=18.118M

6a. 

7a. Boyle’s law states that the volume of a fixed mass of a gas is inversely proportionally to its pressure when temperature is kept constant

b.

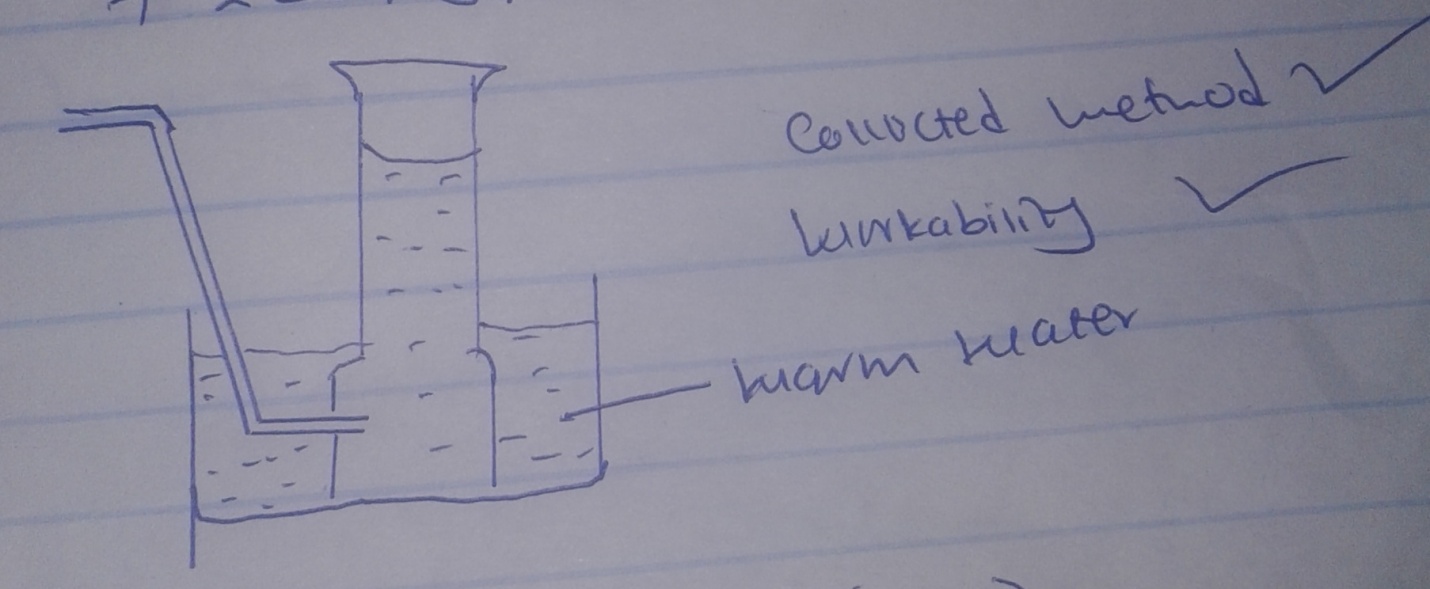
|  |  |
| --- | --- |
| P1V1  T1 | P2V2  T2 |
| 780x400  303 | =600xV2  323 |
| V2 = | 323 x 780 x 400  303 x 600 |
|  | = 554.3234cm3 |

8a.Enthalpy change when are mole of a compound is formed from its gaseous ions

b.DHF =2x-394-286-(-1300)

+ 226KJ/mole.

9a.



b. dilute hydrochloric acid (1mk)

10.

|  |  |
| --- | --- |
| 0.1 moles \_\_\_\_\_\_\_  ?\_\_\_\_\_\_\_\_\_\_\_ | 1000cm3  250cm3 |
| =0.1 x 250 =  1000 | 0.025 moles |
| 0.025 moles \_\_\_\_\_ | 6.95  FM |
| FM = 6.95 =  0.025 | 278 |
| FeSO4.nH2O  152 +18n =  n= | = 278  278  7 |

11. X (2.8.2)

Y(2.8.7 (1mk)

b.Atomic radius of y is smaller than that of x (1mk)

c.Alkaline earth metals (1mk)

12a.Carbon (II) oxide burns with a blue flame

2CO(g) + O2(g) \_\_\_\_\_\_\_\_\_\_\_2CO2)(g)

b.It will produce carbon (II) oxide since there is no air to burn it

13.Ratio M:O

Moles 0.254/63.5  0.64/16

0.04 0.04

EF=MO

14a.Nitric (V) acid has low boiling point than sulphuric (VI) acid

b.Sodium nitrate

c.Manufacture of fertilizers

15a.2 NaOH (aq) + Cl(g) \_\_\_\_\_\_\_\_\_\_\_NaCL(aq) + NaCL(aq) + H2O (aq)

b.Sodium hypochlorate

NaOCL + dye \_\_\_\_\_\_\_\_\_NaCl + dye -0

16a.Calcium Hydrogen carbonate and magnesium hydrogen carbonate

b.Distillation removes the substance dissolved in water

c.Contain Ca2+ necessary for formation of strong bones and teeth

17a.Iodine melting point is above the room temperature

b.Increase of molecular mass increase the forces of attraction between the molecules

18a.Water /moisture

And oxygen /air

b.Tin cans are not reactive and non toxic

19.Dessicator –drying substances

Crucible –heating solid

Deflagrating spon-holding substances being burnt.

20a.Mg (s) + H2O(g) \_\_\_\_\_\_\_MgO(s) + H2(g)

b.Potassium –reacts with steam explosively

21a.Grahams law : rate of diffusion of a gas is inversely proportional to the square root of its density

bi.

|  |  |
| --- | --- |
| RA = 2.9  RB = 1.98 | = 121  Gas B diffuse 1.21 fasts than A |
| Bii. RA = 64  RB MMA | * 1. = 64   mmA  1.212=64  MMA  MMA= 64  1.212  =43.69 |

22i.C2H5OH = 12

ii.C2H5Cl – 5

b.Dehydration

23a.Salt ?Y at 500 only 82g of the 120g of y dissolves

b.120-82g

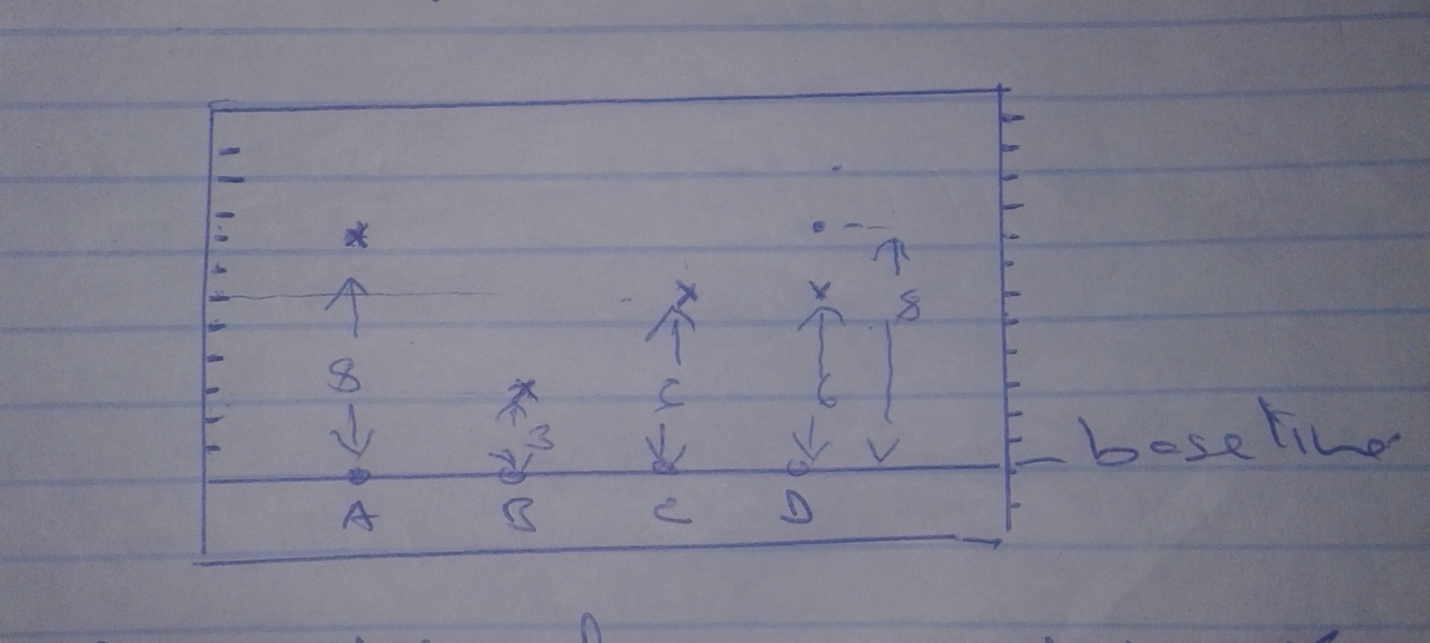
=38g

24a.X – iron will rust

Y iron will not rust

b.In y iron will not rust because zinc is more reaction that will react with oxygen protecting iron.

25.



ii.Contained c and A

26.M1V1 =M2V2

50 x 5.0 =1 x v2

V2=250cm3

Volume of distilled water 250-50

= 200cm3

**PAPER 2 CHEMISTRY MARKING SCHEME**

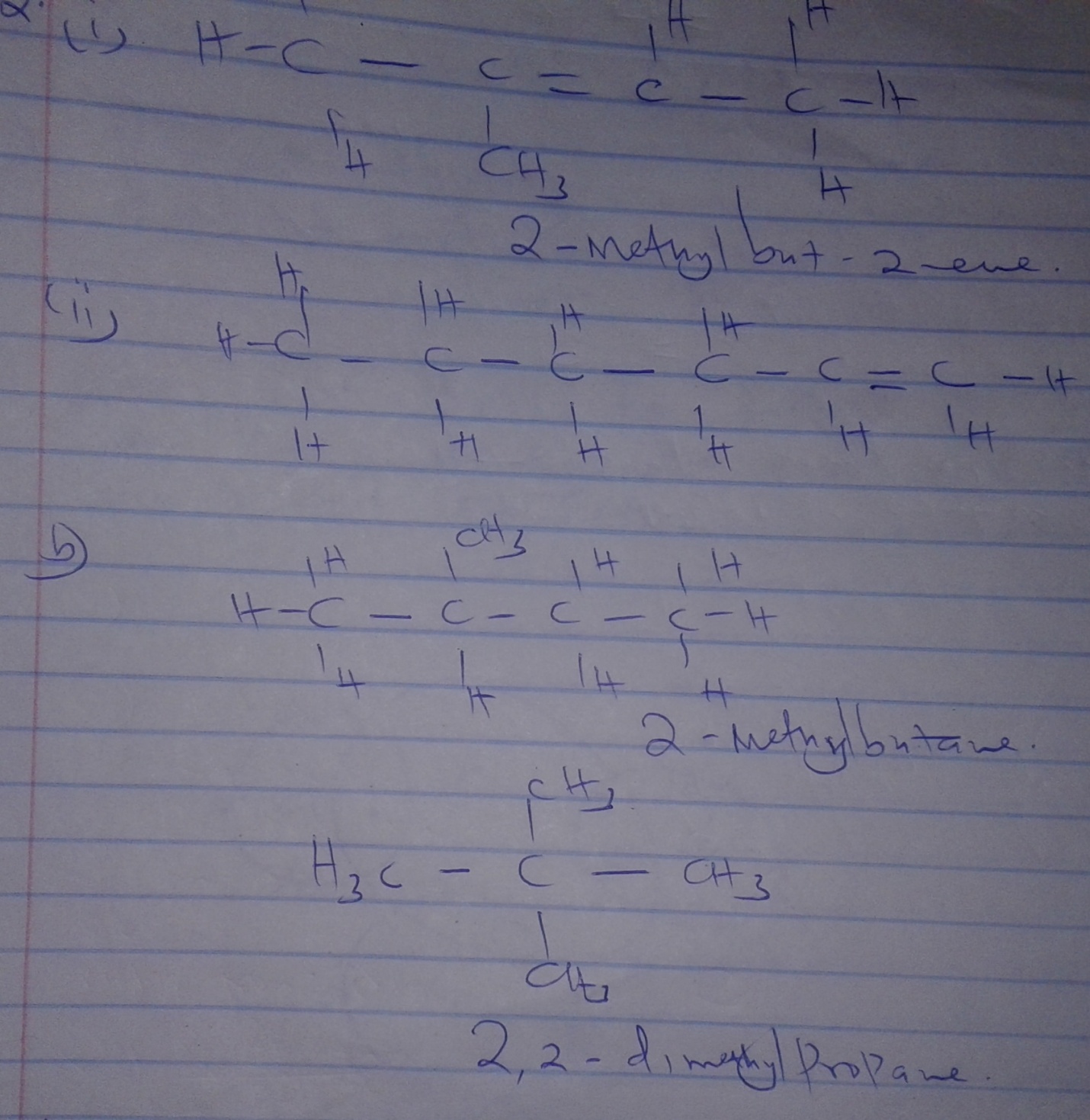
1i. Noble gases

ii.D2SO4

[iii at Y](mailto:iii.@Y) b. E

1. Ionic bond-bond formed by transfer of e-s from metal to non metal
2. D/M
3. Element E react by gaining one electron which reduce the electrostatic pull by the positive nuclear making ionic radiuses increase
4. Group (VI) period 3
5. Because of increase in the strength the molecular bond in the oxide of L compared to G
6. Atomic radii of C is smaller that that of L. due to increase of the positive nuclear charge across the period
7. Ionization energy increase from J to L due to increase of the strength of the nuclear charge.

H

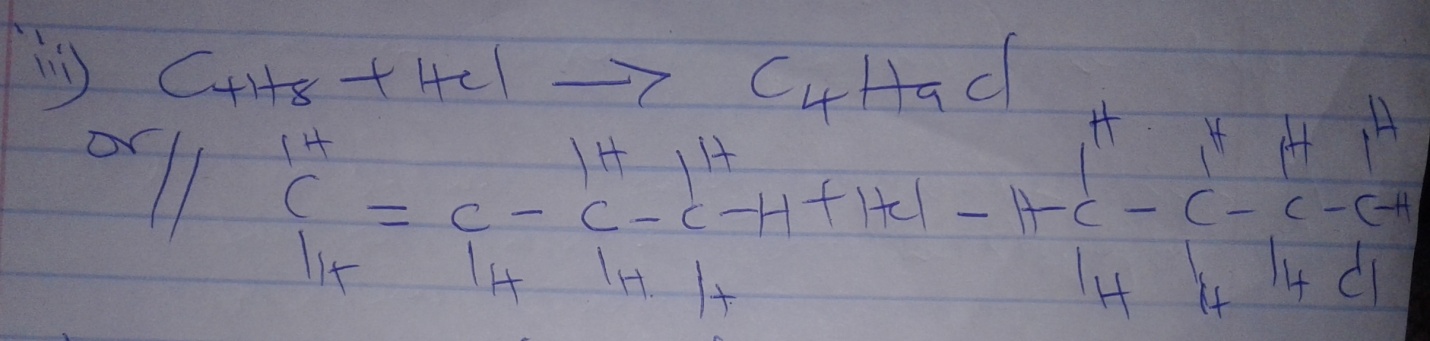


ci. A-C4H10

ii.butyne decolourised purple H+ potassium manganese (VII) while compound A doesn’t

iii.C4H8+HCL C4H9CL

Or



iv.

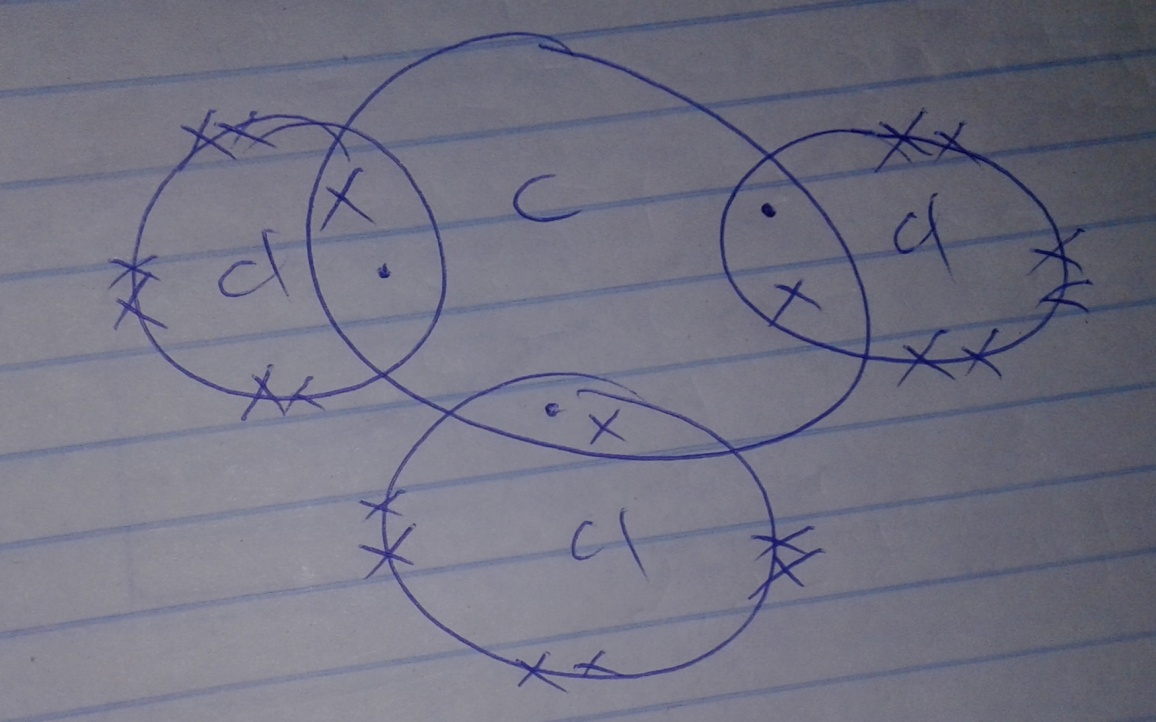
v.Addition reaction (hydrogenation)

vi.Reagent –hydrogen

Condition –Nickel catalyst

Heat 1500C

d.Were found to deplete the ozones layer that prevents ultra violet rays of the sun reaching earth

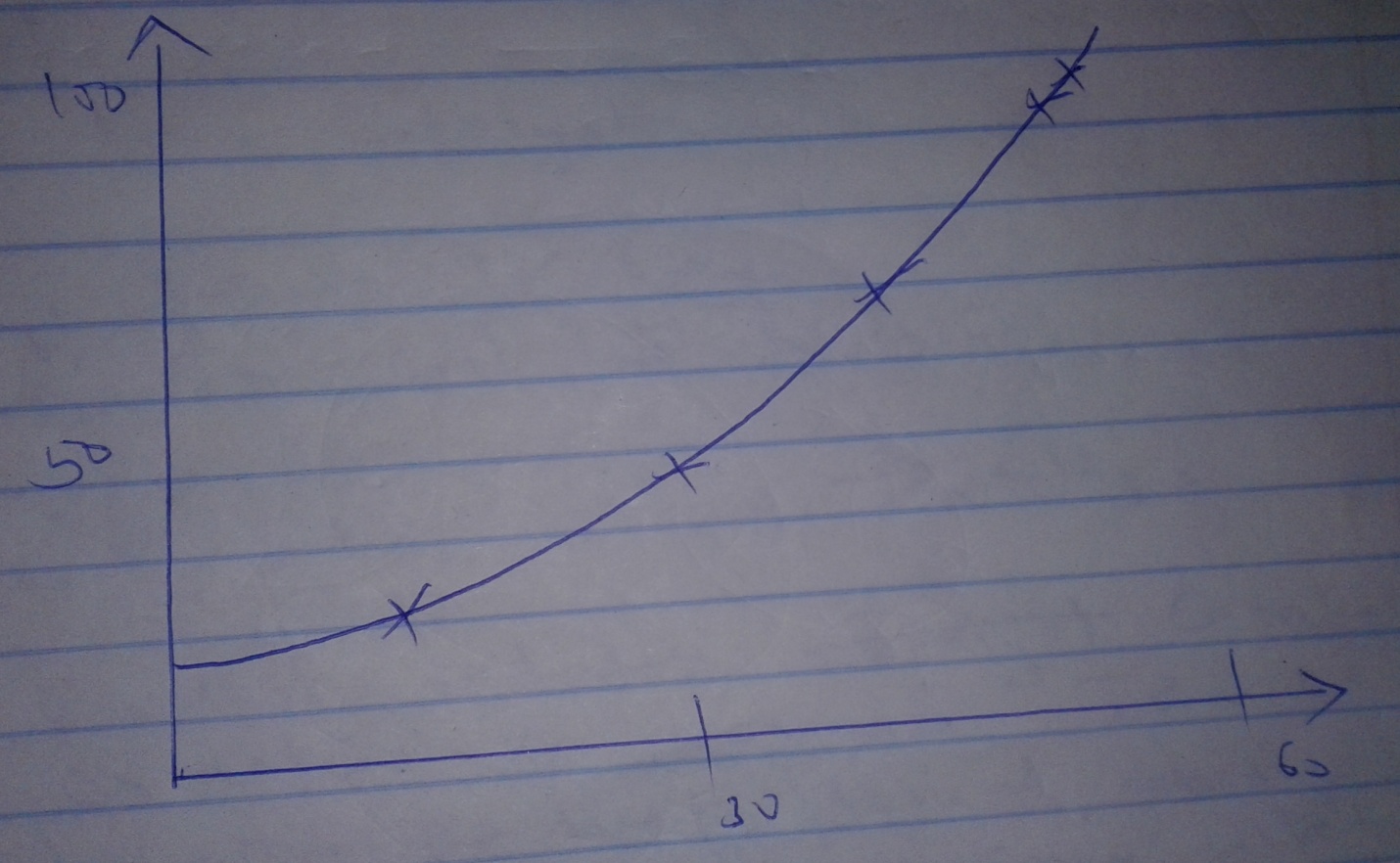


3a. A solution which cannot dissolve any more of a solute at a particular temperature

bi.25g per 100g of water

iiMass dissolved =62g

Mass undissolved =80-62=18g



Scale -1mk

Axis -1mk

Plotting -1mk

Shape -1mk

c.RFM of KNO3 =101

Moles in 100g = 25/101 =0.2475

Moles in 1000g of water =0.2475x1000=2.475m

d.Add NH4OHSOL to precipitate AL(OH)3

-Filter

-Dry with low temperature

4a.Nitrogen –R

bi.Cracking of long chain alkaline

-Natural gas

-Electrolysis of acidified water

ii.To remove the impurities that would poison the catalyst

iii.Iron catalyst

ci.Heat exchange

ii.To cool the mixture

ii.N2(g) + 3H2g\_\_\_\_\_\_\_\_\_\_\_2NH3g

d.Reaction between catalytic oxidation of ammonia is an exothermic reaction the heat produced, during the reaction enable the platinum wire to glow.

c.Manufacture of nitrogenous fertilizer

-Softening hard water

-Man. Of hydrazine used in rocket fuels.

5a.Different forms of an elements at the same physical state

b.Graphite has a delocalized electron that is not used in bonding

ci.

ii.Reduction property of carbon

d.Salt made of two bonded salts

ei.Boiling water under high pressure

ii.Sulphur froth

fi.

ii.Through oxidation

Dye+Nacl\_\_\_\_\_\_\_(dye-0) + NaCl (colourless)

6ai.Effervescence is observed due to production of a gas

ii.A white precipitate solid is observed due to formation of insoluble lead (II) chloride

bi.

* Penalize fully if not balanced
* Penalize fully if letters are joined
* Penalize fully if small letters are mixed with capital letters

ii.

-Penalize as above

c.

d.Precipitation of double decomposition

ei.Zinc (II) nitrate

ii.Zinc (II) oxide

iii.

7i.Black soil

ii.NaOH or KOH to absorb CO2

iii.Its poisonous

iv.2CO(g) +O2(g) \_\_\_\_\_\_\_\_\_2CO2(g)

v.Prevent heat from burning the cork/bring or prevent copper (III) oxide from being blown into the delivery tube.

vi.Fuel –reducing agent in extraction of metals

**PAPER 3 MARKING SCHEME**

1A.Titration label –(4mks)

Award as follows

* Complete table –1mk
* Decimal …..1/2mk tied only to the first and beyond rows only. Ie one decimal place through out or if two decimal places, the last digit must be zero or 5 through out otherwise 0 mark
* Accuracy

If any +- 0.1 of the s.v award 1mk

If none of check if any value is within +- 0.2 award ½ mk, otherwise 0 mk

* Principle of arranging …..1mk
* Final answer …..1mk let the candidate answer (use condition for accuracy to award marks)\

bii.RFM of C =126 1/2mk

Concentration of c =6.3/126 correct Ans 1/2mk

(do not penalize if the RFM is wrongly calculated )

iii.Moles of C used = (ans (ii) x litre value ) ÷1000

iv.Dibasic acid ;NaOH=1:2 ½

Moles of A in 25cm3 =ans (iii) x2 =correct answ

v.Concentration of A =(ans (iv) x 1000) /25=correct ans ½

**TITRATION TABLE 2 (41/2mk)**

Award as follows –as per table 1 above

c.Moles NaOH used =(molarity in procedure 1b(v) x 25) /1000) ½ = correct ans ½

d.Moles of D =(time value from table 2x25/1000)1/2

Correct an ½

e.Moles of D in 250ml has mole in d. above x(250/25) = ans Q

NaOH : HCL=1:1

25ml of B has answ Q

f.Molarity of B =(ans Q x 1000) /25 1/2 = correct ans 1/2

**QUESTION 1B**

**Table 3……………………(3mks)**

Award as follows

Complete table ………….(1mk) penalize half mark

Once incomplete table

Decimal ……………………1/2mk whole numbers /one decimal place 0.0,0.5 used throughout.

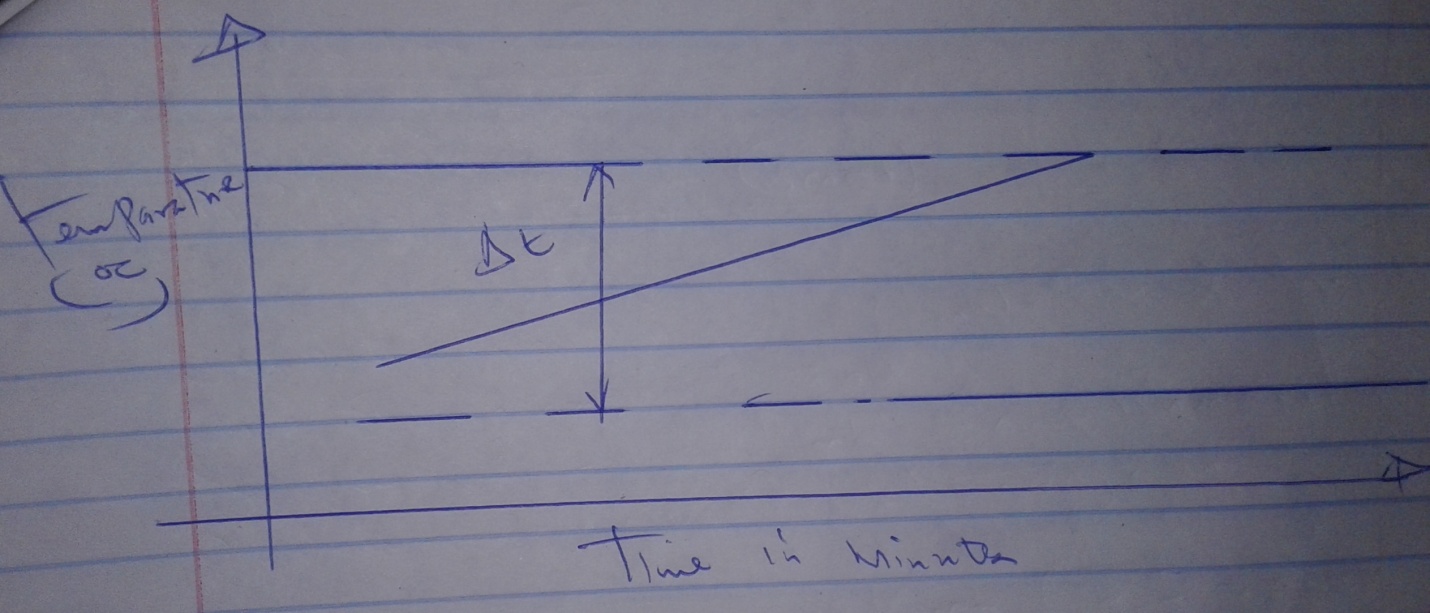
Accuracy ……………..1/2mk (+-20C at second minute of the s.v

Trend ……………..1mk (constant temperature from 1st minute 1/2mk, then constant temp. from 21/2mk minute to 41/2 minute 1/2mk (all temp must be lower /than from the 1st trend)

**GRAPH** (3MKS)

Award as follows

* Labeling both axes correctly…..1/2mk
* Scale …..1/2mk (actual graph to occupy atleast half of the space on each axis )
* Plotting ……………………………….1mk (all 8 to 9 plots correctly plotted award 1mk. 5 to 7 plotted around half marks, less than 5 zero ).
* Shape ………………1mk



1. Showing the Dt correctly 1/2mk
2. Then reading it correctly 1/2mk
3. Moles =3/101=0.0297 1/2mk (3d.p)

30 x Dt x 4.2 ½ =correct ans ½

1. Heat of solution =ans in iii /ans in ii above =-ve value ½ (ignore the answer of no negative sign.)

a.

|  |  |
| --- | --- |
| Observation | inferences |
| Droplets of a colourless  Liquid from on cooler parts of the boiling tube | C is hydrated  C contains water of crystallization |

b.

|  |  |
| --- | --- |
| Observation | inferences |
| Dissolves to forms a pale green solution | Coloured ion soluble |

i.

|  |  |
| --- | --- |
| Observation | inferences |
| Green ppt insoluble in excess | Fe2+ present |

ii.

|  |  |
| --- | --- |
| Observation | inferences |
| Green PPt which turns brown on adding H2O2 | Fe2+ present or Fe2+ oxidized to Fe3+ |

iii.

|  |  |
| --- | --- |
| Observation | inferences |
| White ppt that persist warming | cl- absent |

iv.

|  |  |
| --- | --- |
| Observation | inferences |
| White ppt | So2-, SO3-, CO32- present |

v.

|  |  |
| --- | --- |
| Observation | inferences |
| The green colour of solution faded turns colourless  A grey deposit | Zn displaces cation of C from solution |

3a.

|  |  |
| --- | --- |
| Observation | inferences |
| Burns with yellow flame | C=C or C=C |

b.

|  |  |
| --- | --- |
| Observation | inferences |
| Forms a colourless solution | Polar substance |

c.

|  |  |
| --- | --- |
| Observation | inferences |
| Purple colour turns colourless | C=C or C=C  R=OH |

d.

|  |  |
| --- | --- |
| Observation | inferences |
| pH =5 | Weakly acidic |