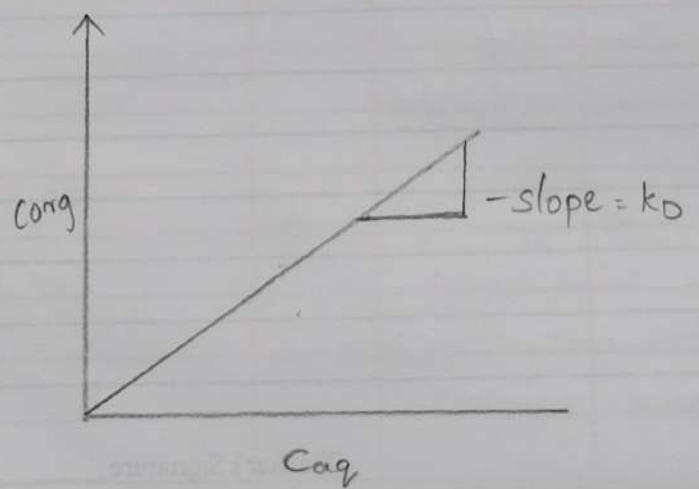
INDEX

S.No	Volume of M/20 hypo for org layer V_{org}	Volume of M/600 hypo for org layer	C_{org}	C_{aq}	$K_D = \frac{C_{org}}{C_{aq}}$
1.	25.	12.5	0.258	0.024	10.74
2.	21.5	14.1	0.215	0.02	7.67
3.	17.8	10.5	0.178	0.04	8.47
4.	17.4	9.8	0.174	0.015	9.17
5.	13.5	9.2	0.135	0.018	7.5

Graph:- A Graph is plotted by taking C_{org} on y-axis & C_{aq} x-axis a straight line is passed through the origin is obtained. The slope of the straight line as equal to K_D (Distribution co-efficient)



Date

Expt. No. Distribution Laws Page No. 1

Distribution of I_2 between CCl_4 & H_2O

Aim:-

To determine the portion co-efficient of I_2 b/w CCl_4 and H_2O.

Apparatus:-

Reagent bottle, 2 burrette & 1, 2 pippets conical flask.

Chemicals:-

Saturated solution of I_2 in CCl_4 pure m/20 and m/600 hypo solution, starch solution.

Principle:-

A common solute when added to a system of two immiseible liquids distributions. It self in a defint concentrate ratio. I_2 gets distributed itself between CCl_4 & H_2O separatly The portions co-efficient can be determined by tetra agents.

K_D = concentrate of solute in organic phase = con of I_2 CCl_4 layer con of solution in aquous phase con of I_2 H_2O layer.

Procedure:-

Take 50 ml of I_2 in CCl_4 & 50 ml of H_2O in clean reagent bottle.

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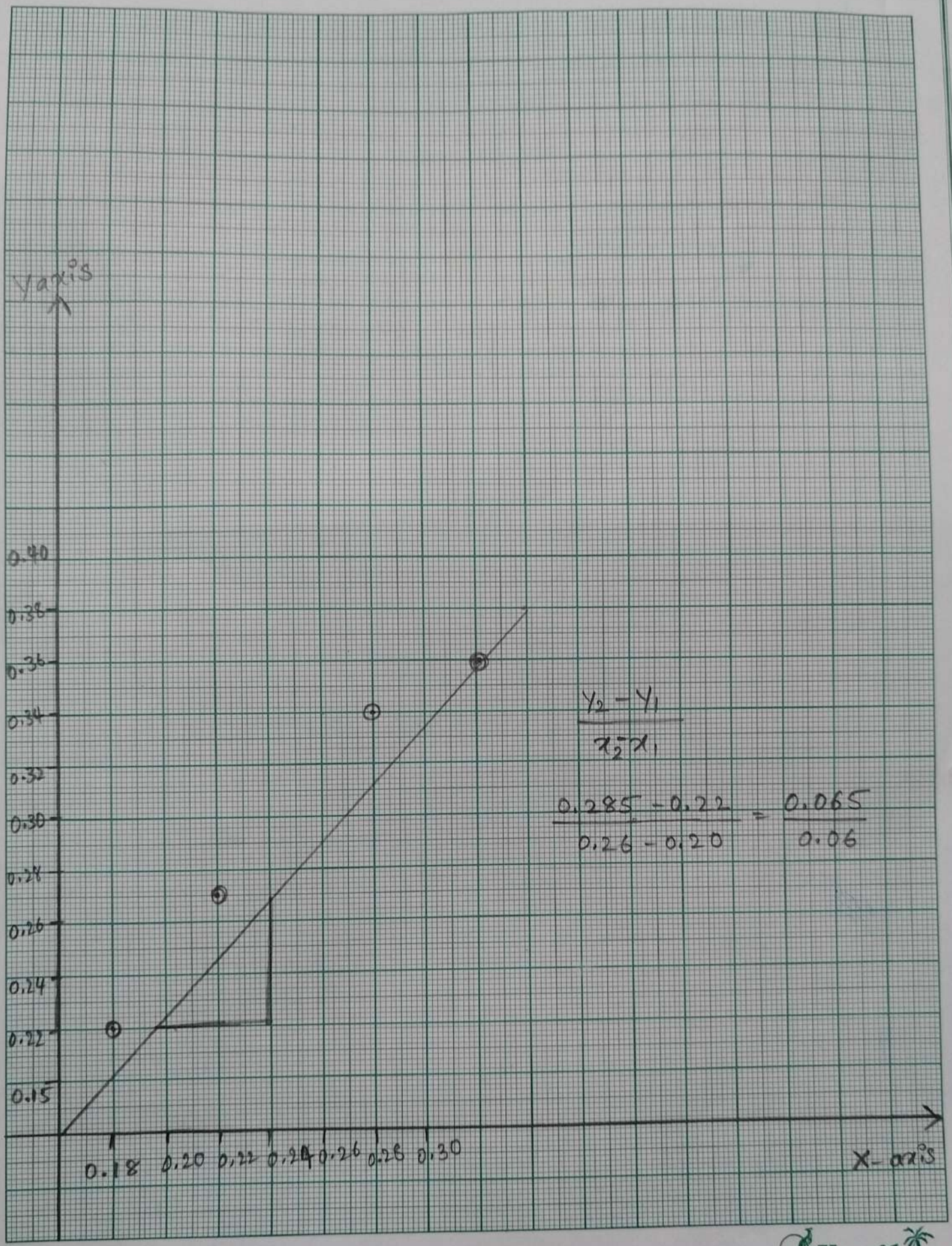

y axis
0.40
0.38
0.36
0.34
0.32
0.30
0.28
0.26
0.24
0.22
0.15
0.18
0.20
0.22
0.24
0.26
0.28
0.30
X- axis
$\frac{y_2 - y_1}{x_2 - x_1}$
$\frac{0.285 - 0.22}{0.26 - 0.20} = \frac{0.065}{0.06}$

* shake the bottle for about 10 minutes and allow it to settle for 5 minutes. The two layers, get separation the lower layer is ccl4 layer & upper layer is aqueous layer.

* Get 10ml aqueous layer & pippete out into a conical flask & titrated aganist m/600 hypo solution using starch as an indicator. The end point being the disappearance of blue color The titra values noted as V_{aq}.

* 10 ml of organic layer (ccl4) is pippeted out into another conical flask & titrated aganist m/20 hypo solution. When the blue colour just disappear as & the titrated values is noted as V_{org}.

* Now add 10 ml of distilled H_2O & 10 ml of pure carbon tetra chloride to the reagent bottle and shake the bottle for 10min & allow it to settle for 5min to attain the equilibrium Repeat the procedure for the layers & tabulate the titrate values & calculate the concentrated of I_2 in both layer & calculate the results.

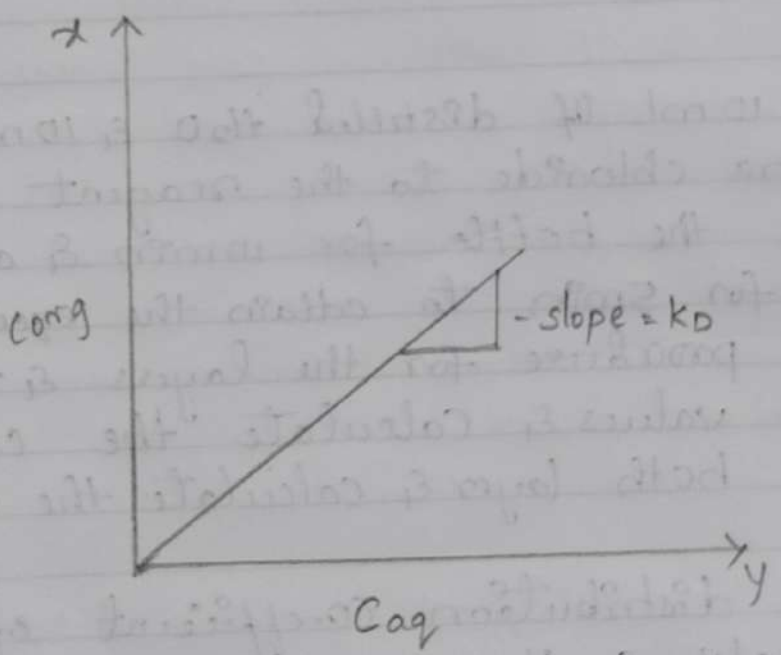
Result:-

The distribution co-efficient of I_2 b/w ccl4 & H_2O.

Teacher's Signature

S.NO	Vol of NaOH for organic layer	Vol of NaOH for aq layer	C_{org}	C_{aq}	$k_D = \frac{C_{org}}{C_{aq}}$
1.	43	36	0.43	0.36	1.9444
2.	37	30	0.37	0.30	1.2333
3.	34	24	0.34	0.24	1.416667
4.	26	23	0.26	0.26	1.130434

Graph:- A graph is plotted by taking C_{org} on x-axis & C_{aq} on y-axis a straight line is passed through the origin is obtained slope of the straight line is equal to k_D (distribution co-efficient)



Expt. No. _____ Distribution Law Date _____ Page No. 3

Distribution of Acetic acid b/w n-butane & H_2O

Aim:-

To determine the distribution co-efficient of acetic acid b/w n-butanol & H_2O.

Chemicals:-

5% Acetic acid, 0.1 NaOH, n-butanol, phenol, phallen indicator.

Apparatus:-

Reagent bottle, conical flask, burette 10ml pipette

Principle:-

When a solid (or) liquid then the solute distribution two immesiable liquid & then the solute distributes itself in a such way that ratio of its constant temperature. If C_1, C_2 are then concentration & of solute in two solvents then the distribution position co-efficient K_D is given by.

K_D = con. of solute in organic phase = C_{org}
con. of solute in organic phase = C_{org}

Procedure:-

Take in a clean reagent bottle & take 50 ml of n-butanol & 50ml of 5% acetic acid.

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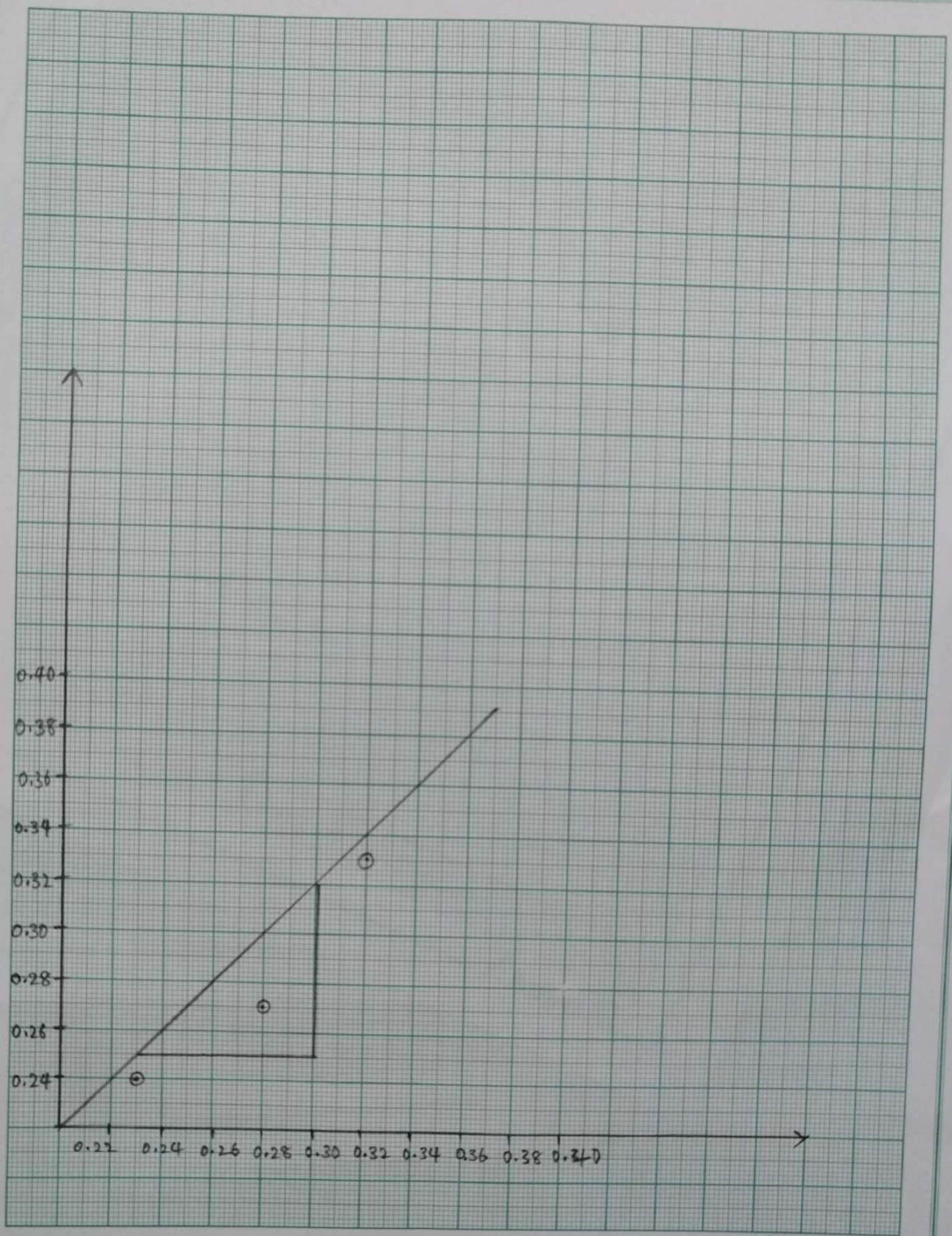
0.40
0.38
0.36
0.34
0.32
0.30
0.28
0.26
0.24
0.22
0.24
0.26
0.28
0.30
0.32
0.34
0.36
0.38
0.40

* Cork the bottle & shake well without spilling of the solution for about 10 mins. Then open the cork & keep the bottle & acid and for 5 mins without disturbing. so that the two layers seperate out.

* Fill the burette with 0.1 M NaOH & clamp it to stand.

* Pipette out 10 ml of organic layer & 10 ml of aequous concial flask from the reagent bottle into two clean conical flask add 2-3 drops of phenol pthalin indicator & titrate them aganist 0.1 M NaOH until the solution turns to pale Pink in colour the titrated values are noted as V_{org} & V_{as}.

* Now add the 10ml of n-butanol & 10ml of dist H_2O is the reagent bottle & shake well about 10 min keep a side 5min without distrubuting.

* The procedure is repeated for three or more sets of readings & k_D is calculated.

Results:-

The distribution or co-efficient of acetic acid b/n n-butanol & H_2O.

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S.NO	Volume of NaOH (ml	conductivity
1,	0	0.15
2,	1	0.45
3,	2	0.95
4,	3	1.35
5,	4	1.75
6,	5	1.98
7,	6	2.37
8,	7	2.63
9,	8	2.90
10,	9	3.03
11,	10	4.80
12,	11	5.31
13,	12	5.93
14,	13	6.54
15,	14	7.55
16,	15	6.54
17,	16	8.12
18,	17	8.48
19,	18	8.84

Expt. No. _____ Date _____

Page No. 5

ELECTRO CHEMISTRY

Titration of weak acid aganist strong base CH_3COOH Vs NaOH :-

Aim:-

To determine the strength of a given weak acid (CH_3COOH) by conductometric titration with strong base (NaOH) of 0.01M.

Apparatus:-

Conductometer, burrette, pipette, beaker & conical flask.

chemical flask:-

CH_3COOH soln of NaOH solution

$$CH_3COOH + NaOH \longrightarrow CH_3COONa + H_2O$$

$$CH_3COOH \longrightarrow CH_3COO^{\ominus} + H^{+}$$

Principle:-

conductometric titration may be obtained as those titration in which end point is calculated (or) detected with the help of conductometer. Measure conductometer titration based on the fact of that conductances of solution at a constant temprature depends upon the number & molarity of ions present.

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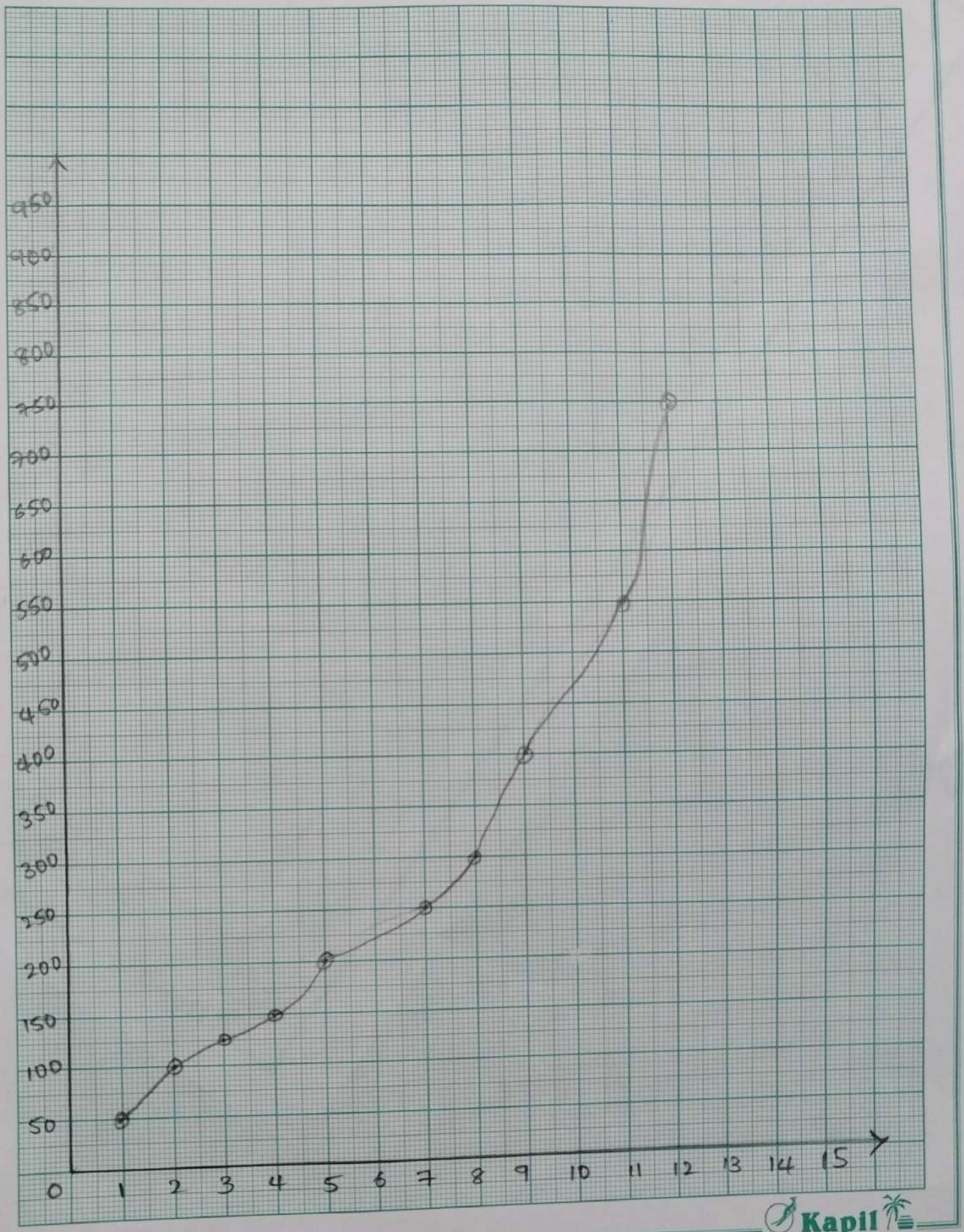
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

with strong base & initial conductance of acetic acid solution is low because of its poor dissac -iation on adding NaOH. solution highly minimi -sed sodium acetate is formed.

$$CH_3COOH + Na^+ + OH^- \longrightarrow CH_3COO^- + Na^+ + H_2O$$

Procedure:-

- Take 40 ml of given acid solution into a clean 100 ml beaker deep the conductivity cell in the acid solution after proper cleaning with disteled H_2O if the cell is not properly dipped in acid solution & add little Quantity of dist. H_2O so that the cell properly dipped.

- Fill up burette with NaOH soln rate the conductance of soln before expect any addition of NaOH solution from the burrete repeat the titration to get minimum 10 readings after the end point is riched.

- Tabulate the obsorbed conductance & plot a graph by taking conductance on y-axis & volume of base on x axis point of intersection of two required neturalise acid solution. Then concenbration

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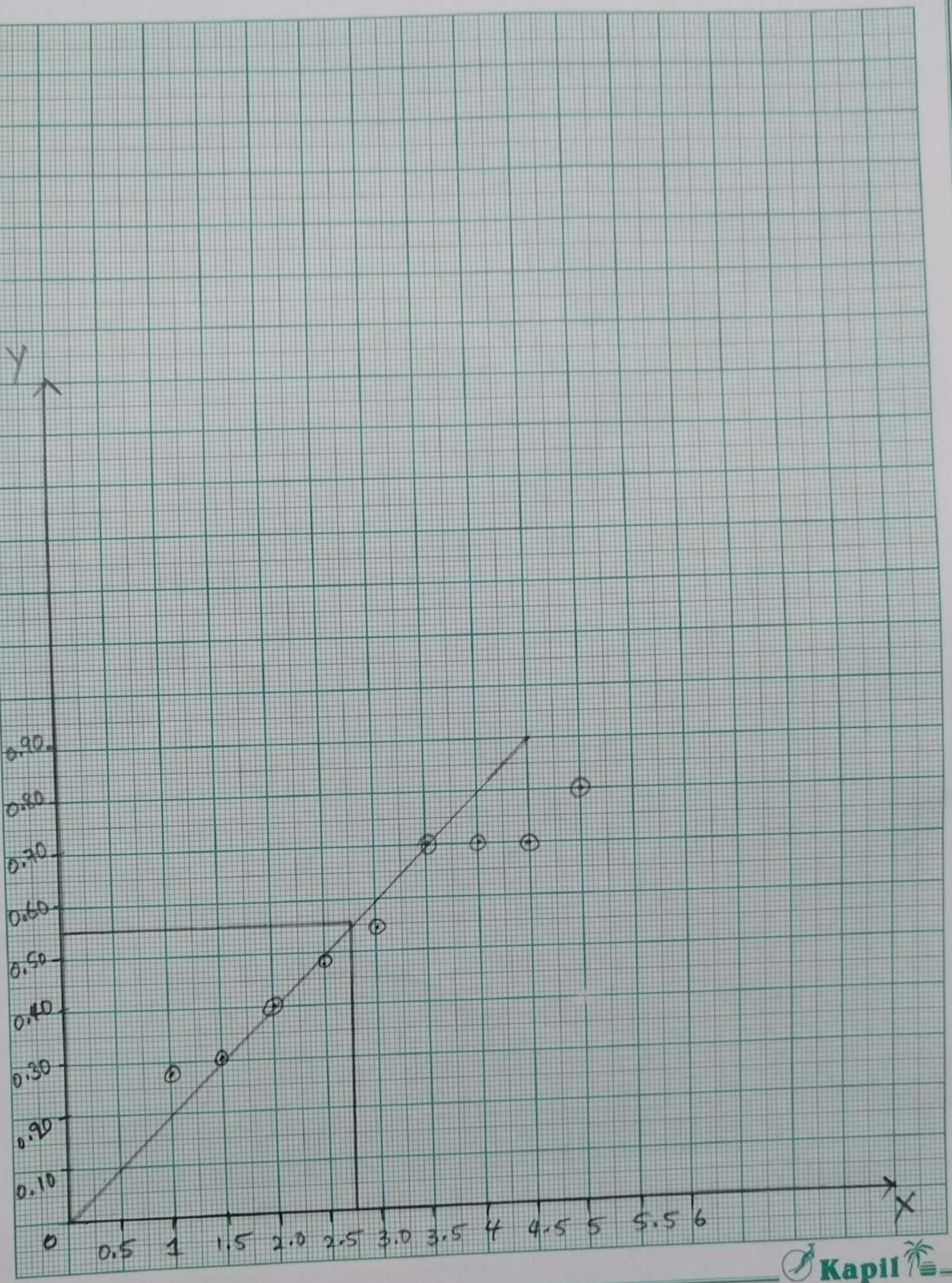
of acid by using the following formula can be calculated.

$$M_1V_1 = M_2V_2$$

M_1 ⟶ con of CH_3COOH
V_1 ⟶ vol of CH_3COOH
M_2 ⟶ con of NaOH
V_2 ⟶ vol of NaOH.

Result:-

The molarity of CH_3COOH obtained from the conductance titration is extracted is 0.1 M.


Y
X
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0
0.5
1
1.5
2.0
2.5
3.0
3.5
4
4.5
5
5.5
6

Date

Expt. No.

Page No. 8

-: CALORIMETER :-

Verification of Beer's law for kmno4 soln

Aim:-

Verification of Beer's law by using kmno4

Apparatus:-

Test tubes, cuvettes, calorimeter.

Chemicals:-

Potassium permanganate solution

Principle:-

According to beer's law when monochromatic length is passed out through medium solution the rate of decrease in intensity of incident radiation with distance travelled is directly proportional to the initial intensity & concentration of substance absorbing light.

$$-\frac{dI}{dx} \propto I.C$$

$$-\frac{dI}{dx} = k.IC$$

$$-\frac{dI}{I} = k.C\,dx.$$

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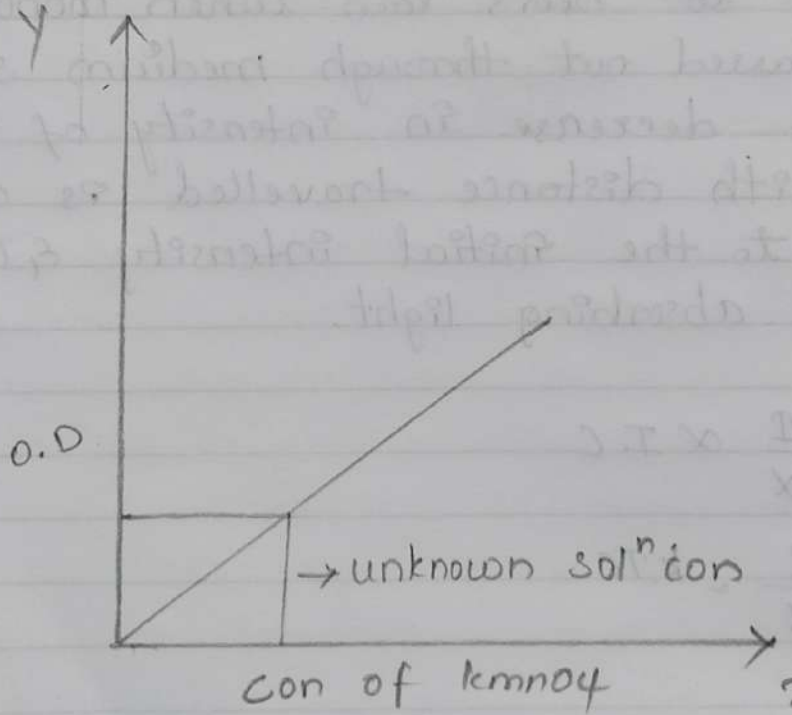
S.NO	vol of kmno4 in ml	vol of H_2O in ml	optical density	con of kmno4
1,	10	0	0.80	5×10^{-4}
2,	9	1	0.70	4.5×10^{-4}
3,	8	2	0.68	4×10^{-4}
4,	7	3	0.67	8.5×10^{-4}
5,	6	4	0.54	3×10^{-4}

Graph - Graph is drawn by taking O.D on y-axis & con of kmno4 on x-axis.



On integration

$$I \cdot \frac{I}{I_0} = k.c\,[x]_0^x$$

$$\log \frac{I_0}{I} = \frac{k}{2.303}\,[x]_0^x$$

$$\log \frac{I_0}{I} = \frac{k}{2.303}\,cx$$

$$A = \epsilon . cx$$

Where,

A = Obsorbance
ε = molar extraction co-efficient
c = conlenfration
x = path length

Procedure :-

prepare a solution of 0.1 M $KMnO_4$ solution calibrate the calorimeter by setting to 0% absorbance inserting a glass curetter containing dist water.

- Now take the solution under study in the cuvette & the filter at which maximum absorbance is obtained is selected for further study.

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- Now set the calorimeter at selected filter and prepare the following concentration of $KMnO_4$ solution.

Result:

The given unknown kmno4 solution concentration is 2.5N.

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Table - I

Bottle no	Vol of Acetic acid	water
1	50 ml	0
2	40	10
3	30	20
4	20	30
5	10	40

Table - II

Bottle no	Initial con. HCl	Vol of N/10 NaOH	$x = NC_2/_{20}$	log c/m	log x

Expt. No. _____ Date _____

Page No. 11

-: Adsorption :-

Adsorption of Acetic acid animal charcol.

Aim :-

To verify the adsorption of isotherm for acetic acid adsorption on animal charcol.

Apparatus :-

Reagent bottle - 3, Burette funnel, watching glass, filter paper, it pipette, conical flask.

Chemicals :-

0.1 acetic acid, 0.7m NaoH charcol & 1 gm of phenapthalene.

Principle :-

Franeleth proposed a relation b/w the amount of a solute adsorption on a difinate amount adsorbent & the equillbrium con. of The adsorle in the solution according to which.

$$x/m = k.\ ce^{1/n} \longrightarrow (x/m) = \log d + 1/m \log e^{c}$$

Where,

n → amount of solute absorbed

ce → equillibrium conc of adsorbent

K → constant.

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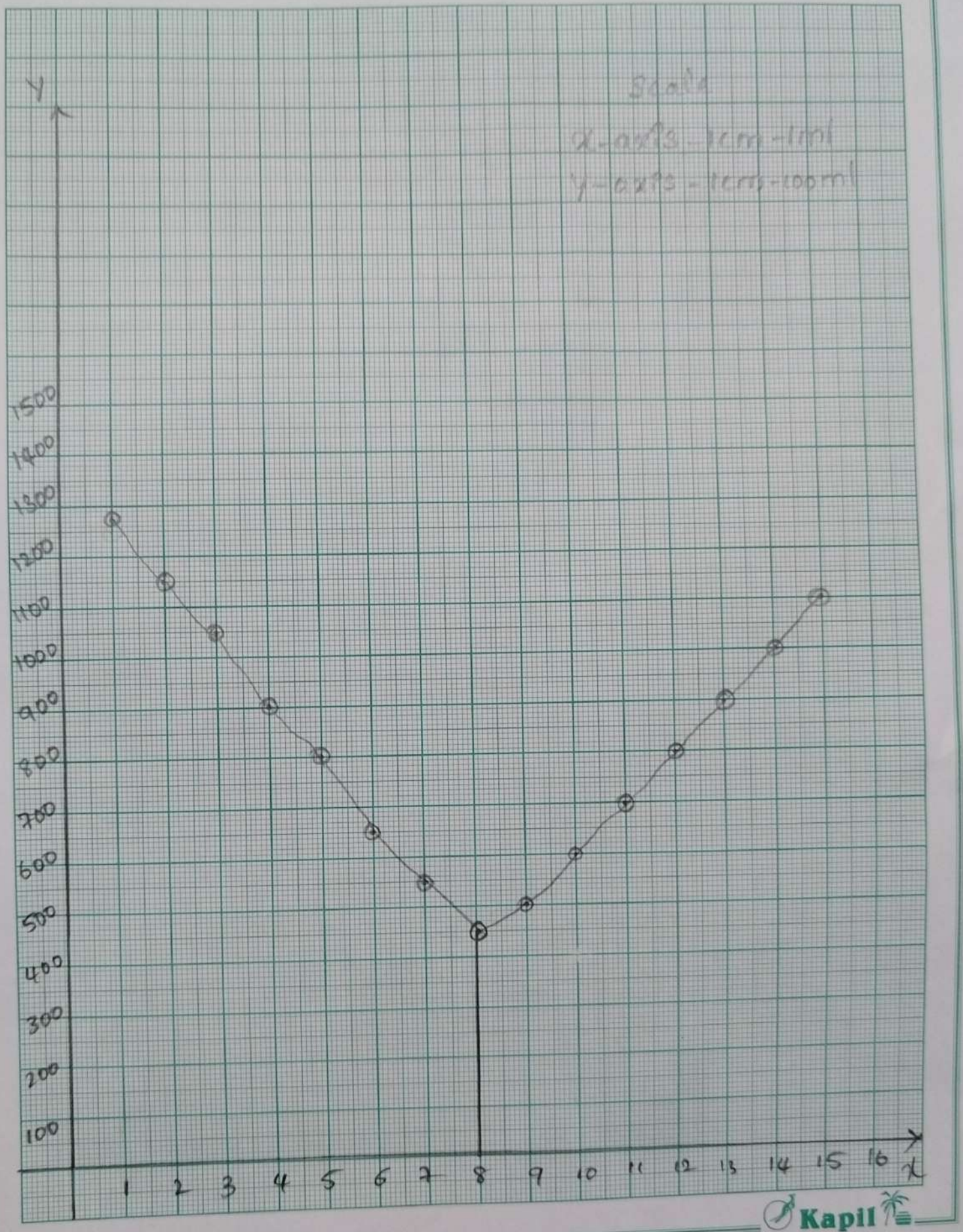
Scale
x-axis - 1cm - 1ml
y-axis - 1cm - 100ml
y
x
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Kapil

n → no. of layer acetic acid absorbed to the surface layer of charcol.

Procedure:-

Take a clean reagent number than 1-5 prepare the following a solution mixture.

Fill the burette with 0.1 M NaOH solution Pipette out 10ml of stock solution 0.1 M acetic acid solution into a conical flask and add (or) 2 drops of phenopthalene indicator solution the en end point is noted when a length point light pink colour is observed.

After 1 hour filter the content of each bottle separatly through a filter paper number 4 which following reject the first 5ml of filtrate and calculate & pipette out 10ml of filtrate in to a clean conical flask.

And titrate it again with 0.1 M NaOH by adding 1 (or) 2 drops reagent repeat the procedure with the titrate of other bottle and calculate the result.

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Graph :-

A graph is plotted taking log (x/m) on y-axis & log (μ) on x-axis is 1 straight line attaing y-axis is obtained to slope of the straight line is equal to y-axis & the intercept is equal to log (c).

Result :-

The adsorption of isotherm is verified.

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Expt. No. _____ Date _____

Page No. 14

PHYSICAL CONSTANT

Determination of physical constant Surface tension.

Aim:-

To determine the surface tension of their given liquid using pylonometer.

Apparatus:-

pylometer, rubber, tube, weight box.

chemicals:-

Benzene, Carbon, tetrachloride, n-hexone

Principle:-

The surface tension of a given liquid can be calculated by using the equation

$$f = \frac{h_2}{n_1} = \frac{n_1 \times d_2}{h_2 \times d_1}$$

f_2 = The surface tension of a given liquid
h_2 = The no. of drops for the given liquid
d_2 = velocity of the given liquid.
n_1 = no. of drops of water
d_1 = The density of water
S_1 = The surface tension of water.

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S.NO	liquid	no. of drops n_1	no. of drops n_2	mean $\left(\frac{n_1+n_2}{2}\right)$	substance - tension	literate value	Y-error
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Date

Expt. No.

Procedure :-

Shalgonometer consists of a fine capillary tube with the center the upper & lower ends of the bulb consits two marks say A and B.

- clean the salganometer throughly with distilled H2O followed by chromic acid and again with distilled H2O followed by throughly the upper end slightly above the mark A and light the rubber tube with a pinch of clamp the Shalgonometer.

- Now discharge H2O & dry the tube by using air current on in the given the repeat the process with other given liquids & tubulate the result.

- calculate the surface tension using the above given formula.

Results :-

Surface tension of given liquid temperature 0°c dym/cm.

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PHYSICAL CONSTANT

Determination of constant velocity

Aim:-

To determine the velocity of given liquids using ostwalds vescometer

APParatus:-

Ostwald, vescometer, lamp, breaker

Chemicals:-

Benzene, carbotetea chloride, n-benzene

Theory:-

Postulate derived the fundamental equation to measure the co-efficient of velocity as below

$$b = \pi r^4 + P/8ut$$

n = co-efficient of velocity

V = Volume of the liquid.

l = length of narrow tubes radius of tube

t = The temperature under the above the equation can be reduced as

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$$\frac{\eta_2}{\eta_1} = \frac{P_1 t_1}{P_2 t_2}$$

Since the hydrostat pressure is directly proportional to the density of liquid.

$$\frac{\eta_2}{\eta_1} = \frac{d_1 t_1}{d_2 t_2}$$

Procedure:-

- The ostwald velocity consists of a capillary tube a bulb "B" at its upper. There are two marks X & Y on the tube & above and below the bulb "A".

- clean the vescometer throughly with dist H_2O followed by chromic acid and again with dist. H_2O.

- Set the vescometer & introduce measured volume of given organic liquid into the large bulb "B" Now suck the liquid up into the bulb A throughly the capacity a rubber tube attached to upto a level begin the capillary plate, then stop cork when the liquid reaches upto mark X & note temperature when it reaches mark Y response

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the same to get concelent reading.

- Once the density given complete of organic compound liquid & water co-efficient of velocity of water then value for the liquid can lee calculated.

Result :-

co-efficient of velocity of the given compound is at temperature 0°c.