B.Sc. II Year
Paper XIV (CH-207) Practicals

M.Marks:60 **Time: 7 Hrs.**

(One day in two sessions i.e. 9:00AM-12:30PM and 1:30PM-5:00PM)

Section–A (Inorganic)

1.Gravimetric Analysis:

Quantitative estimations of, Cu^{2+} as copper thiocyanate, Ni^{2+} as Ni – dimethylglyoxime and Al^{3+}as oxinate.

2. Colorimetry:

To verify Beer - Lambert law for $KMnO_4/K_2Cr_2O_7$ and determine the concentration of the given $KMnO_4/K_2Cr_2O_7$ solution.

3.Preparations: Preparation of Cuprous chloride, tetra ammine cupric sulphate, chrome alum, potassium trioxalatochromate(III) and Nickel Hexammine chloride.

Section-B (Physical)

1. To determine the CST of phenol – water system.
2. To determine the solubility of benzoic acid at various temperatures and to determine the ▲H of the dissolution process.
3. To determine the enthalpy of neutralisation of a weak acid/weak base vs. strong base/strong acid and determine the enthalpy of ionisation of the weak acid/weak base.
4. To determine the enthalpy of solution of solid calcium chloride.
5. To study the distribution of iodine between CCl_4 and water.
6. Determine rate constant of hydrolysis of $CH_3COOC_2H_5$.

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Section-C (Organic)

Systematic identification (detection of extra elements, functional groups, determination of melting point or boiling point and preparation of at least one pure solid derivative) of the following simple mono and bifunctional organic compounds: Naphthalene, anthracene, acenaphthene, benzyl chloride, *p*-dichlorobenzene, *m*-dinitrobenzene, *p*-nitrotoluene, resorcinol , hydroquinone, α-naphthol, β-naphthol, benzophenone, ethyl methyl ketone, benzaldehyde, vanillin, oxalic acid, succinic acid, benzoic acid, salicyclic acid, aspirin, phthalic acid, cinnamic acid, benzamide, urea, acetanilide, benzanilide, aniline hydrochloride, p-toluidine, phenyl salicylate (salol), glucose, fructose, sucrose, *o*-, *m*-, *p*-nitroanilines, thiourea.

Distribution of marks

1.	Section A	15 marks
2.	Section B	15 marks
3.	Section C	15 marks
4.	Viva-voce	05marks
5.	Lab Record	10 marks

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B.Sc 2nd Year (2023-24) Chemistry Practicals

Sr.No	Class Roll	University Roll No	Regn. No	Name	Father Name
1	1212122015009	210038206	21-JL-149	MUSKAN	RAM MEHAR
2	1222122015003	220036501	21-JL-134	MUSKAN	CHAMAN LAL
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4	1222122015010	220036504	21-JL-151	VARSHA	LEELA KRISHAN

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S.N.R.L JAIRAM GIRLS COLLEGE (KKR)

SESSION – 2023-2024

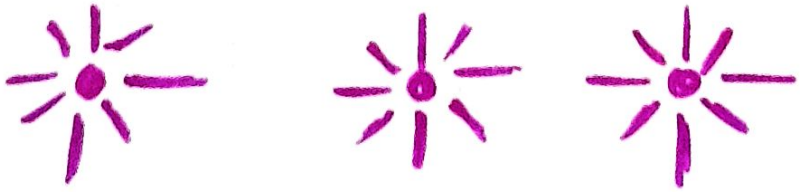
SUBMITTED TO : MS. DIKSHA

SUBMITTED BY : RINKI

CLASS : BSC II YEAR

ROLL NO : 1222122015005

SUBJECT : CHEMISTRY



PARTICULARS OF THE EXPERIMENT PERFORMED

S.NO.	PROJECT	DATE	PAGE	REMARKS
1.	To determine the enthalpy of neutralisation of strong acid (HCl) by strong Base. (Sodium Hydroxide) Solution.	11-10-23		
2.	To determine the enthalpy of neutralisation of weak acid (acetic acid) versus strong base (Sodium hydroxide) and determine the enthalpy of ionisation of the weak acid.	13-10-23		
3.	To determine the enthalpy of neutralisation of weak base (ammonium hydroxide) versus strong acid acid (hydrochloric acid) and determine the enthalpy of ionasation of weak base.	18-10-23		
4.	To prepare a pure sample of cuprous chloride, Cu_2Cl_2.	27-10-23		
5.	To prepare a pure sample of tetraaminecopper(II) sulphate monohydrate, $[Cu(NH_3)_4]SO_4 \cdot H_2O$.	30-10-23		
6.	To prepare a pure sample of chrome alum $K_2SO_4 \cdot Cr_2(SO_4)_3 \cdot 24H_2O$.	6-11-23		
7.	Preparation of Hexaamine nickel chloride			
8.	Preparation a pure sample of potassium trioxalatochromate(III), $K_3[Cr(C_2O_4)_3] \cdot 3H_2O$	10-11-23		
9.	To determine the partition coefficient of iodine in carbon tetrachloride and water.	16-11-23		

PARTICULARS OF THE EXPERIMENT PERFORMED

S.NO.	PROJECT	DATE	PAGE	REMARKS
	Organic Chemistry:—			
1.	Identification of functional group (dinitrobenzene)	2-2-24		
2.	Identification of functional group (COOH) (Benzoic acid)	13-2-24		
3.	Identification of functional group (oxalic acid)	21-2-24		
4.	Identification of functional group (β-napthol)	23-2-24		
5.	Identification of functional group (COOH and Phenol)	7-3-24		
6.	Identification of functional group (Glucose)	19-3-24		
7.	Identification of functional group (Alcohols) Resorcinol.	20-3-24		
8.	Identification of functional group (Napthalene)	2T4-24		
9.	Identification of funtional group (Thio-Urea)	6-4-24		

Expt. No. 1 Date ..... Page No. 1

Aim :- To determine the enthalpy of neutralisation of Hydrochloric acid (Stoong acid) by Sodium hydroxide (Strong Base) solution.

Requirements :-

(a) Apparatus :- A 250 ml wide mouth polythene bottle (or a thermos flask) having a cork with two holes (one for thermo-meter graduated to 0.1°C., pipette, beakers, stirrer.

(b) Chemicals :- 0.5 N hydrochloric acid and sodium hydroxide solutions.

Theory :- When strong acids are neutralised by strong bases, it is observed that the enthalpy of neutralisation is not constant and differs from 13.67 Kcal. This is because, unlike strong acids and strong bases. are not completely ionised on dissolution in water. Consequently, some heat is required for dissociation of strong acids or bases into H^+ ions or OH^- ions. The measured enthalpy of

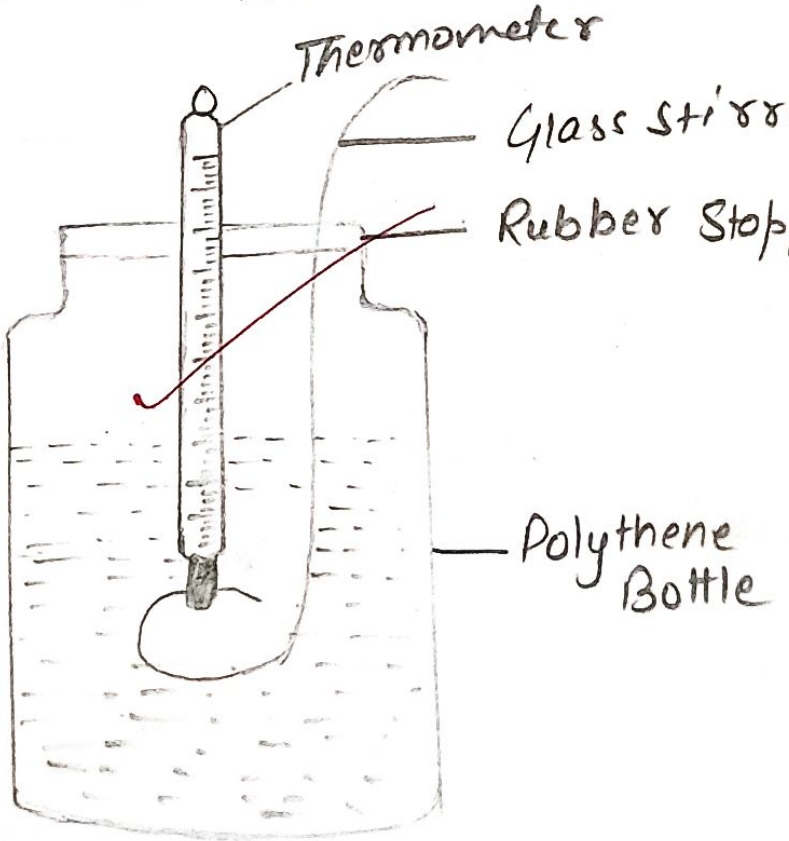
Expt. No. 1 Date ..... Page No. .....

Aim : To determine the enthalpy of neutralisation hydrochloric acid (strong acid) by sodium hydroxide (strong base) solution.

Requirements :

(a) Apparatus : A 250 ml wide mouth polythene bottle having a cork with two holes, thermometer graduated to 0.1°C, pipette, beakers, stirrer.

(b) Chemicals : 0.5 N hydrochloric acid and sodium hydroxide solutions.



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Result :— Enthalpy of neutralisation (ΔH) of hydrochloric acid solution by sodium hydroxide solution is -20 Q calories.

→ Heat of Neutralisation with HCl and NaOH is 55.47 K cal.

Precaution :—

1. No metallic stirrer should by used.
2. The contents of the polythene bottle should be used constantly and quickly stirred.
3. Temperature must be recorded using accurate thermometer graduated to 0.1 °C magnifying lens may preferably be used.

Aim :- To determine the enthalpy of neutralisation of a weak base (ammonium hydroxide) versus strong acid (HCl) and determine the enthalpy of ionisation of weak base.

Requirements :-

(a) Apparatus :- A 250 ml wide mouth polythene bottle (or a thermos flask) having a cork with two holes (one for thermometer and the other for stirrer), thermometer graduated to 0.1°C, pipette, beakers, stirrer.

(b) Chemicals :- 0.5 N Hydrochloric acid and ammonium hydroxide solutions.

Theory :- When strong acids are neutralised by weak bases it is observed that the enthalpy of neutralisation is not constant and differs from 13.67 Kcal. Consequently, some heat is required for dissociation of weak acids or bases into H^+ ions or OH^- ions. Thus it follows that in such a case the reaction involves not only neutralisation but also the ionisation of the strong acid or weak base. Thus the enthalpy of neutralisation

Equations:

$NH_4OH \rightleftharpoons NH_4^+ + OH^-$, $\Delta H = 1.47$ Kcal

$OH^- + H^+ + Cl \longrightarrow H_2O + Cl^-$; $\Delta H = -13.67$ Kcal

$NH_4OH + H^+ + Cl^- \longrightarrow NH_4^+ + Cl^- + H_2O$; $\Delta H = -12.30$ Kcal

Observation and Calculation :-

(a) For water equivalent

let, initial temp. of water = 31°C

Temp. of hot water = 72°C

Temp. after mixing = 50°C

Water equivalent of the calorimeter,

$$W = \left[\frac{1\omega(72-50)}{50-31}\right] - 1\omega$$

$$= 1\omega \times \frac{22}{19} - 100$$

$$= 15.79$$

(b) For heat of Neutralisation :-

Temp. of acid = 30°C

Temp of alkali = 33°C

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Aim :- To determine the partition cofficient of Iodine in carbon tetrachloride and water.

Requirements :- Iodine, Carbon tetrachloride, distilled H_2O and Sodium thiosulphate, three stoppered glass bottles of about 50 ml, capacity funnel, conical flask.

Theory :- On shaking iodine with water and carbon tetrachloride, it distributes itself in the two liquids without undergoing any change in its molecular state. Thus, the partition law in applicable in its sample formic,

$$\frac{\text{Concentration of Iodine in } CCl_4 \text{ layer}}{\text{Concentration of Iodine in } H_2O \text{ layer}} = K \text{ (partition cofficient)}$$

Procedure :- Wash the glass stopper bottles and dry them.

(ii) with the help of a burette and dry them take 25 ml, 20 ml, 15 ml and 10 ml. 2% iodine solution in bottle No. 1, 2, 3 and 4 respectively.

(iii) Take pure CCl_4 in another burette and

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Calculation: Conc. of Iodine in two layers may be calculated as follow, K = Conc. of I_2 in CCl_4 / Conc. of I_2 in H_2O

For Bottle I

For aq. layer

$N_1 \times 5 = \frac{1}{100} \times V_1 = \frac{4}{100} \Rightarrow N = \frac{1}{125}$

Conc. of I_2 in $H_2O = \frac{1}{125} \times 127$

$= 1.016\ gL^{-1}$

Bottle No II

For aqeous layer

$N = \frac{V_2}{100 \times 5} = 1.6/5\omega$

Conc^n of $I_2 = 1.6/5\omega \times 127$

$= 0.4064\ gL^{-1}$

Bottle No III for aq layer.

$N \times V_3 = \frac{1.1}{5\omega}$

Conc^n of $I_2 = \frac{1.1}{5\omega} \times 127$

$= 0.279\ gL^{-1}$

Bottle No IV for aq. layer

$N = \frac{V_4}{100 \times 5} = \frac{0.2}{5\omega}$

Conc of $I_2 = \frac{0.2}{5\omega} \times 127$

$= 0.050\ gL^{-1}$

For CCl_4 layer :-

$N \times 5 = \frac{1}{20} \times V_1 = \frac{16}{20}$

$N = \frac{16}{20 \times 5} = 0.16$

Conc. of $CCl_4 = 0.16 \times 127$

$= 20.32\ gL^{-1}$

For CCl_4 layer,

$N = \frac{V_2}{20 \times 5} = \frac{12}{1\omega}$

Conc. of I_2 in $CCl_4 = \frac{12}{1\omega} \times 127$

$= 15.24\ gL^{-1}$

For CCl_4 layer :-

$N = \frac{V_3}{20 \times 5} = \frac{6.5}{1\omega}$

Conc^n of I_2 in $CCl_4 = \frac{6.5}{1\omega} \times 127$

$= 8.255\ gL^{-1}$

For CCl_4 layer :-

$N = \frac{V_4}{20 \times 5} = \frac{5.5}{1\omega}$

Conc of I_2 in $CCl_4 = \frac{5.5}{1\omega} \times 127$

$= 6.888\ gL^{-1}$

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transfer 0, 5, 10 and 15 ml of it in bottle no. 1, 2, 3 and 4 so that total volume in each bottle [no. 1, 2, 3 and 4] is 25 ml.

(iii) Now with the help of a burette add 50 ml of distilled water to each bottle. The total volume in each bottle is 75 ml.

(iv) Close the bottles with glass stoppers or corks and shake for 30 minutes either manually or by using mechanical shaker.

(v) Allow the bottles to remain undisturbed for 15 min so that the two layers separate perfectly.

(vi) Separate two layers of each bottle with the help of separating funnel and keep them in separate bottles.

(vii) Now, pipette out 5 ml CCl_4 layer of bottle no. 1 in titration flask. Add 1.0 g of KI and 20 ml distilled water. Titrate with N/20 hypo sol^n taken in Burette.

Result :- Average value of K = 1e0·795