Experiment – 1

Aim: To determine the strength of ammonia in tap water sample.

Apparatus required: Pipette, burette, funnel, conical flask, volumetric flask, and dropper

Chemical required: Standard N/20 - Na_2CO_3, HCl solution, water sample and methyl orange indicator.

Theory: NH_3 is highly soluble in H_2O. It is nitrogenous compound and present in water in from of ammonia hydroxide in solution.

NH_3 (g) + H_2O (l) ----→ NH_4OH (aq.)

Where, NH_3 is coming from the pesticides, insecticides fertilizer and other industrial water that are disposed off into the water.

The titration of NH3 and HCl is called Acid – Base titration. Here, HCl is not a primary standard solution, So it is firstly standardized by the help of Na_2CO_3 solution.

Procedure:

I) Standardisation of HCl Solution -

i- Rinse and fill the burette with HCl.

ii- Pipette out 10ml of Na_2CO_3 solution and added 2 drops of methyl orange, titrated with HCl solution till colour changed from yellow to light pink.

iii- The experiment was repeated three times to get concordant reading.

II) Titration of water sample with HCl Solution –

i- Rinse and fill the burette with HCl.

ii- Pipette out 10ml water sample in conical flask.

iii- Add 2-3 drops of methyl orange and titrate with HCl solution till the colour change from yellow to light pink.

iv- The experiment was repeated three times to get concordant reading.

Observation Table:

I) Standardisation of HCl-

S. No.	**Burette Reading**		**Volume of HCl used, (ml)**
	Initial	**Final**	
1	0	13	13
2			
3			

Concordant reading = …… ml

$N_1 V_1$ = $N_2 V_2$

(Na_2CO_3) (HCl)

(1/20) X 10 = N_2 X …..

N_2 = …… N of HCl

(II) Titration of water sample with HCl

S. No.	Burette Reading		Volume of HCl used(ml)
	Initial Volume (ml)	Final Volume (ml)	
1	0	2.2	2.2
2			
3			

Concordant reading 2.2 ml

$N_2 V_2$ = $N_3 V_3$

(HCl) (Water)

… X ….. = N_3 X 10

N_3 = ……. N of water

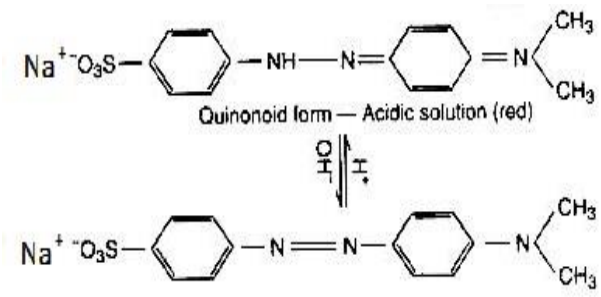
Strength = N_3 X 17

= ….. g/L of NH_3

Structure:

Indicator -Methyl Orange

(Acidic Medium) - Pink



(Basic Medium) - Yellow

Result:

Normality of water = ……..N

Normality of HCl = ……..N

Strength of NH_3 = ……. g/L

Precautions:

1. Handle the apparatus with carefully.

2. Do not pipette out hot solutions.

3. There should be no air bubbles in burette.

4. Lower meniscus of HCl should be observed.