Chemistry Lab Report

Exp No: *01*
Exp Name: Standardization of HCl using 100mL of 0.1(M) Na_2CO_3.
Equipments: 1. Burette($500mL$) 2. Conical flask($250mL$) 3. Funnel 4. Wash bottle 5. Pipette 6. Burette stand.

Theory: Titration is a common laboratory method of quantitative chemical analysis to determine the concentration of an identified analyte (a substance to be analyzed). A reagent, termed the titrant or titrator, is prepared as a standard solution of known concentration and volume. The titrant reacts with a solution of analyte to determine the analyte's concentration. The volume of titrant that reacted with the analyte is termed the titration volume.

Chemicals: 1. HCl 2. Na_2CO_3 3. Distilled water 4. Indicator(Methyl orange).

Chemical Reaction:

$$Na_2CO_3 + 2HCL \rightarrow 2NaCl + H_2O + CO_2$$

Now,

$$e_1S_1V_1 = e_2S_2V_2 \;\Rightarrow\; S_2 = \frac{e_1S_1V_1}{e_2V_2} \;\ldots\; \ldots\; \ldots (1)$$

Where, $e_1 = 2, \quad e_2 = 1$

S_1 = concentration of Na_2CO_3
S_2 = concentration of HCl
V_1 = volume of Na_2CO_3
V_2 = volume of HCl

Description:

01. $0.1(M)Na_2CO3$ solution preparation: At first we weight $1.061g$, then we take it into a $250mL$ flask and mixed it with $250ml$ distilled water. After mixing it for some time, it's ready for experimental work.

02. Standardization of HCl solution: At first fil the burette with HCl solution and record the initial burette reading. Then take $10mLNa_2CO3$ in conical flask and mix it up with 1/2 drops of Methyl Orange.

03. Determination: Mix HCl with Na_2CO_3 drop by drop carefully until Na_2CO_3 solution changes it's color. When Na_2CO_3 changes it's color that means it's the end point of our titration. Now mark the reading for HCl from burette for our further calculation.

Data Table:

	Burette HCl volume			
SN	$V_{1Na_2CO_3}$	$Initial_{(mL)}$	$Final_{(mL)}$	$Diff_{initial-final}$
01	$10mL$	$0mL$	$21.6mL$	$21.6mL$
02	$10mL$	$21.6mL$	$49.9mL$	$21.3mL$

Calculation:

From the table, Mean value of $HCl = \frac{21.6+21.3}{2} = 21.45mL$
From equation (1) we get, $S_2 = \frac{e_1 S_1 V_1}{e_2 V_2} = \frac{2 \times 0.100094 \times 10}{21.45} = 0.09332$ M

Result: The concentration of HCl is **0.09332 M**.

Discussion: The molarity of HCl may not be totally correct for same certain chemical fault.

Precaution:
01. Usually an air bubble is present in the nozzele of the burette. It must be removed before taking the inital readint.
02. There should not be any kind of leakage from the burette during titration.
03. Always add acid to water.
04. Dont't let base level in burrete to reach zero.