Date:

Sun Mon Tue Wed Thu Fri Sat

Section A

Question 1

i. **Apparatus**

A : Volumetric flask

B : pipette

C : Burette

F : Conical flask.

ii

Initial Reading	Final Reading	Volume used (cm^3)
3.2 cm^3	17.4 cm^3	14.2 cm^3
6.5 cm^3	20.8 cm^3	14.3 cm^3
9.7 cm^3	24.1 cm^3	14.4 cm^3

Mean volume of HCl used $= \frac{(14.2 + 14.3 + 14.4)}{3}$

$= 14.3\ cm^3$

iii

- $n_1 = 1$ (Na_2CO_3)
- $n_2 = 2$ (HCl)

Given Volume of Na_2CO_3 sol. $= V_1 = 10\ cm^3$

Mean volume of HCl $= V_2 = 14.3\ cm^3$

$n_1 = 1$ (Na_2CO_3)

n_2 $(HCl) = 2$

Molarity of HCl $= 0.1\ M$

Required : Molarity of $Na_2CO_3 = M_1 = ?$

Formula:

By re-arranging, we get

$$M_1 = \frac{M_2 V_2 \cdot n_1}{V_1 \cdot n_2}$$

Solution

$$M_1 = \frac{0.1 \times 14.3 \times 1}{10 \times 2}$$

$$M_1 = \frac{1.43}{20}$$

$$\boxed{M_1 = 0.07165\,M}$$

Result:

Molarity of Na_2CO_3 is 0.07165 M

Section B

Question 2

i. A given organic compound 'X' gives a positive Bayers test (Reaction with $KMnO_4$). Mention the Change observed for this test.

A: A positive Bayer's test indicates the presence of unsaturation (double of triple bonds)

Change observed: decolorization of $KMnO_4$ solution to a brown MnO_2 (manganese dioxide) precipitate.

ii. When an unknown salt is subjected to a flame, a crimson red flame is obtained. Give procedure of the test and indicate the cation which gave the red flame.

Procedure:

i. Dip a nichrome

i. Dip a nichrome or platinum wire in Conc. HCl acid and hold it in a flame to clean it.

ii. Take a little of the salt solution paste on the loop of the fire and hold it in the flame and observe.

Observation

A crimson red flame indicates the presence of Sr^{+2} i.e strontium cation.

iii. ~~When~~ sugar decomposes on heating. Write the product of decomposition and write observation of the exp:

A: When sugar is heated, after melting it first gives yellow color, then turns brown and finally black.

It releases steam i.e water vapour and gives off burnt caramel smell/odor.

Products of decomposition

- Water (H_2O)
- volatile compounds
- carbon (C)

iv. The purpose of the experiment is to remove the hardness of water containing $CaCl_2$. write a method with a chemical equation to remove it.

Method: $CaCl_2$ Hardness can be removed by adding sodium Carbonate.

Chemical Equation:

$$CaCl_2 + Na_2CO_3 \rightarrow 2NaCl + CaCO_3$$

Observation

Calcium Carbonate precipitates are seen when sodium carbonate is added to hard water. This can be filtered out and thus we are left with clean soft water.