Exercise no. 2

Simultaneous determination of sodium carbonate
and sodium bicarbonate using Warder titration

Dilute the analytical sample with distilled water in a measuring flask to the mark (100 mL) and mix completely. The solution in the measuring flask should be treated as 100 mL of the water sample. **Pipette** 10 mL of the solution into the conical flask and dilute with distilled water to **about** 100 mL.

Add 1-2 drops of **phenolphthalein** to a solution in a conical flask and titrate with 0.1M HCl till the **colour disappears**. Write down the first endpoint volume (a mL). Then, add 1-2 drops of **methyl orange** to the same solution and titrate with HCl solution till the colour changes from **yellow** to **orange**. Write down the second endpoint volume (b mL). Repeat the titrations to obtain three concordant results (not differing more than 0.2 mL).

Calculate the amount of carbonates and bicarbonates present in the sample using formulas:

$$X_{carbonates} = 2a \cdot c \cdot 53 \text{ [mg]}$$

$$Y_{bicarbonates} = (b - a) \cdot c \cdot 84 \text{ [mg]}$$