

## Experiment No.2

- A- Determination of the number of total equivalents of salts**
- B- Determination the ratio of the NaCl and KCl salts using positive ion exchanger**

### Materials

- 1- HCl (3M)
- 2- AgNO<sub>3</sub> (0.1 M)
- 3- NaCl
- 4- KCl
- 5- Methyl orange
- 6- NaOH

### Procedure

1. Reactivate the ion exchanger column using hydrochloric acid (HCl) (3M).
2. Wash the column with distilled water until it becomes neutral.
3. Carefully weigh (0.2 g) from the sample contain (NaCl and KCl).
4. Dissolve the salt with a little amount of the distilled water in the beaker, then transfer it to the ion exchanger column.
5. Collect the solution from the bottom of the column in the conical flask and then was the beaker with a little distilled water and transfer it to the ion exchanger column.

6. Collect the first amount of washing water from the column and check it by adding of the methyl orange indicator. when a pink color appear, Add another amount of the distilled water to the column and collect it in the conical flask, then also check it by use the methyl orange indicator and repeat this process until the pink color disappearance.
7. Titrate the solution that collected in the conical flask with the sodium hydroxide (0.1N).
8. Calculate the volume for the titration and calculate the number of equivalents in the sample.

### Calculation

$$\underbrace{\text{No. of Meq. of cation}} = \text{No. of Meq. NaOH}$$

$$\text{No. of Meq. of NaCl} + \text{No. of Meq. of KCl} = \text{No. of Meq. Of NaOH}$$

$$\frac{0.2 - X}{58.5} + \frac{X}{74.5} = \frac{N (\text{NaOH}) \times V (\text{NaOH})}{1000}$$

$$\text{Wt of KCl} = X$$

$$\text{Wt of NaCl} = 0.2 - X$$

$$\% \text{ NaCl} = \frac{0.2 - X}{0.2} \times 100$$

$$\% \text{ KCl} = \frac{X}{0.2} \times 100$$

## Discussion questions

1. How do we know that the column has become neutral?
2. What will happen to the column after we transfer the solution sample to it and what the type of the groups that the column will be carry?
3. What is the type of resins in the both of the cationic and anionic ion exchange columns?
4. Why we cannot use litmus paper to check the solution that come down from the column through the activation process?