# EXPERIMENT 6

## OXIDATION-REDUCTION REACTION ($KMNO_4$ STANDARDIZATION)

# *Introduction*

- These types of titration depend upon the change in oxidation number of reacting substances, a redox reaction between an oxidizing agent and a reduction agent.
- A substance that is oxidized is termed a ***reducing agent***, while the substance that is reduced is term an ***oxidizing agent***.

## Oxidation

Is defined as a loss of one or more electrons by atom or an increase in the oxidation number.

## Reduction

Is defined as a gain of one or more electrons by atom or a decrease in the oxidation number (opposite oxidation).

Oxidation can never take place without reduction, because something must be able to pick up the electrons lost by the oxidized molecules.

# Types of Sterilizer

- Many *sterilizer* have the property of killing bacteria because they are either oxidizing or reducing agent.

| Oxidizing agent | Reducing agent |
| --- | --- |
| *Chlorine* | *Formaldehyde* |
| *Potassium permanganate* | *Sulfur dioxide* |
| *Iodine* solution | |

# Procedure

- $KMnO_4$ is a strong oxidizing agent, and will be standardization in this experiment versus oxalic acid using sodium oxalate as the primary standard.

- **Procedure:**

1. Take 0.13 gm of sodium oxalate to 250 ml conical flask.
2. Add 20 ml of 1 N sulfuric acid ($H_2SO_4$).
3. Heat the solution to about 60 °C.
4. Then titration solution versus permanganate slowly.

- The solution must still be hot at the end point.

$$5H_2C_2O_4 + 2MnO_4^- + 6H^+ \longrightarrow 10CO_2 + 2Mn^{++} + 8H_2O$$

# *Calculation*

- Calculate the normality of $KMnO_4$

- $Titer\ factor\ of\ {}^{NaOX}/_{KMnO4} = \frac{Wt.NaOX}{Vol.KMnO4}$

- $Normaity\ of\ KMnO4 = \frac{T\ x\ 1000}{GEW}$