PHARMACEUTICAL ANALYSIS – BP102T

UNIT: IV REDOX TITRATIONS

CLASS:33

TOIPC: CLASSIFICATION OF REDOX TITRATION

Classification of Redox Titrations

Redox titrations (oxidation-reduction titrations) are a type of volumetric analysis based on **electron transfer reactions** between the titrant and the analyte. These titrations are classified based on the type of oxidizing or reducing agents involved.

Classifications of Redox Titrations

1. Permanganometry

- **Oxidizing Agent:** Potassium permanganate ($KMnO_4$)
- **Indicator:** Self-indicator (purple color of $KMnO_4$ disappears when reduced)
- **Medium:** Usually acidic (H_2SO_4)
- **Example Reactions:**
  - $KMnO_4 + Fe^{2+} \rightarrow Fe^{3+} + Mn^{2+}$
  - $KMnO_4 + \text{oxalic acid} \rightarrow CO_2 + Mn^{2+}$

2. Dichrometry

- **Oxidizing Agent:** Potassium dichromate ($K_2Cr_2O_7$)
- **Indicator:** External (e.g., diphenylamine sulfonate)
- **Medium:** Acidic (H_2SO_4)
- **Common Uses:** Estimation of Fe^{2+}, Sn^{2+}

3. Iodimetry

- **Oxidizing Agent:** Free iodine (I_2)
- **Used to Titrate:** Reducing agents
- **Indicator:** Starch (turns blue with iodine)
- **Example:**
  - $I_2 + S_2O_3^{2-} \rightarrow I^- + S_4O_6^{2-}$

4. Iodometry

- **Reducing Agent:** Iodide ion (I^-) reacts with oxidizing agents to release iodine
- **Titration of:** Released iodine with sodium thiosulfate ($Na_2S_2O_3$)
- **Indicator:** Starch
- **Example:**
  - $Cu^{2+} + I^- \rightarrow I_2$ (then I_2 titrated with $Na_2S_2O_3$)

5. Cerimetry

- **Oxidizing Agent:** Cerium(IV) sulfate ($Ce(SO_4)_2$)
- **Medium:** Acidic
- **Indicator:** Ferroin or N-phenylanthranilic acid
- **Example Use:** Determination of reducing substances like Fe^{2+}