

Laboratory Manual

- 1) Permanganometry is the titrimetric analysis using a standard solution of potassium permanganate as the titrant. KMnO_4 is a strong oxidant. The pink color of very slight excess of KMnO_4 imparts a pink color to the titrated solution. This makes possible the detection of end point and thus KMnO_4 acts as a self-indicator.

KMnO_4 is not a primary standard substance. So, it needs to be standardized against oxalic acid. Today the procedure of standardization of KMnO_4 by titration with oxalic acid will be demonstrated-

Standardization of KMnO_4 with standard oxalic acid solution

25 ml of (N/20) standard oxalic acid solution was taken in a 250 ml conical flask, 25 ml 4(N) H_2SO_4 was added and heated to $70-80^\circ\text{C}$ and titrated with KMnO_4 solution until the solution turns light pink that is stable for about 30 seconds. Two readings were taken and the average value was used for calculation of strength of KMnO_4 solution.

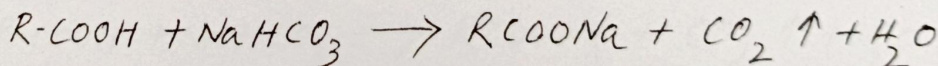
Calculation:

$$V_1S_1 = V_2S_2$$

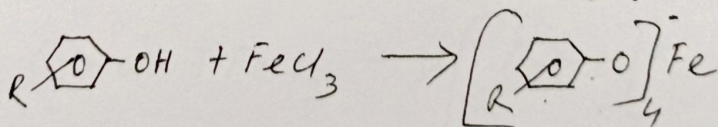
2) Functional Group Detection:

Functional groups assign the chemical properties to an organic compound like carboxylic acid, phenolic-OH, carbonyl, amine, nitro group etc. Detection of a few functional groups will be demonstrated today-

- i) Carboxylic acid ($-\text{COOH}$): To ethanolic solution of a pinch of sample, 1 drop of saturated NaHCO_3 is added. Effervescence is observed which confirms presence of $-\text{COOH}$ functional group.



- ii) Phenolic-OH: To ethanolic solution of sample, one drop of neutral FeCl_3 is added. Color change confirms presence of Phenolic-OH functional group.



- iii) Carbonyl group: To ethanolic solution of the sample, 2 drops of 2,4-DNP solution was added. Appearance of reddish-orange precipitate, confirms presence of carbonyl functional group.

