SUBJECT - CHEMISTRY
CLASS - B.Sc(Hons) PART-III
PAPER - V
TOPIC - Liquid Junction Potential (E_L)
Dr Hari Mohan prasad Singh
Department of Chemistry
Dr. L.K.V.D College Tajpur Samastipur

Liquid Junction Potential (E_L): If H^+ and Cl^- ions have the Same activity in a given Solution, then $a_+ = a_\pm$ and the emf of The cell in which E_L is eliminated would become,

$$E = \frac{RT}{F} \ln \frac{(a_\pm)_2}{(a_\pm)_1} \quad --- (1)$$

$$\therefore \; E_L = E_t - E = (2t_- - 1)\frac{RT}{F} \ln \frac{(a_\pm)_2}{(a_\pm)_1} \quad -- (2)$$

This equation holds good for uni-univalent electrolytes.

Again -

$$t_+ + t_- = 1$$

$$\therefore \; t_- - 1 = -t_+$$

on adding t_- both Sides, we get -

$$t_- + (t_- - 1) = t_- - t_+$$

or $2t_- - 1 = t_- - t_+$

putting this value of $(2t_- - 1)$, we get -

$$E_L = (t_- - t_+)\frac{RT}{F} \ln \frac{(a_\pm)_2}{(a_\pm)_1} \quad --- (3)$$

Thus the sign and magnitude of E_L depends upon the transport number of cation and anion. If the transport number of ions are not very different, E_L will be small. This explains the use of Concentrated solution of KCl to minimise E_L as the transport numbers of K^+ and Cl^- ions are almost equal.