# Terms related to electrolytic conduction

i) Resistance (R)

Hinderence to the flow of ions

SI unit : ohm , $\Omega$

ii) Conductance (C)

Easiness with which ions can flow , it is reciprocal of resistance.

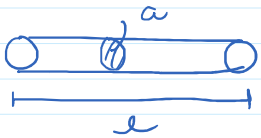
$C = \frac{1}{R}$ , unit : $ohm^{-1}$, mho , Seimen (S)

iii) Resistivity ($\rho$) or Specific resistance

$R = \rho \frac{l}{a}$

$l \rightarrow$ length of section through which current flows

$a \rightarrow$ area of cross section




$\rho = R \frac{a}{l}$ units: ohm-cm

$a = 1$ unit, $l = 1$ unit

$\rho = R$

$a = 1 cm^2$, $l = 1$ cm, volume $= 1 cm^3 = 1$ ml

Resistivity is defined as resistance offered to all the ions present in 1 ml solution.

iv) Conductivity (k) or specific conductance

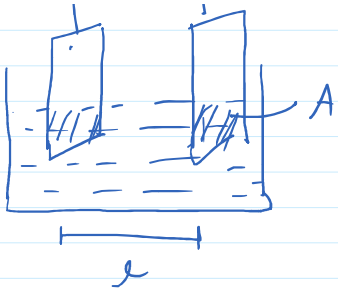
It is conductance of 1 ml solution

$k = \frac{1}{\rho}$

units: $\frac{1}{\text{ohm cm}} = \text{mho } cm^{-1} = S cm^{-1}$

Cell constant

Cell constant




Cell constant (G) = $\frac{l}{a}$

unit : $cm^{-1}$

$R = \rho \frac{l}{a}$

$= \rho G$

$G = \frac{R}{\rho}$

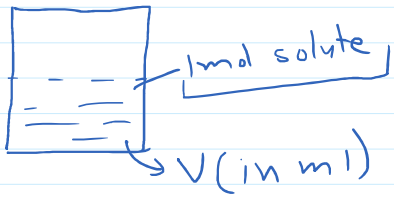
$\boxed{G = R \times K}$

$\boxed{\text{cell constant} = \text{resistance} \times \text{conductivity}}$

V) Molar conductivity

Conductance of all the ions produced by 1 mol of electrolyte is known as molar conductivity.

$\Lambda_m = K \times V$




1 ml = $1 cm^3$

units : $S cm^{-1} \frac{ml}{mol}$

$= S cm^{-1} \frac{cm^3}{mol}$

unit = $S cm^2 mol^{-1}$

Let a solution has molarity M

M moles electrolyte is present in = 1000 ml solution

1 mole " " " " = $\frac{1000}{M}$ ml solution

$V = \frac{1000}{M}$ ml

$\Lambda_m = K \times V$

$\boxed{\Lambda_m = \frac{K \times 1000}{M}}$ units: $S cm^2 mol^{-1}$

VI) Equivalent conductivity ($\Lambda_{eq}$)

Conductance of solution containing 1 equivalent of electrolyte

$\Lambda_{eq} = K \times V$

V = volume of solution in ml containing 1 equivalent of electrolyte.

$$\Lambda_{eq} = \frac{K \times 1000}{N}$$

Units $Scm^2\ eq^{-1}$

$N = n\ factor \times M$

$$\Lambda_{eq} = \frac{K \times 1000}{n\ factor \times M}$$

$$\Lambda_{eq} = \frac{\Lambda_m}{n\ factor}$$