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**UNIT: IV: ELECTRO CHEMISTRY**

**Conductance [or Conductivity]**

Any substance that allows an electric current to flow through is called conductor.The conductor which offers a little resistanceto the flow of electricityallows more current to pass through. The capacity to conduct electricity is called the conductivity or conductance. It is denoted by $'π$’ . Its SI unit is Siemen (S).

 **Specific Conductance[or Electrolytic conductance]** : The reciprocal of of specific resistance is called Specific Conductance. We know that

R$ α\frac{l}{a}$

R = $ρ.\frac{l}{a}$

$\frac{1}{ρ}$=$\frac{1}{R}$.$ \frac{l}{a}$

K = $π.\frac{l}{a}$

Its SI unit is Sm-1.

**Equivalent conductance:**  Equivalent conductivity of a solution at a dilution as the conductance of all the ions produced from one gram equivalent of the electrolyte dissolved in Vcm3 of the solution when the distance between the electrodes is one cm and the area of the electrodes is so large that whole of the solution is contained between them. It is represented by $Λ$eq.

**Molar conductance:** The molar conductivity of a solution at a dilution v is the conductance of all the ions produced from one mole of the electrolyte dissolved in V cm3 of the solution. when the electrodes are one cm apart and the area of the electrodes is so large that the whole of the solution is contained between them. It is usually represented by $Λ$m.

**Cell constant**

Cell constant = $\frac{l}{a}$

Where ‘l’ is the distance between the electrode of the cell and ‘a’ is the surface area of the electrode.Thus cell constant may be obtained by measuring ‘l’ and ‘a’ . Alternatively this may be obtained as followed with the help of the following equation.

R = $ρ\frac{l}{a}$

$\frac{1}{c}=\frac{1}{K}.\frac{l}{a}$

$\frac{l}{a}=\frac{K}{C}$

OR, $\frac{l}{a}=\frac{Specific conductance}{Observed conductance}$

The ratio $\frac{l}{a}$ is called cell constant.

 A KCl solution of any concentration , suppose N/50 is taken in the concentration cell whose cell constant is to be measured. The resistance of the cell is measured with the help of wheatstone bridge method.

 As per Kohlrausch law the specific conductance of N/50 KCl solution at 25$℃$ is 0.002765 ohm-1 . If the resistance of the cell is 400 ohms,then-

Cell constant =0.002765 X 400 =1.106 cm-1