

Electrochemistry

Introduction:-

Electrochemistry is a branch of chemistry which deals with the chemical applications of electricity. Electrochemistry deals with the chemical reactions produced by passing electric current through an electrode, or the production of electric current through chemical reactions.

Conductors:-

A substance or material that allows electric current to pass through it is called a conductor. The ability of a material to conduct electric current is called conductance.

Eg:- All metals, graphite, fused salt, aqueous solution of acids, bases, etc.,

Non-conductors (or) insulators:

Materials which do not conduct electric current are called non-conductors or insulators.

Eg:- Plastics, wood, most of the non-metals, etc.

Types of conductors:-

1. Metallic Conductors (or) Electronic Conductors :-

Metallic Conductors are solid substances, which conduct electric current due to the movement of electrons from one end to another end. The conduction decreases with increase of temperature.

Eg :- All metals, graphite.

2. Electrolytic Conductors :-

Electrolytic conductors conduct electric current due to the movement of ions in solution or in fused state. The conduction increases with increase of temperature.

Eg :- Acids, bases, electrovalent substances.

Types of Electrolytic conductors :-

a) Strong electrolytes :-

Strong electrolytes are substances, which ionise completely almost at all dilutions.

Eg :- HCl , NaOH , NaCl , KCl , etc.

b) Weak electrolytes :-

Weak electrolytes are substances, which ionise to a small extent even at high dilutions.

Eg :- CH_3COOH , NH_4OH , CaCO_3 , etc.,

c) Non electrolytes :-

Non electrolytes are substances, which do not ionise at any dilutions.

Eg:- Glucose, sugar, alcohol, petrol, etc.,

cell terminology :-

i) current :-

current is the flow of electrons through a wire or any conductor.

ii) Electrode :-

Electrode is a material (or) a metallic rod / bar / strip which conducts electrons.

iii) Anode :-

Anode is the electrode at which oxidation occurs.

iv) Cathode :-

Cathode is the electrode at which reduction occurs.

v) Electrolyte :-

Electrolyte is a water soluble substance forming ions in solution, and conduct an electric current.

v) Anode compartment.

Anode compartment is the compartment of the cell in which oxidation half-reaction occurs. It contains the anode.

vi) Cathode compartment.

Cathode compartment is the compartment of the cell in which reduction half reaction occurs. It contains the cathode.

vii) Half-cell:

Half cell is a part of a cell, containing electrode dipped in an electrolytic solution. If oxidation occurs at the electrode that is called oxidation half cell. If reduction occurs at the electrode that is called reduction half cell.

viii) Cell :-

Cell is a device consisting two half cell. The two half cells are connected through one wire.

Electrode Potential :- (Metal - metal ion electrodes)

A Metal (M) consists of metal ions (M^{n+}) with valence electrons. When the metal (M) is placed in a solution of its own salt, any one of the following