The emf of the above cell is measured and the electrode potential is calculated from the emf as follows,

$$E_{cell} = E^{\circ}_{right} - E^{\circ}_{left}$$

$$E_{cell} = E^{\circ}_{cal} - E^{\circ}_{Zn}$$

$$E^{\circ}_{Zn} = E^{\circ}_{cal} - E_{cell}$$

$$= +0.2422 - 1.0025$$

$$E^{\circ}_{Zn} = -0.7603 \text{ volt.}$$

i.e the reduction potential of Zn electrode = -0.7603 volt.

Ion- Selective electrodes (ISE)

Ion- selective electrodes are the electrodes having the ability to respond only to a particular ions, and develop potential, ignoring the other ions in a mixture totally.

The potential developed by an ion- selective electrode depends only on the concentration of particular ions.

Eg:- Glass electrode.

The glass membrane of the glass electrode is only selective to H^+ ions only in a mixture.

Glass Electrode (Internal Reference electrode)

Construction:-

A glass electrode consists of thin-walled glass bulb (the glass is a special type having low melting point and high electrical conductivity) containing a Pt wire in 0.1M HCl. The glass electrode is represented as.

Pt, 0.1 M HCl | Glass

HCl in the bulb furnishes a constant H^+ ion concentration.

Glass electrode is used as the 'internal reference electrode". The pH of the solutions, especially coloured solutions containing oxidizing or reducing agents can be determined. The thin walled glass bulb called glass membrane functions as an ion-exchange resin, and an equilibrium is set up between the Na^+ ions of glass and H^+ ions in solution. The potential difference varies with the H^+ ion concentration, and its emf is given by the expression.