

Answer on Question #52784 - Chemistry - Inorganic Chemistry

For calomel electrode:

$$pH = \frac{E - E_{kal}}{2.303(RT/F)}$$

where E is the measured electromotoric force (in V), E_{kal} is the potential of the calomel electrode at given temperature (see Tab.2). $R=8.314 \text{ Jkmol}^{-1}$ is the gas constant, $F=96485 \text{ Cmol}^{-1}$ is the Faraday constant, T is the temperature.

For quinhydrone electrode:

$$\begin{aligned} E &= E_k + 0.000198 T \cdot \log [H^+] \\ &= E_k - 0.000198 T \cdot p_H \\ \text{or } E &= E_k - 0.0577 p_H \text{ at } 18^\circ \text{ C.} \end{aligned}$$

$$\text{So } pH = (E_k - E) / 0.0577$$

where E is the measured electromotoric force (in V), E_k – is the potential of quinhydrone electrode and T is the temperature.