pH

In the restricted range of dilute aqueous solutions having *amount concentrations* less than 0.1 mol dm^{-3} and being neither strongly acidic nor strongly alkaline (2 <pH <12).

$$pH = -\lg\{\gamma_{\pm} c(H^+)/\text{mol dm}^{-3}\} \pm 0.02$$

where $\gamma_{\pm}$ is the mean ionic *activity coefficient* of a typical univalent electrolyte on a concentration basis. The operational definition is based on the *electromotive force* measurement of the galvanic cell:

reference electrode |KCl(aq) || solution X|H(g) |Pt

where the KCl solution has a molality greater than 3.5 mol kg^{-1} relative to a standard solution S, replacing X in the scheme above [usually KH_2PO_4 (aq) of molality 0.05 mol kg^{-1} which has a pH = 4.005].

$$pH(X) = pH(S) + (E_S - E_X)F/(RT \ln 10).$$

G.B. 62; 1996, *68*, 986; see also 1990, *62*, 2205; 1984, *56*, 569