N	ิด	m	16	•
1 1	а	11	16	

pH and Indicators	Objectives
18. pH and Indicators	-define pH
	-describe the use of the pH scale as a measure of the degree of acidity/alkalinity
	-discuss the limitations of the pH scale
	-write an expression for Kw
	-use universal indicator paper or solution to determine pH
	-calculate the pH of dilute aqueous solutions of strong acids and bases
	-justify the selection of an indicator for acid base titrations

Def^{*n*}: The **ionic product of water** is $K_w = [H^+][OH^-]$

The pH Scale:



Examples of pH Conditions:



Limitations of the pH scale:

- 1. Only has a range of 0-14.
- 2. Does not work for concentrated solutions.
- 3. Only works for aqueous solutions.



Find the pH of a 0.11 mol/L solution of HCl

Find the pH of a 0.5 mol/L solution of H_2SO_4

Find the $\mathrm{H}^{\scriptscriptstyle +}$ concentration of a HCl solution whose pH is 1.9

For strong bases:

$$pOH = -log_{10}[OH^-]$$

and

pH = 14 - pOH

Find the pH of a solution whose OH^- concentration is 4.6 x 10^{-9} mol/L

Find the pOH of a 0.35 mol/L solution of NaOH

Find the pH of a 0.75 mol/L solution of Ca(OH)₂

Find the OH⁻ concentration of an KOH solution whose pH is 13.2