RELATIVE STRENGTHS OF 0.10 mol/L ACIDS AND BASES @ 298.15 K (25ºC)

INCREASING ACID STRENGTH ↑

INCREASING BASE STRENGTH ↓

% Dissociation with Water	Acid		Conjugate Base	K_a
	Name	Formula		
100	perchloric acid	$HClO_4(aq)$	$ClO_4^-(aq)$	very large
100	hydroiodic acid	$HI(aq)$	$I^-(aq)$	3.2×10^{9}
100	hydrobromic acid	$HBr(aq)$	$Br^-(aq)$	1.0×10^{9}
100	hydrochloric acid	$HCl(aq)$	$Cl^-(aq)$	1.3×10^{6}
100	sulfuric acid	$H_2SO_4(aq)$	$HSO_4^-(aq)$	1.0×10^{3}
100	nitric acid	$HNO_3(aq)$	$NO_3^-(aq)$	2.4×10^{1}
100	hydronium ion	$H_3O^+(aq)$	$H_2O(l)$	-
51	oxalic acid	$HOOCCOOH(aq)$	$HOOCCOO^-$	5.4×10^{-2}
30	sulfurous acid ($SO_2 + H_2O$)	$H_2SO_3(aq)$	$HSO_3^-(aq)$	1.3×10^{-2}
27	hydrogen sulfate ion	$HSO_4^-(aq)$	$SO_4^{2-}(aq)$	1.0×10^{-2}
23	phosphoric acid	$H_3PO_4(aq)$	$H_2PO_4^-(aq)$	7.0×10^{-3}
8.2	nitrous acid	$HNO_2(aq)$	$NO_2^-(aq)$	7.2×10^{-4}
7.8	hydrofluoric acid	$HF(aq)$	$F^-(aq)$	6.6×10^{-4}
4.1	methanoic acid	$HCOOH(aq)$	$HCOO^-(aq)$	1.8×10^{-4}
-	methyl orange	$HMo(aq)$	$Mo^-(aq)$	$\sim \times 10^{-4}$
2.3	hydrogen oxalate ion	$HOOCCOO^-(aq)$	$OOCCOO^{2-}(aq)$	5.4×10^{-5}
1.3	ethanoic (acetic) acid	$CH_3COOH(aq)$	$CH_3COO^-(aq)$	1.8×10^{-5}
0.21	carbonic acid ($CO_2 + H_2O$)	$H_2CO_3(aq)$	$HCO_3^-(aq)$	4.4×10^{-7}
-	bromothymol blue	$HBb(aq)$	$Bb^-(aq)$	$\sim \times 10^{-7}$
0.1	hydrosulfuric acid	$H_2S(aq)$	$HS^-(aq)$	1.1×10^{-7}
7.9×10^{-2}	dihydrogen phosphate ion	$H_2PO_4^-(aq)$	$HPO_4^{2-}(aq)$	6.3×10^{-8}
7.9×10^{-2}	hydrogen sulfite ion	$HSO_3^-(aq)$	$SO_3^{2-}(aq)$	6.2×10^{-8}
5.4×10^{-2}	hypochlorous acid	$HOCl(aq)$	$OCl^-(aq)$	2.9×10^{-8}
-	phenolphthalein	$HPh(aq)$	$Ph^-(aq)$	$\sim \times 10^{-10}$
7.9×10^{-3}	hydrocyanic acid	$HCN(aq)$	$CN^-(aq)$	6.2×10^{-10}
7.6×10^{-3}	boric acid	$H_3BO_3(aq)$	$H_2BO_3^-(aq)$	5.8×10^{-10}
7.6×10^{-3}	ammonium ion	$NH_4^+(aq)$	$NH_3(aq)$	5.8×10^{-10}
2.2×10^{-3}	hydrogen carbonate ion	$HCO_3^-(aq)$	$CO_3^{2-}(aq)$	4.7×10^{-11}
2.0×10^{-4}	hydrogen phosphate ion	$HPO_4^{2-}(aq)$	$PO_4^{3-}(aq)$	4.2×10^{-13}
1.4×10^{-4}	dihydrogen borate ion	$H_2BO_3^-(aq)$	$HBO_3^{2-}(aq)$	1.8×10^{-13}
1.1×10^{-4}	hydrogen sulfide ion	$HS^-(aq)$	$S^{2-}(aq)$	1.3×10^{-13}
4.0×10^{-5}	hydrogen borate ion	$HBO_3^{2-}(aq)$	$BO_3^{3-}(aq)$	1.6×10^{-14}
-	water (55.5 mol/L)	$H_2O(l)$	$OH^-(aq)$	-
-	hydroxide ion	$OH^-(aq)$	$O^{2-}(aq)$	-

ACID-BASE INDICATORS AT 298.15 K (25^{O}C)

Indicator	pH Range	Colour Change as pH Increases
methyl violet	0.0 -1.6	yellow to blue
thymol blue	1.2 - 2.8 8.0 - 9.6	red to yellow yellow to blue
orange IV	1.4 - 2.8	red to yellow
methyl orange	3.2 - 4.4	red to yellow
bromocresol green	3.8 - 5.4	yellow to blue
litmus	4.5 - 8.3	red to blue
methyl red	4.8 - 6.0	red to yellow
chlorophenol red	5.2 - 6.8	yellow to red
bromothymol blue	6.0 - 7.6	yellow to blue
phenol red	6.6. - 8.0	yellow to red
phenolphthalein	8.2 -10.0	colorless to pink
thymolphthalein	9.4 -10.6	colorless to blue
alizarin yellow R	10.1 -12.0	yellow to red
indigo carmine	11.4 - 13.0	blue to yellow
1,3,5 - trinitrobenzene	12.0 - 14.0	colorless to orange