

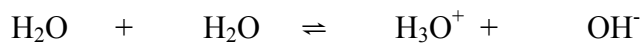
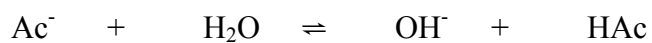
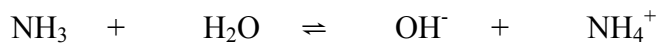
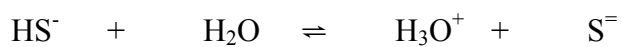
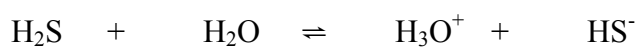
Lecture Notes O: Acid-Base Chemistry II

1) Bronsted-Lowry definition of an acid and a base:

Acid: proton donor

Base: proton acceptor

Examples of Bronsted acids and bases:



2) Weak acids and bases

Hydrofluoric acid	HF	+	H ₂ O	⇌	H ₃ O ⁺ + F ⁻	K _a = 6.6x10 ⁻⁴	pK _a = 3.18
Formic acid	HCOOH	+	H ₂ O	⇌	H ₃ O ⁺ + HCOO ⁻	K _a = 1.77x10 ⁻⁴	pK _a = 3.75
Acetic acid	HAc	+	H ₂ O	⇌	H ₃ O ⁺ + Ac ⁻	K _a = 1.76x10 ⁻⁵	pK _a = 4.75
Nitrous acid	HNO ₂	+	H ₂ O	⇌	H ₃ O ⁺ + NO ₂ ⁻	K _a = 4.6x10 ⁻⁴	pK _a = 3.34
Acetyl Salicylic acid	C ₉ H ₈ O ₄	+	H ₂ O	⇌	H ₃ O ⁺ + C ₉ H ₇ O ₄ ⁻	K _a = 3x10 ⁻⁴	pK _a = 3.52
Hydrocyanic acid	HCN	+	H ₂ O	⇌	H ₃ O ⁺ + CN ⁻	K _a = 6.17x10 ⁻¹⁰	pK _a = 9.21
Ammonia	NH ₃	+	H ₂ O	⇌	NH ₄ ⁺ + OH ⁻	K _b = 1.79x10 ⁻⁵	pK _b = 4.74
	C ₂ H ₅ NH ₂	+	H ₂ O	⇌	C ₂ H ₅ NH ₃ ⁺ + OH ⁻	K _b = 5.6x10 ⁻⁴	pK _b = 3.25

Problem

What is the pH of a 1M solution of acetic acid?

3) Hydrolysis

What is the pH of a 1M solution of Sodium Acetate?

Concept

Consider an exceptionally weak acid, HA, with a $K_a = 1 \times 10^{-20}$. You make a 0.1M solution of the salt NaA. What is the pH?

- a) 1 b) 2 c) 12 d) 13

4) Various acid-base reactions

Acid dissociation



Hydrolysis



Reverse of the above:

