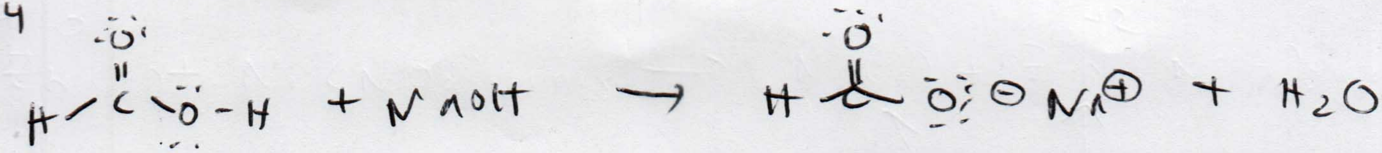
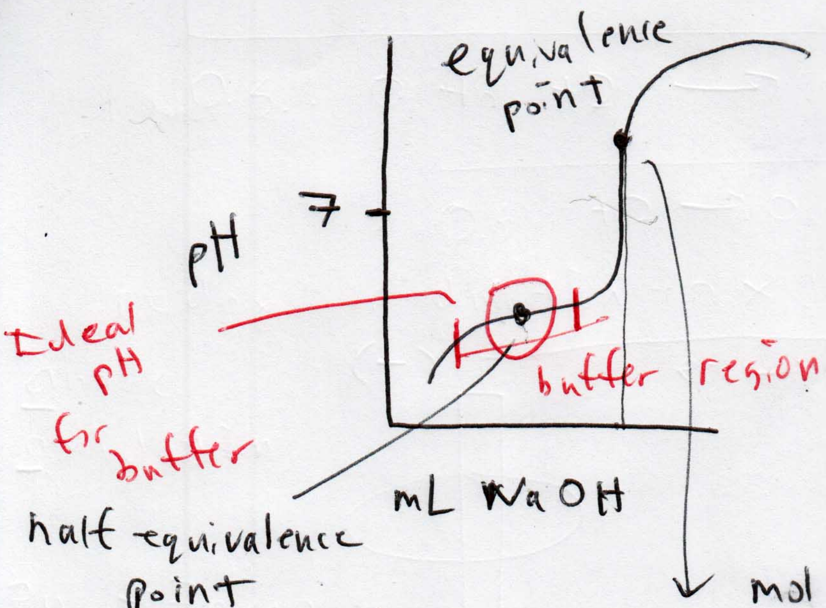
2/4/14





Because this salt is the product of a weak acid and a strong base, it will react with water to establish an equilibrium, canging OH^- to form, meaning the neutralized solution will be basic.

mol acid reacted = mol base reacted
HCOOH NaOH

pKa = pH
[acid] = [conjugate base]
HCOOH $HCOO^-$

$K_a\,(HCOOH) = 1.70\times10^{-4}$

Ideal composition ! mol HCOOH = mol NaHCOO

$pH = -\log_{10}(1.7\times10^{-4}) = 3.77$

$pH = pK_a + \log\frac{[A^-]}{[HA]}$

K_a (lactic acid) $= 1.38\times10^{-4}$

$pK_a = -\log_{10}(1.38\times10^{-4}) = 3.86$

$4.00 = 3.86 + \log\frac{[A^-]}{[HA]}$

$\log\frac{[A^-]}{[HA]} = .14$

$[A^-]/[HA] = 10^{.14} = 1.38$

$[HA] = [A^-]/1.38$ $[A^-] = 1.38[HA]$

Given 50 mL of 0.100 M of lactic acid $n = M \cdot V$

$(.100)(.050) \longrightarrow 0.0050$ mol lactic acid

mass sodium lactate $= 1.38 \times (0.0050) \times MM$.

titration of polyprotic acid

monoprotic – dissociates into only one available H^+

di, tri, poly ⟶ 2, 3, many

Examples of polyprotic acids: H_2SO_4, H_3PO_4, H_2CO_3

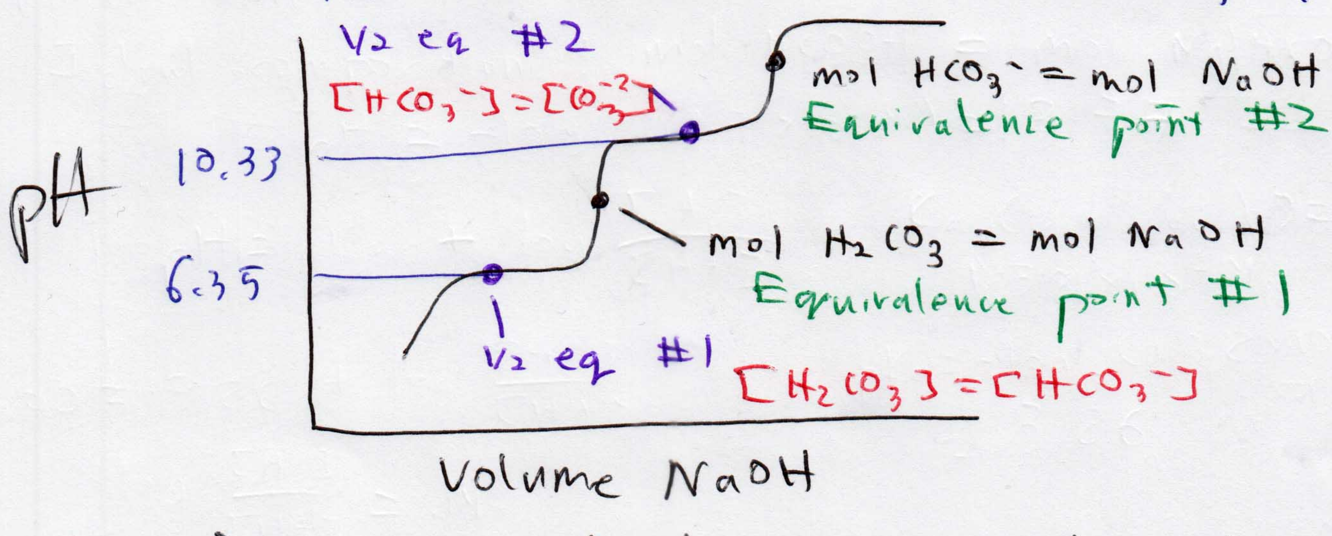
$H_2CO_{3(aq)} \rightleftharpoons H^+_{(aq)} + HCO_3^-{}_{(aq)}$ $K_{a_1} = 4.5 \times 10^{-7}$

$HCO_3^-{}_{(aq)} \rightleftharpoons H^+_{(aq)} + CO_3^{-2}{}_{(aq)}$ $K_{a_2} = 4.7 \times 10^{-11}$

$pK_{a_1} = 6.35$ $pK_{a_2} = 10.33$

The first dissociation of an acid is usually stronger than the second because once the first H^+ is remove an anion is generated (– and + attract),

If HCO_3^- / CO_3^{-2} is part of a buffer system, pK_{a2} is used, because it descibes the strength of the H^+ that will dissociate from HCO_3^-.



amphoteric – a compound that can act as both an acid and a base

Examples: HCO_3^-, HSO_4^-, $H_2PO_4^-$, H_2O

HClO $K_a = 2.9 \times 10^{-8}$

Given 0.50M HClO and 0.50 M NaClO, what would the pH of the solution be if 10.0 mL of 8.0M HCl were added to 1L of the buffer?