

17.21b

85ml 0.13M HLac

95ml 0.15M NaLac

100% Dissoc

NaLac \rightarrow Na⁺ + Lac⁻

WA
RICE

$M = \frac{\text{moles}}{L}$

moles = M * L

HLac \rightarrow H⁺ + Lac⁻

0.01105 moles

0.13M

85ml

HLac

moles HLac

0.15M

95ml

NaLac

moles NaLac

0.01425 moles

0.18L

180ml

0.061M

WA

0.079

0.08M

CB

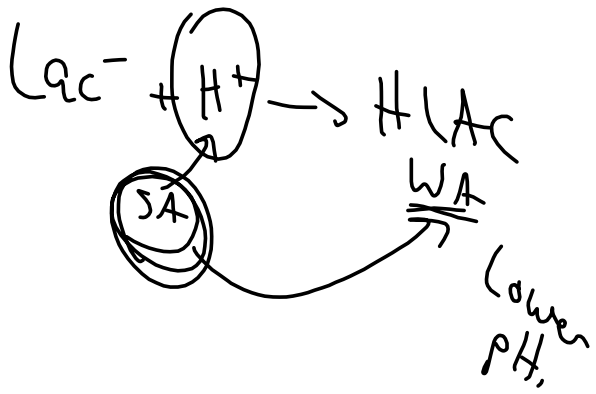
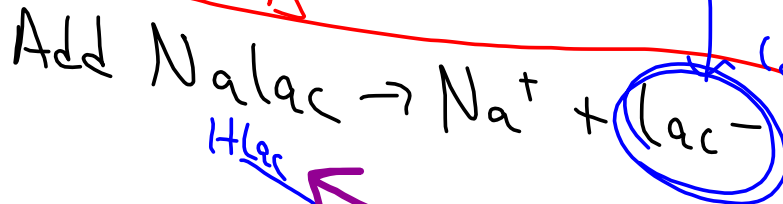
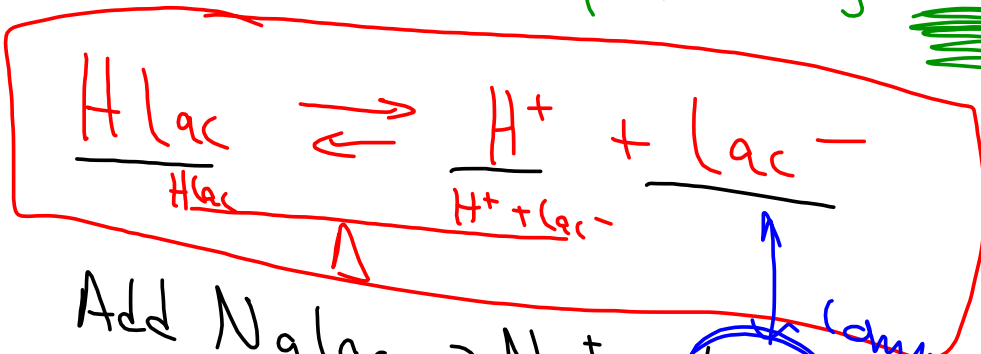
$$pH = pK_a + \log \left(\frac{[B]}{[A]} \right)$$

$$= -\log(1.4 \times 10^{-4}) + \log \frac{0.01425}{0.061}$$

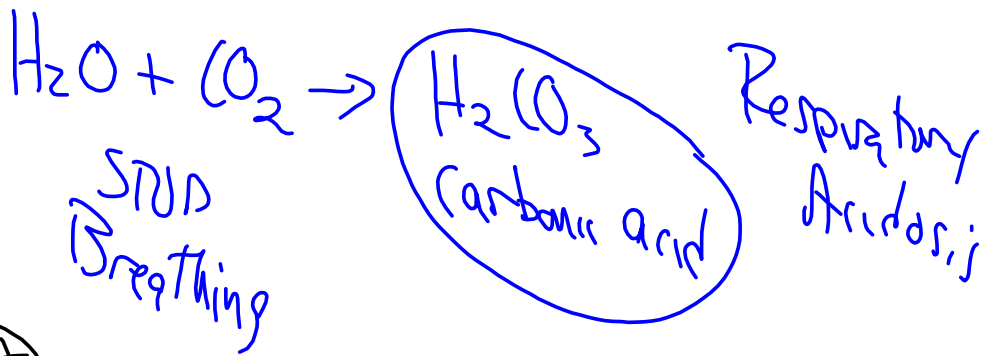
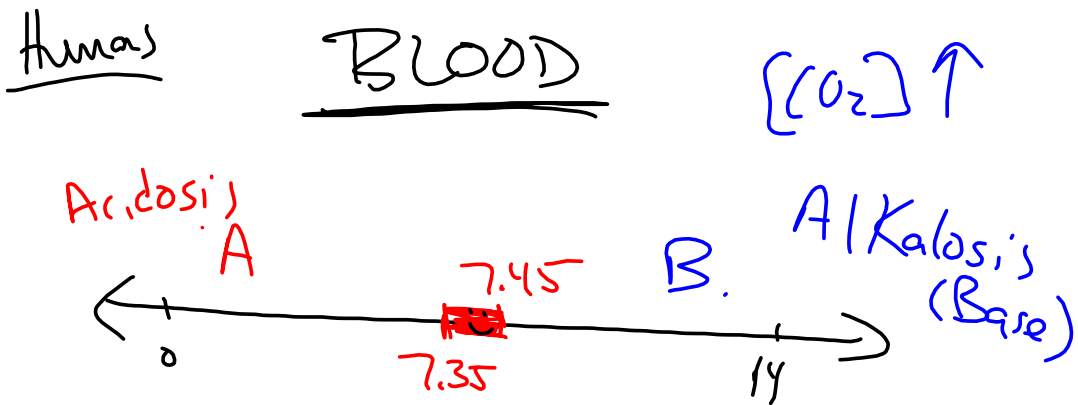
pH = 3.74

Buffer - Prevents Drastic Changes
in pH!

$$pH = -\log [H^+]$$

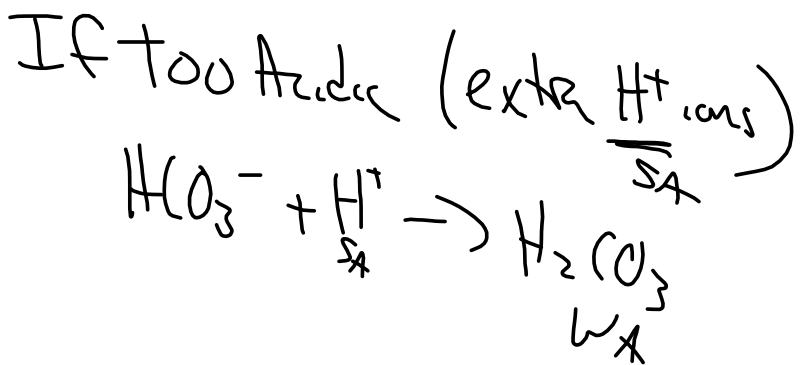
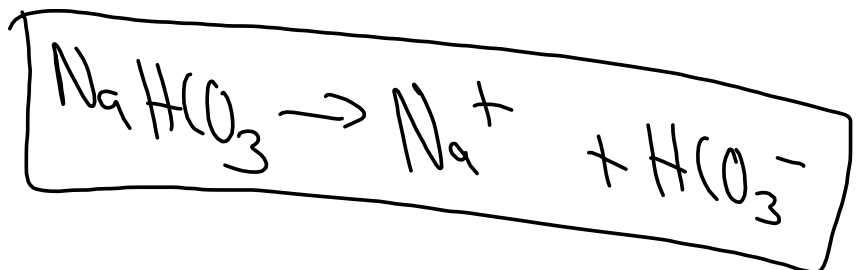


Conjugate Base
 Lose $[H^+]$
 Not as Acidic
 Absorbs / releases H^+ ions



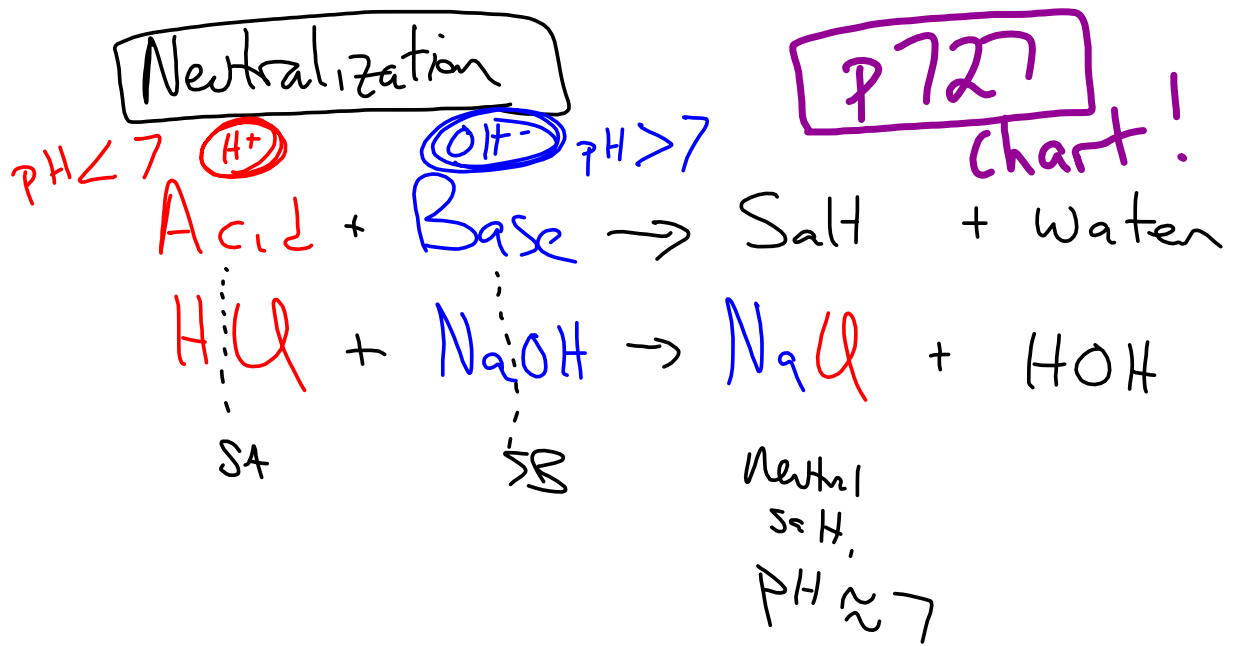
Salt \rightarrow Sodium Bicarbonate (IV)

Buffer \rightarrow Result Des in pH



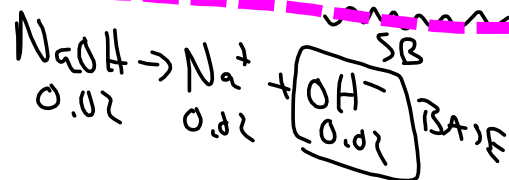
If too Basic $[OH^-] \uparrow$

Net



Buffer 0.3mole HoAc (WA) + 0.3mole NaAc (CB)
 $\text{Na}^+ + \text{OAc}^-$
 1l soln
 WA + Salt of WA (conj. base)
 pH = 4.74

① Add 0.02mole NaOH, New pH?



Next moles

①	$\text{H}_2\text{OAc} + \text{OH}^- \rightarrow \text{OAc}^- + \text{HOH}$
I	0.30 0.02 0.3
Δ	-0.02 -0.02 +0.02
E	0.28 \emptyset 0.32

WA 0.28mole
 0.32mole
 OAc⁻ CB

① * Next using moles
 Subtract the smaller # (weaker)

② Recalc New M 1l

③ $\text{pH} = \text{pK}_a + \log \frac{[\text{base}]}{[\text{acid}]}$

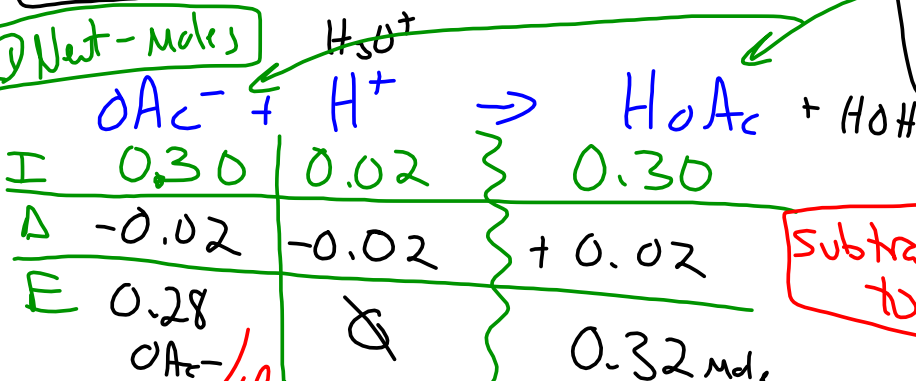
$\text{pH} = (-\log(1.8 \times 10^{-5})) + \log \frac{0.32}{0.28}$

OR 19ins | pH = 4.71
 New pH = 4.90

② Add 0.02 mole HCl

Buffer
 HoAc 0.3 moles
 +
 OAc⁻ 0.3 moles
 CB

① Net-moles



Subtract smaller # to neutralize!

Recalc New M

0.28M OAc⁻ CB

0.32M HoAc WA

old pH 4.74

③ Find new pH

$$pH = pK_a + \log \left(\frac{[base]}{[acid]} \right)$$

$$= -\log(1.8 \times 10^{-5}) + \log \frac{0.28}{0.32} = 4.68$$

new pH 4.68

Buffer = 0.14 mole HCNO + 0.11 mole KCNOCB
 GIVEN WA

1L

$K_a = 3.5 \times 10^{-4}$

① Original pH Buffer = 3.35

$$pH = pK_a + \log \frac{b}{a} = -\log(3.5 \times 10^{-4}) + \log \frac{0.11}{0.14}$$

② Find pH after adding 0.015 moles HNO₃

0.015 moles H⁺

Net Moles	CNO ⁻	+ H ⁺	→	HCNO
I	0.110	0.015		0.14
D	-0.015	-0.015		+0.015
E	0.095	∅		0.155

Subst. smaller # moles

② Recalc New M

0.095M CNO⁻ CB

0.155M HCNO WA

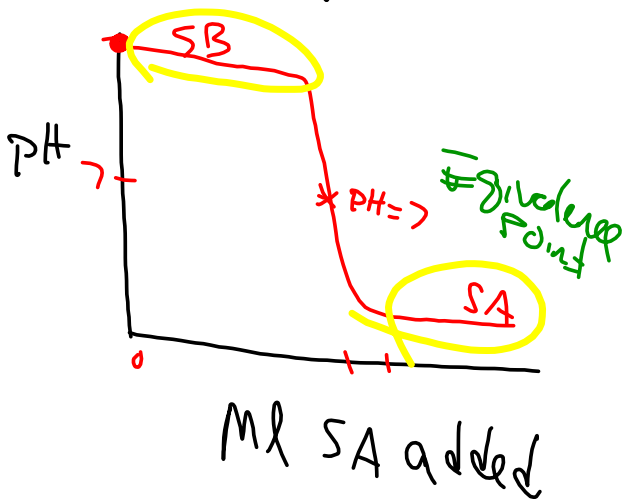
Original 3.35

New pH = 3.24

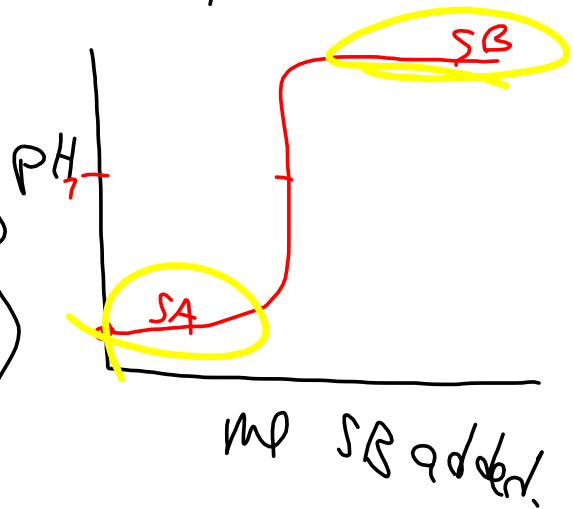
$$pH = pK_a + \log \left(\frac{b}{a} \right) = -\log 3.5 \times 10^{-4} + \log \frac{0.095}{0.155}$$

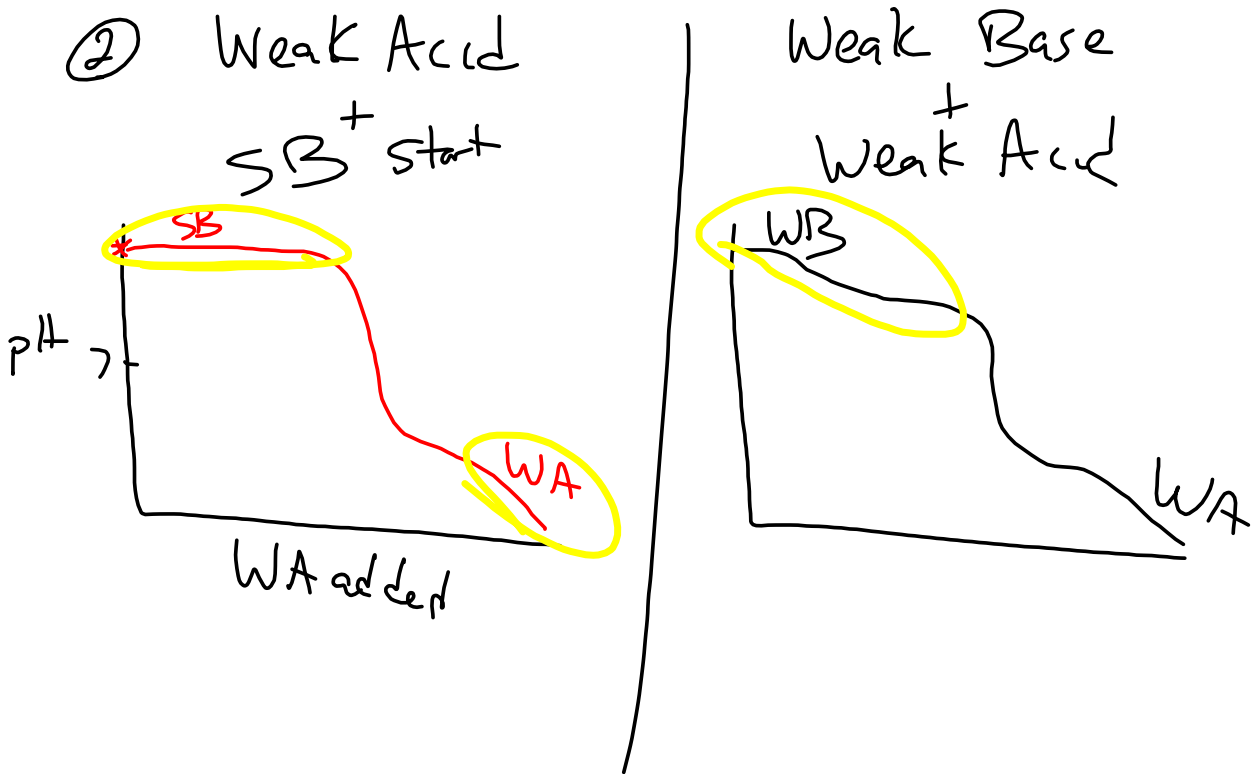
Graph titration

① Add ^{strong} Acid to my ^{strong} Starting Base



② Add strong Base starting with SA





End point
of a titration

Where the indicator
changes color.

Phenolphthalein
change, clear \rightarrow purple
pH 9 \rightarrow pH 10

Equivalence Point
of a titration.

Equivalent amounts
of H^+ and OH^-

\approx pH \approx 7

Test Fri

Chap 16+17

Skip K_{sp}

Skip pH before, at, after
equivalence point

HW PS 17-1 (1995)

2 → 11, 18, 19

PS 17-2 # 2 → 5