

Buffer or Titration

- ① What is it? SA/SB/WA/WB
Soluble salt?
- ② Balanced eqn → NET Ionic
- ③ RICE Using moles → Subt smaller #
C = change (Mole ratio)
- ④ Recalc New M Moles
φ
- ⑤ PH, POH, $[H^+]$, $[OH^-]$

Mar 12-7:26 AM

PS17

① $HOAc \rightleftharpoons H^+ + OAc^-$

← decrease degree of dissoc.

②

I	WA HCN	→	H ⁺	+	CN ⁻	}	SS KCN	→	K ⁺	CN ⁻
	0.1				0.1		0.1			0.1
Δ	-x		+x		+x					+x
E	0.1-x		x		x					x+0.1

Common Ion

0.1 100% 0.1

Mar 12-7:59 AM

③ $HF \rightarrow H^+ + F^-$

I 0.1	}	}	$x + 0.1$
D -x	}	}	x
E 0.1-x	}	}	$x + 0.1$

$KF \rightarrow K^+ + F^-$

0.1

(0.1)

(common ion)

$$K_a = \frac{[H^+][F^-]}{[HF]} = \frac{x(x+0.1)}{0.1-x}$$

Mar 12-8:11 AM

④ $pH = pK_a + \log \frac{[base]}{[acid]}$

$\log \frac{1}{1} = 0$

(ratio)

$pH = pK_a$

⑤ $K_w = K_a \times K_b$

$\frac{1 \times 10^{-14}}{1.8 \times 10^{-5}} = 5.56 \times 10^{-10}$

Mar 12-8:16 AM

⑥ $KOAc \rightarrow K^+ + OAc^-$ (SS) *acid/salt*

$HOAc \rightleftharpoons H^+ + OAc^-$ (WA) *2M 1L*

Buffer

$HOAc \rightleftharpoons OAc^- + H^+$

Proton acceptor = Base

Mar 12-8:21 AM

⑧ $CH_3NH_3^+ Cl^-$ *MORE H's = Acid*

CH_3NH_2 *∴ Base*
 $K_b = 4.4 \times 10^{-4}$

+ 10ml 0.1 M HCl *STRONG ACID*

Base

Buffer

(P727)

Mar 12-8:36 AM



$$K_a = \frac{[\text{H}^+][\text{I}_n^-]}{[\text{HI}_n]}$$

$\text{pH} = 10$
 $[\text{H}^+] = 1 \times 10^{-10}$

$$\frac{K_a}{[\text{H}^+]} = \frac{[\text{I}_n^-]}{[\text{HI}_n]} = \frac{1 \times 10^{-12}}{1 \times 10^{-10}} = 1 \times 10^{-2} = 0.01$$

Mar 12-8:42 AM

(14) $\text{pH} = \text{p}K_a + \log \frac{b}{a}$

$$10 = -\log(1 \times 10^{-12}) + \log \frac{\text{I}_n^-}{\text{HI}_n}$$

$$10 = 12 + \log \frac{\text{I}_n^-}{\text{HI}_n}$$

$$-2 = \log \frac{\text{I}_n^-}{\text{HI}_n}$$

$$1 \times 10^{-2} = \frac{\text{I}_n^-}{\text{HI}_n}$$

$$0.01$$

anti-log
both sides

Mar 12-8:53 AM

~~$\text{CuS (s)} \rightarrow \text{Cu}^{+2} + \text{S}^{-2}$~~

	}	Cu^{+2}	$+$	S^{-2}	
H	}	O		O	
-	}	x		x	
I	}	x		x	

Balance

$K_{sp} = [\text{Cu}^{+2}] [\text{S}^{-2}] = 5 \times 10^{-22}$

$(x) (x) = 5 \times 10^{-22}$

$x = 2.24 \times 10^{-11} \text{ M} = [\text{Cu}^{+2}] = [\text{S}^{-2}]$

Mar 12-9:04 AM

$\text{PbCl}_2 \text{ (s)} \rightarrow \text{Pb}^{+2} + 2 \text{Cl}^{-1}$ Balance

$K_{sp} = 1.7 \times 10^{-5}$ x 1.62×10^{-2} x 3.24×10^{-2} 2x

RATIO
RICE
Table

mole - balanced

③ K_{sp} expression
④ Solve

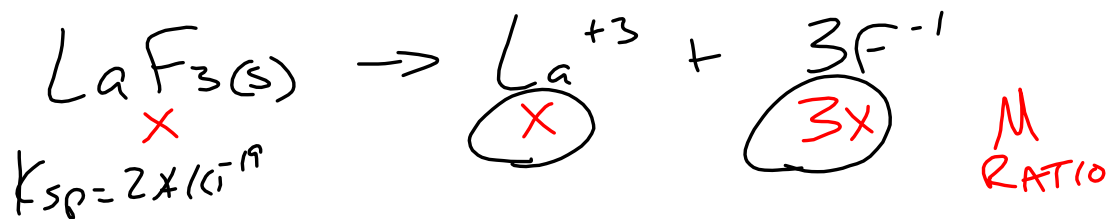
$K_{sp} = [\text{Pb}^{+2}] [\text{Cl}^{-1}]^2$

$1.7 \times 10^{-5} = (x) (2x)^2$

$= 4x^3$

$1.62 \times 10^{-2} = x$

Mar 12-9:07 AM



$$K_{sp} = [\text{La}^{+3}] [\text{F}^{-1}]^3$$

$$2 \times 10^{-19} = (\times) (3\times)^3$$

$$= 27 \times^4$$

Mar 12-9:12 AM

HW

PS 17-1 # 15-20

AND

17.52

Mar 12-9:15 AM