

Neutralization **ACID + BASE → SALT + H₂O**

- ① Convert to MOLES
 - Subtract smaller amount (Acid or Base) on RICE Table
- ② Recalculate new Molarity ← $\frac{\text{Moles}}{l}$
- ③ pH, pOH, [H⁺], [OH⁻] ← *NOT AC W/amp!*

May 6-7:25 AM

Acids/Bases

Ex pH 0.5M F⁻ (NaF)

(No H⁺/OH⁻ Then add H₂O!)

$\text{F}^- + \text{H}_2\text{O} \rightleftharpoons \text{HF} + \text{OH}^-$

Base H⁺ acceptor

I	0.5	0	0
D	-x	+x	+x
E	0.5-x	x	x

(pH > 7) ← Always use net ionic eqn!
Mole Ratio!

$K_b = \frac{(x)(x)}{0.5-x} = 1.47 \times 10^{-11}$

$X = 2.7116 \times 10^{-6} = [\text{OH}^-]$

$K_a = 6.8 \times 10^{-4}$
 $K_a \times K_b = K_w$
(x 10⁻¹⁴)
 $\text{pOH} = -\log [\text{OH}^-]$
 $\text{pOH} = 5.57$
 $\text{pH} = 8.433$

May 6-7:36 AM

(16) $\text{pH} = 8.66$
 $\text{Fe}(\text{OH})_2(\text{s}) \rightarrow \text{Fe}^{+2}(\text{aq}) + 2\text{OH}^{-}(\text{aq})$

M RATIO X X 2x

$$K_{sp} = \frac{[\text{Fe}^{+2}][\text{OH}^{-}]^2}{1} = 4.87 \times 10^{-17}$$

$$K_{sp} = \frac{(x)(2x)^2}{1} = 4.87 \times 10^{-17}$$

$$x = 2.3 \times 10^{-6} \text{ M} \left(\frac{\text{mole}}{\ell} \right)$$

- ① write eqn
- ② M ratio
- ③ Ksp expression

May 6-7:47 AM

(17) $\Delta S^{\circ} = -269 \text{ J/mole}\cdot\text{K}$ $\Delta H^{\circ} = -103.8 \text{ kJ/mole}$

Find K at 25°C

① $\Delta G^{\circ} = \Delta H^{\circ} - T\Delta S^{\circ}$ (KELVIN)

$$\Delta G^{\circ} = -103.8 - \left[(298)(-269 \times 10^{-3}) \right]$$

$$\Delta G^{\circ} = -23.64 \text{ kJ}$$

② $\Delta G = -RT \ln K$

$$-23.64 = -(8.314 \times 10^{-3})(298) \ln K$$

$$K = 13915.9696648$$

May 6-7:55 AM

(19) $Zn(s) + Ni^{+2}(aq) \rightarrow Zn^{+2}(aq) + Ni(s)$

LEO AN OX GER FARED (Red ↓)

$$Q/K = \frac{[Zn^{+2}]}{[Ni^{+2}]}$$

$$E = E^{\circ} - \frac{RT}{nF} \ln Q$$

$E^{\circ} = +0.48$

$$E = 0.48 - \frac{(8.314)(298)}{(2)(96000)} \ln \frac{0.1}{2.5}$$

May 6-8:01 AM

(22) $HX \rightarrow H^+ + X^-$

I	0.1	0	0
Δ	-x	+x	+x
E	0.1-x	x	x

pH = 4
 $[H^+] = 1 \times 10^{-4}$

$$K_a = \frac{[H^+][X^-]}{[HX]} = \frac{(x)(x)}{0.1-x} = \frac{(1 \times 10^{-4})^2}{0.1 - 1 \times 10^{-4}}$$

May 6-8:15 AM

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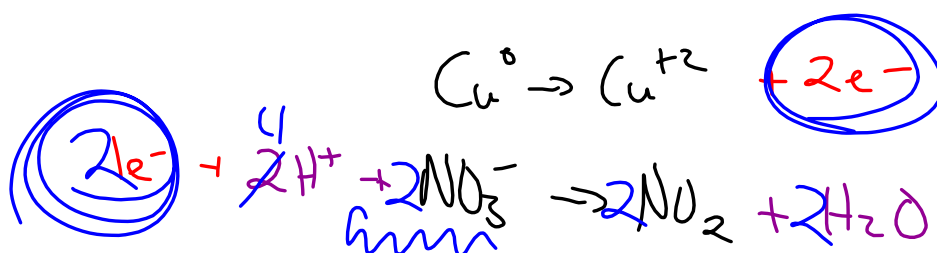
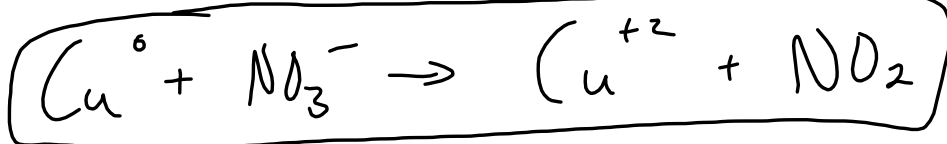
$$\Delta G = \Delta H - T \Delta S$$

\ominus = \oplus - \downarrow High Temp
 SPONT.

LARGE #

May 6-8:20 AM

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May 6-8:24 AM

(EC) $\text{Rate} = 0.02 \frac{\text{M}}{\text{sec}}$ $[A] = 0.1\text{M}$

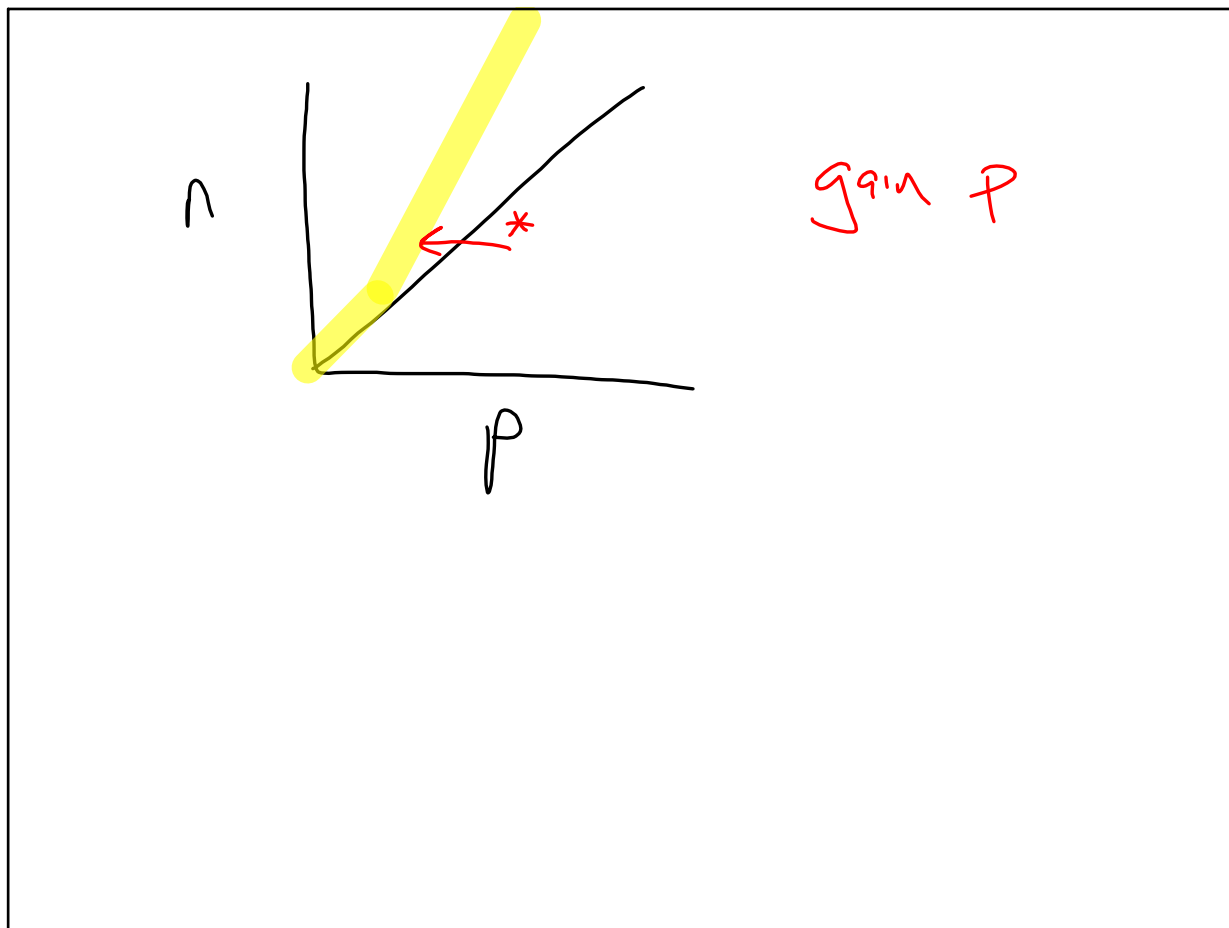
$\text{Rate} = k[A]^2$
 $0.02 = k [0.1]^2$
 $k = 2$

$\text{Rate} = k[A]^2$
 $= 2(0.2)^2$
 $\text{Rate} = 0.08$

May 6-8:36 AM

HW 2017 Final #1-19

May 6-8:39 AM



May 6-8:45 AM