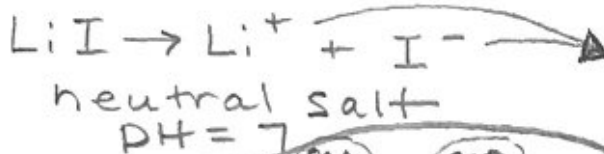
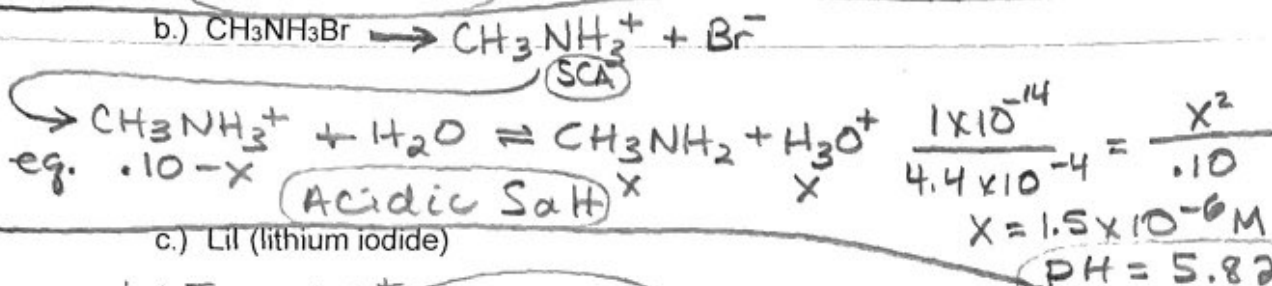
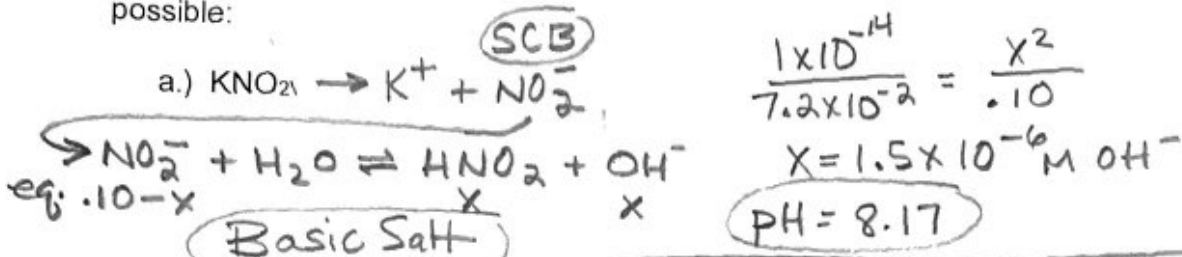


Acid/Base/Salt Questions

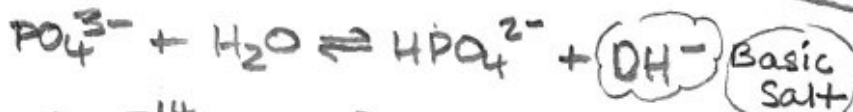
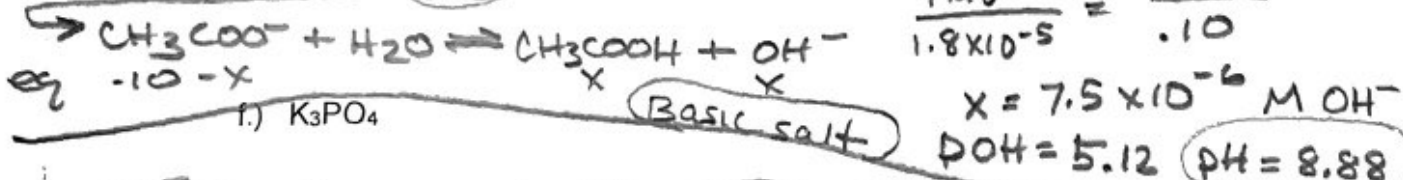
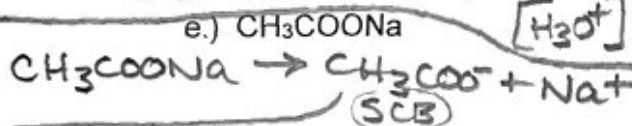
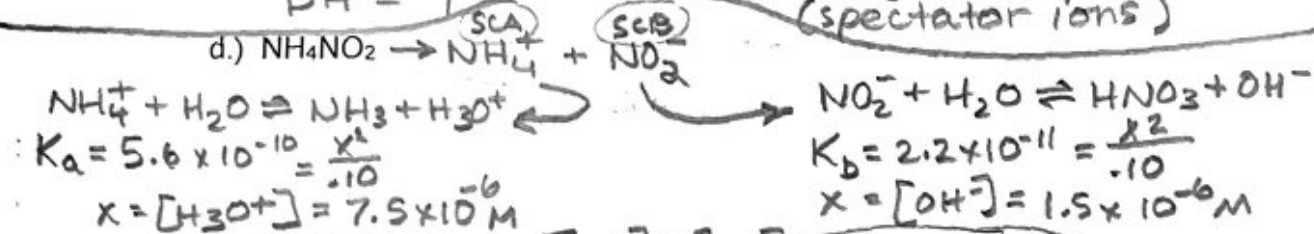
Remember: If a salt is soluble, then the components of the salt **might** interact with water. **HYDROLYSIS** is the interaction of a strong conjugate with water and because water is amphoteric, it can interact with an acidic or basic conjugate.

Find pH of .10M soln of each.

1. Classify the following salts (acid salts or basic salts) and show hydrolysis if possible:



weak conjugates (spectator ions)



$\frac{1 \times 10^{-14}}{4.8 \times 10^{-13}} = \frac{x^2}{.10 - x}$

K_{a3}

$x = .021 \text{ M} = [\text{OH}^-]$

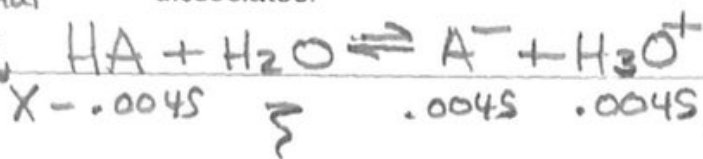
pOH = 1.31
pH = 12.7

Weak Acid

HA

If a weak monoprotic acid has a pH of 2.35, determine the original concentration of the acid in a solution where 0.65% of the acid dissociates.

original conc.



pH = 2.35

$$\begin{aligned}
 [\text{H}_3\text{O}^+] &= 10^{-2.35} \\
 &= .0045 \text{ M}
 \end{aligned}$$

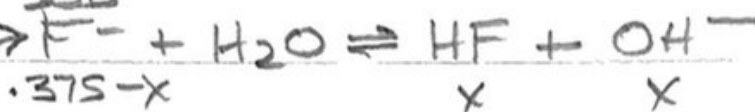
$$\begin{aligned}
 .65\% &= \frac{.0045}{X} \times 100 \\
 .0065 &= \frac{.0045}{X}
 \end{aligned}$$

X = .69 M = [HA] original

SALT

3. Calculate the pH of a solution made by dissolving 0.75 moles of the salt, KF, in 2.0 liters of water. The K_a for HF is 7.2 x 10⁻⁴.

$$\frac{.75 \text{ moles KF}}{2.0 \text{ L}} = .375 \text{ M}$$



$$\frac{1 \times 10^{-14}}{7.2 \times 10^{-4}} = \frac{X^2}{.375 - X}$$

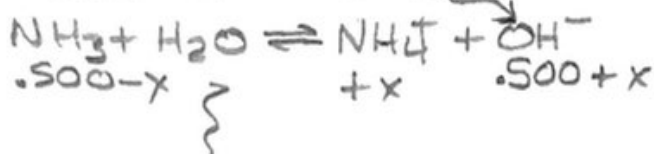
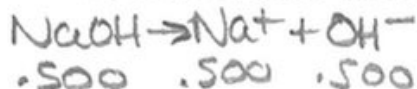
X = [OH⁻] = 2.3 x 10⁻⁶ M

pOH = 5.64

pH = 8.36

SB + WB

4. Calculate pH, pOH, [H⁺], and [OH⁻] in a solution made with 0.500 M NaOH and 0.500 M NH₃. The K_b of NH₃ is 1.8 x 10⁻⁵.



$$1.8 \times 10^{-5} = \frac{(X)(.500)}{(.500)}$$

X = 1.8 x 10⁻⁵ M = [NH₄⁺]

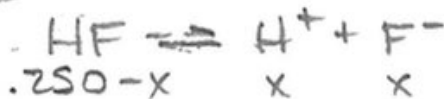
[OH⁻] = .500 M

pOH = -log(.500) = .301

pH = 14 - .301 = 13.699

WA + salt

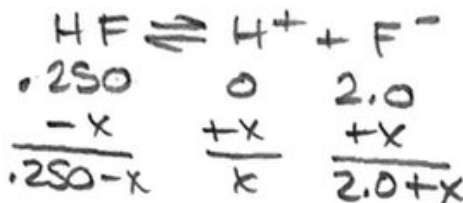
5. Calculate the [F⁻] in a 0.250 M solution of HF. If 1.0 moles of NaF is added to 500.0 ml of that solution, determine the new total [F⁻] that results.



$$7.6 \times 10^{-4} = \frac{X^2}{.250 - X}$$

X = [F⁻] = .013 M

$$\frac{1.0 \text{ mol HF}}{.500 \text{ L}} = 2.0 \text{ M}$$



$$7.6 \times 10^{-4} = \frac{(X)(2.0 + X)}{.250 - X}$$

X = 9.5 x 10⁻⁵ M = [H⁺]

[F⁻] = 2.0 M
pH = 4.02

[H₃O⁺] = 2.00 x 10⁻¹⁴ M