Dougherty Valley HS Chemistry - AP
Acid Base – pH Calculations

Worksheet #1

Name: **Period:** **Seat#:**

Directions: Show all work. Box final answers.

1) **Strong Acid Solution** – *assume full dissociation* Calculate the pH of 0.00125 M HNO_3 *2.903* *>> Determine [H^+] and then the pH.*	**2)** Strong Base Solution – *assume full dissociation* Calculate the pH of 0.00125 M KOH *11.097* *>> Determine [OH-], calculate pOH, and then calculate the pH.*
3) **Weak Acid Solution** – *does not fully dissociate* Calculate the pH of 0.00125 M HOCl *5.18* K_a= 3.5 x 10^{-8} *>> Determine [H^+] using an ICE table, then calculate the pH.*	**4)** **Weak Base Solution** – *does not fully dissociate* Calculate the pH of 0.00125 M NH_3 *10.15* K_b= 1.8 x 10^{-5} *>> Determine [OH^-] using an ICE table, calculate the pOH, then calculate the pH.*

5) Salt of a Weak Acid – *have to consider hydrolysis*

Calculate the pH of 0.00125 M NaOCl <u>*9.28*</u>

$K_{a\ HOCl} = 3.5 \times 10^{-8}$

>> Write hydrolysis, calculate Kb, determine [OH$^-$] using an ICE table, calculate the pOH, then calculate the pH.

6) Salt of a Weak Base – *have to consider hydrolysis*

Calculate the pH of 0.00125 M NH_4Cl <u>*6.08*</u>

$K_{b\ NH3} = 1.8 \times 10^{-5}$

>> Write hydrolysis, calculate Ka, determine [H$^+$] using an ICE table, then calculate the pH.

7) Diprotic Acid Solution – *1st is strong, 2nd is weak*

Calculate the pH of 0.00125 M H_2CO_3 <u>*4.64*</u>

$K_{a1} = 4.2 \times 10^{-7}$ $K_{a2} = 4.8 \times 10^{-11}$

>> Assume all [H$^+$] dissociate from 1st ionization, determine [H+] using an ICE table, then calculate pH.

8) Mixture of Acid and Base – *neutralize then see excess*

Calculate the pH of 20.0 mL of 0.00125 M HNO_3 added to 30.0 mL of 0.00125 M KOH <u>*10.398*</u>

$K_{a1} = 4.2 \times 10^{-7}$ $K_{a2} = 4.8 \times 10^{-11}$

>> Determine the moles of excess H+ or OH- taking into account the balanced chemical equation, determine the total volume of the mixture, calculate the [H+] or [OH-] based on the excess that was left after neutralization, then calculate the final pH.