South Pasadena • AP Chemistry Name _____ Period ___

Ch 17 • Acids & Bases

STATION 1—CONJUGATE ACIDS & BASES

Identify the conjugate acid-base pairs in the following equation:

$$HC_2H_3O_2(aq) + H_2O(l) \leftrightarrows H_3O^+(aq) + C_2H_3O_2^-(aq)$$

The conjugate acid of SO_4^{2-} is _____

The conjugate base of HCO_3^- is _____

The conjugate acid of NH_3 is _____

Which substance(s) are amphiprotic / amphoteric? H_2O OH^- NH_3 HCO_3^- SO_4^{2-}

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STATION 2—pH OF ACID SOLUTIONS

Calculate the pH of a 0.150 M solution of HCl. (K_a = very large)

Calculate the pH of a 0.150 M solution of HF. ($K_a = 7.2 \times 10^{-4}$)

What is the % dissociation of HF in a 0.150 M solution?

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STATION 3—EQUILIBRIA

The following equation is written to represent relative concentrations in solution:

$$HC_2H_3O_2(aq) + H_2O(l) \leftrightarrows H_3O^+(aq) + C_2H_3O_2^-(aq)$$

Which species is the stronger acid: $HC_2H_3O_2$ or H_3O^+

Knowing that H_2S is a stronger acid than HCN, re-write the following equilibrium to show which species are more concentrated in solution.

$$HCN(aq) + HS^-(aq) \rightleftharpoons CN^-(aq) + H_2S(aq)$$

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STATION 4—pH & pOH

$[H^+]$	$[OH^-]$	pH	pOH	acidic or basic?
		3.25		
2.5×10^{-2}				
	7.1×10^{-5}			

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STATION 5—ICE BOX

A 0.0300 M solution of the weak acid, HA, has a pH of 4.25.

a. Write the dissociation equation for this weak acid.

b. Calculate the $[H^+]$ for a 0.0300 M solution of this weak acid.

c. Calculate the K_a of this weak acid.

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STATION 6—LEWIS & BRONSTED-LOWRY DEFINITIONS

Consider the reaction: $F^- + H_2O \leftrightarrows HF + OH^-$

F- would be a (circle all answers that apply):

Brønsted-Lowry acid Brønsted-Lowry base Lewis acid Lewis base

Consider the reaction: $BF_3 + NH_3 \rightarrow BF_3NH_3$

BF_3 would be a (circle all answers that apply):

Brønsted-Lowry acid Brønsted-Lowry base Lewis acid Lewis base

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STATION 7—DIPROTIC ACIDS

Consider the diprotic acid, sulfurous acid: H_2SO_3 $K_{a1} = 1.2 \times 10^{-2}$ $K_{a2} = 6.6 \times 10^{-8}$

a. Write the equations for the step-wise dissociation of sulfurous acid.

b. Calculate the pH of a 0.0200 M solution of H_2SO_3.

c. What is the $[SO_3^{2-}]$ in a 0.0125 M solution of H_2SO_3?

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STATION 8—SALT SOLUTIONS

For each solution, state whether it would be **A**cidic, **B**asic, or **N**eutral.

___	NH_4Cl	___	Na_2SO_4	___	$KC_2H_3O_2$
___	CaF_2	___	$MgSO_3$	___	KI

HCN is a weak acid with a $K_a = 6.2 \times 10^{-10}$.

a. Write the equation for the equilibrium that exists in a solution of KCN.

b. Calculate the K_b for CN^-.

c. Calculate the pH of a 0.0200 M solution of KCN.

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STATION 9—WEAK BASES

NH_3 is a weak base with a $K_b = 1.8 \times 10^{-5}$.

a. Write the dissociation equation for NH_3 in water.

b. Calculate the pH of a 0.100 M solution of NH_3.

c. Calculate the K_a for the conjugate acid of NH_3.

d. Write the equation for the equilibrium that exists in a solution of NH_4Cl.

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