**Name: Period: Seat#:**

**Worksheet #6**

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| 1. Write an expression for the ionization constant, Kb for each reaction.
 |
| 1. $OCH\_{3 (aq)}^{-}+ H\_{2}O\_{(l)}\leftrightarrow HOCH\_{3 (aq)}+ OH\_{(aq)}^{-}$
2. $NH\_{2 (aq)}^{-}+ H\_{2}O\_{(l)} \leftrightarrow NH\_{3 (aq)}+ OH\_{(aq)}^{-}$

 | 1. $S\_{(aq)}^{2-}+ H\_{2}O\_{(l)} \leftrightarrow HS\_{(aq)}^{-}+ OH\_{(aq)}^{-}$
 |
| 1. Predict whether each equilibrium lies primarily to the left or to the right. Explain for each.
 |
| * 1. $HBr\_{(aq)}+ H\_{2}O\_{(l)} \leftrightarrow H\_{3}O\_{(aq)}^{+}+ Br\_{(aq)}^{-}$
	2. $NaH\_{(soln)}+NH\_{3 (l)}\leftrightarrow H\_{2 (soln)}+NaNH\_{2 (soln)}$
 | * 1. $OCH\_{3 (aq)}^{-}+ NH\_{3 (aq)} \leftrightarrow CH\_{3}OH\_{(aq)}+NH\_{2 (aq)}^{-} $
	2. $NH\_{3 (aq)}+ HCl\_{(aq)} \leftrightarrow NH\_{4 (aq)}^{+}+ Cl\_{(aq)}^{-}$
 |
| 1. Calculate the pH of a 0.0010 M solution of formic acid, HCO2H. Ka = 1.8 x 10-4

$$HCO\_{2}H+ H\_{2}O \leftrightarrow HCO\_{2}^{-}+H\_{3}O^{+}$$ |
| 1. Calculate (a) the pH and (b) the percent ionization of a 0.250 M HC2H3O2 solution. Ka(HC2H3O2) = 1.8 x 10-5. (The formula for acetic acid may also be written as CH3COOH.)

 *HINT: Begin by filling out the equilibrium table below.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Balanced Equation** |  **HC2H3O2 ↔** | **H+  +** | **C2H3O2–** |
| Initial Concentration (M) |  |  |  |
| Change (M) |  |  |  |
| Equilibrium Concentration (M) |  |  |  |

 |
| 1. Calculate the pH of a 0.600 M solution of methylamine CH3NH2.

Kb = 4.4 x 10–4 *HINT: Methylamine is a weak base. Then fill out the equilibrium table below.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Rxn** |  **CH3NH2 +** |  **H2O ↔** | **CH3NH3+ +** | **OH–** |
| I |  |  |  |  |
| C |  |  |  |  |
| E |  |  |  |  |

 |
| 1. The pH of a 0.10 M solution of a weak base is 9.67. What is the Kb of the base? \*Hint\* - use a generic base equation when you don’t know what the base is! B- + H2O ↔ HB + OH-
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| 1. Calculate the concentration of OH- in a 0.25 M solution of NH3. Look up the Kb of NH3 in your reference sheet.
 |
| 1. Identify the conjugate acid–base pairs in each equilibrium. Color code the pairs: acid and conjugate bases should be circled/highlighted/labeled in one color, base and conjugate acids in another.
	1. $HSO\_{4 (aq)}^{-}+ H\_{2}O\_{(l)} \leftrightarrow SO\_{4 (aq)}^{2-}+ H\_{3}O\_{(aq)}^{+} $
	2. $ C\_{3}H\_{7}NO\_{2 (aq)}+ H\_{3}O\_{(aq)}^{+} \leftrightarrow C\_{3}H\_{8}NO\_{2 (aq)}^{+}+H\_{2}O\_{(l)} $
	3. $CH\_{3}CO\_{2}H\_{(aq)}+NH\_{3 (aq)}\leftrightarrow CH\_{3}CO\_{2 (aq)}^{-}+NH\_{4 (aq)}^{+} $
	4. $SbF\_{5 (aq)}+ 2HF\_{(aq)}\leftrightarrow H\_{2}F\_{(aq)}^{+}+SbF\_{6 (aq)}^{-} $
	5. $ HF\_{(aq)}+ H\_{2}O\_{(l)}\leftrightarrow H\_{3}O\_{(aq)}^{+}+F\_{(aq)}^{-} $
	6. $ CH\_{3}CH\_{2}NH\_{2 (aq)}+ H\_{2}O\_{(l)}\leftrightarrow CH\_{3}CH\_{2}NH\_{3 (aq)}^{+}+OH\_{(aq)}^{-} $
	7. $ C\_{3}H\_{7}NO\_{2 (aq)}+ OH\_{(aq)}^{-}\leftrightarrow C\_{3}H\_{6}NO\_{2 (aq)}^{-}+H\_{2}O\_{(l)} $
	8. $ CH\_{3}CO\_{2}H\_{(aq)}+ 2HF\_{(aq)}\leftrightarrow CH\_{3}C(OH)\_{2 (aq)}+HF\_{2 (aq)}^{-} $
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