Name: Date: Period:

Practice: Degrees of Dissociation

1. Manuel was comparing two different bases. One dissociated completely in water, while the other did not. How would you classify each of the two bases (strong or weak)? Why?
2. A table of Ka values is shown below:

|  |  |
| --- | --- |
| **Acid** | **Acid Dissociation Constant, Ka** |
| Hydroiodic Acid, HI | >1 |
| Sulfurous Acid, H2SO3 | 1.54 x 10-2 |
| Arsenic Acid, H3AsO4 | 5.0 x 10-3 |
| Lactic Acid, HCH3H5O3 | 1.38 x 10-4 |
| Hydrocyanic Acid, HCN | 6.17 x 10-10 |

* 1. Which acid(s) would you classify as strong? Why?
	2. Which acid(s) would you classify as weak? Why?
	3. Which acid is the weakest?
	4. Which acid produces the most hydrogen ions when dissolved in solution?
	5. Order the acids from strongest to weakest
1. A table of Kb values is shown below:

|  |  |
| --- | --- |
| **Base** | **Base Dissociation Constant, Kb** |
| Ammonia, NH3 | 1.8 x 10-5 |
| Codeine, C18H21O3N | 8.9 x 10-7 |
| Quinoline, C9H7N | 6.3 x 10-10 |
| Caffeine, C8H10N4O2 | 4.1 x 10-4 |

* 1. Which base is the strongest?
	2. Which base is the weakest?
1. A table of Ka values is shown below:

|  |  |
| --- | --- |
| **Acid** | **Acid Dissociation Constant, Ka** |
| Formic Acid, HCOOH | 1.8 x 10-4 |
| Oxalic Acid, H2C2O4 | 5.9 x 10-2 |
| Phenol, HC6H5O | 1.0 x 10-10 |
| Hydrosulfuric Acid, H2S | 1.0 x 10-7 |

* 1. Which acid has the lowest concentration of H+ ions?
	2. Which acid is the weakest?
	3. Order the acids from weakest to strongest
	4. A conjugate base is the compound left when an acid donates a proton (H+). The stronger the acid, the weaker the conjugate base. Which acid would have the strongest conjugate base?
1. The Kb of a base is calculated by the following reaction:

$$B^{-}+ H\_{2}O \leftrightarrow HB+ OH^{-}$$

From this equation, the Kb is calculated using the following formula:

$$K\_{b}= \frac{\left[HB\right]\left[OH^{-}\right]}{\left[B^{-}\right]}$$

* 1. Calculate the Kb when [HB] = 1.7M, [OH-] = 2.05 x 10-6 M, and [B-] = 1.4 x 10-3 M. How would you compare the strength of this base to one with a Kb of 5.42 x 10-6?
	2. Calculate the Kb when [HB] = 8.0 x 10-2 M, [OH-] = 5.67 x 10-2 M, and [B-] = 3.1 x 102 M. How would you compare the strength of this base to one with a Kb of 4.32 x 10-8?