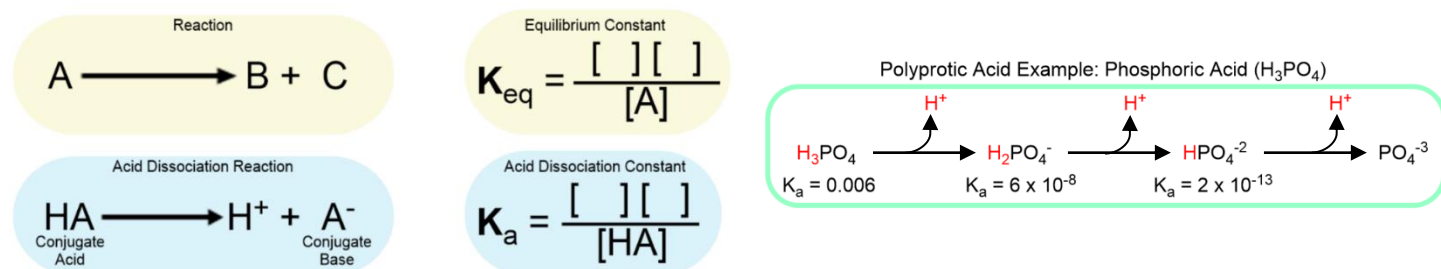


CONCEPT: ACID DISSOCIATION CONSTANT

1) Acid Dissociation Constant (K_a)

- Acid dissociation constant (K_a): is the K_{eq} for an acid's dissociation & a _____ measure of the strength of an acid.
 - Also known as the _____ constant since it expresses the tendency of an *ion* to dissociate from a molecule.
 - The greater the K_a , the _____ the acid.



- _____ Acids: contain *multiple* acidic H atoms that can dissociate to H^+ .
 - There is one K_a for each acidic H.

EXAMPLE: Calculate K_a of uric acid ($C_5H_4N_4O_3$) if $[C_5H_4N_4O_3]_{eq} = 4.07 \times 10^{-3} \text{ M}$ & $[C_5H_3N_4O_3^-]_{eq} = 7.27 \times 10^{-4} \text{ M}$.

- a) $K_a = 9.7 \times 10^{-5}$ c) $K_a = 6.4 \times 10^{-10}$
b) $K_a = 4.2 \times 10^{-8}$ d) $K_a = 1.3 \times 10^{-4}$

PRACTICE: Calculate K_a of propionic acid ($CH_3CH_2CO_2H$) if $[CH_3CH_2CO_2H]_{eq} = 0.2 \text{ M}$ & $[CH_3CH_2CO_2^-]_{eq} = 1.62 \times 10^{-3} \text{ M}$.

- a) $K_a = 1.3 \times 10^{-5}$ c) $K_a = 3.9 \times 10^{-12}$
b) $K_a = 7.8 \times 10^{-10}$ d) $K_a = 5.1 \times 10^{-4}$

CONCEPT: ACID DISSOCIATION CONSTANT

2) pK_a

• K_a values are sometimes inconveniently large/small but can be expressed on a _____ scale with pK_a values.

□ The greater the pK_a , the _____ the acid.

EXAMPLE:

$$pK_a = -\log K_a = \log \frac{1}{K_a}$$

	Weak Acid	Strong Acid
Example:	CH_3COOH	HCl
K_a :	1.76×10^{-5}	1.3×10^6
pK_a :	_____	_____

PRACTICE: Which of the following is the strongest acid listed?

a) Lactic acid, $K_a = 1.38 \times 10^{-4}$

b) Formic acid, $pK_a = 3.75$

c) Acetic acid, $K_a = 1.76 \times 10^{-5}$

d) Propionic acid, $pK_a = 4.87$