CONCEPT: DIPROTIC ACIDS AND BASES

Acid Dissociation Constant

● Diprotic Acids (_____) can donate ___ acidic hydrogens and as a result possess two K_a values.

□ In terms of Ka magnitude: _____ > _____.

- K_{a1} deals with donating the ____ acidic proton (H^+).

- K_{a2} deals with donating the ____ acidic proton (H^+).

□ The relationships between the Ka values and their respective Kb values are shown as:

Diprotic Acid Equilibria

Dissociation Steps

H_2A ⇌ HA^- ⇌ A^{2-}

_____ Form _____ Form _____ Form

Ka-Kb Equations

____ • ____ = K_w ____ • ____ = K_w

Equilibrium Expressions

H_2CO_3 (aq) + _____ ( ) ⇌ _____ (aq) + _____ (aq) K_a___ = _____

_____ (aq) + _____ ( ) ⇌ _____ (aq) + _____ (aq) K_a___ = _____

EXAMPLE: Carbonic acid, H_2CO_3, represents a weak diprotic acid with $K_{a1} = 4.3 \times 10^{-7}$ and $K_{a2} = 5.6 \times 10^{-11}$.

Determine the base dissociation constant associated with the carbonate ion, CO_3^{2-}.

PRACTICE: Determine the equilibrium expression for the K_{a2} of hydrosulfuric acid, H_2S?