

Worksheet – Kw, Ka, and Kb

Write the equations of the following with water. Then write either a Ka or Kb expression for each.

HCl

HNO₃

H₂CO₃

NH₃

NH₄⁺

F⁻

HCOOH

CN⁻

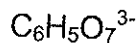
Write the equation for the self-ionization of water.

Write the K expression for the above reaction. What is the value of this expression at 25°C?

What happens to the value of Kw at when the temperature is lowered?

Write how the K_a , K_b , and K_w are related for a conjugate pair.

Calculate the K_b for the following bases.



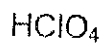
Rank the above based on their strength as bases.

Strongest



Weakest

Rank the acids in decreasing strength (1 = strongest):



K_a is very large

$K_a = 8.0 \times 10^{-5}$



$K_a = 1.2 \times 10^{-2}$

$K_a = 4.4 \times 10^{-8}$

For an oxy acid what is the relationship between the number of O's and acid strength? (Compare H_2SO_4 and H_2SO_3)

Which acid is stronger? HIO_3 or HIO_2

Which produces more H_3O^+ ? H_2CO_3 or HSO_4^-

Which produces more OH^- ? F^- or HCO_3^-

Which conducts better NH_3 or NaOH (both 0.1M)? Why?

Which conducts better HF or HCN (both 0.1M)? Why?

Compare and contrast a strong and weak acid in terms of degree of ionization, size of k_a , conductivity, and concentration of H^+ .

Write the major equilibrium reactions that occur when the following substances are put into water. Do the resulting equilibria favour reactants or products?

HCO_3^- and HSO_3^-

H_2S and NO_2^-

H_2O_2 and SO_3^{2-}

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