

Practice - Equilibrium Constants

- 1.) What are the concentrations of hydronium and hydroxide in pure water?

- 2.) When water is heated;
 - a.) What happens to the $[H_3O^+]$?

 - b.) Is this hot water acidic, basic, or neutral?

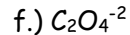
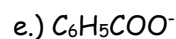
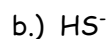
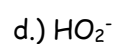
 - c.) What happens to the K_w when the water is heated?

- 3.) Determine what the $[H_3O^+]$ and $[OH^-]$ in the following solutions.
 - a.) 4.0 M HCl
 - b.) 8.0 M $Mg(OH)_2$
 - c.) 0.0050 M H_2SO_4
 - d.) 0.15 M NaOH

- 4.) Write the acid ionization constant expression for the below reactions when the chemical is acting as an acid with water.
 - a.) HF
 - b.) HPO_4^{2-}
 - c.) HIO_3

- 5.) Write the base ionization constant expression for the below reactions when the chemical is acting as a base with water.
 - a.) CN^-
 - b.) $HC_2O_4^-$
 - c.) CH_3NH_2

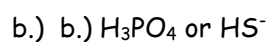
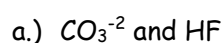
6.) Calculate the K_b for the following bases.



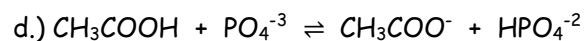
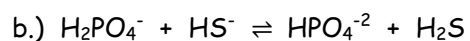
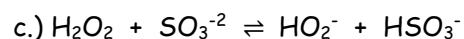
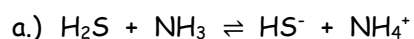
7.) If $K_b = 1.7 \times 10^{-6}$ for N_2H_4 , what is the K_a for $N_2H_5^+$?

8.) If a substance has a K_b value of 2.0×10^{-10} , is the substance a weak acid, weak base. Strong acid, or a strong base? Explain.

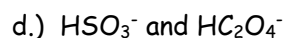
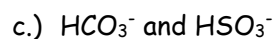
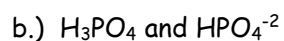
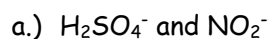
9.) Write the acid/base equilibrium that would occur for the following pairs, including labels for the acid/base conjugate pairs.



10.) Are reactants or products favoured in the following equilibrium equations?



11.) Write the equilibrium reactions and predict if reactants or products are favoured.

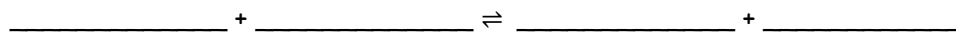


12.) $K_{eq} = 14$ at equilibrium. $H_2Te + HSe^- \rightleftharpoons HTe^- + H_2Se$

a.) Which acid is stronger?

b.) Which base is stronger?

c.) From your previous answers, fill in the blanks below with the following terms: Stronger acid, weaker acid, stronger base, weaker base.



13.) $HOI + H_2GeO_4^- \rightleftharpoons OI^- + H_3GeO_4$; $K_{eq} = 8.8 \times 10^{-3}$

$HOCl + OBr^- \rightleftharpoons OCl^- + HOBr$; $K_{eq} = 14$

$HOBr + H_2GeO_4^- \rightleftharpoons OBr^- + H_3GeO_4$; $K_{eq} = 7.9 \times 10^2$

Arrange the four acids from strongest to weakest.

_____, _____, _____, _____

14.) Three different acids are: H_2SO_3 , H_3PO_4 , and $HCOOH$. Which would form an equilibrium with F^- in which the reactants are favoured? Explain.