6.2 Strength of Acids and Bases Assignment

1) List the following acids in order from strongest to weakest.

HI	HNO_3
H_2S	H_2SO_4
$HC_2H_3O_2$	H_3PO_4

HI, H_2SO_4, HNO_3, HCH_3CO_4, H_2S, H_3PO_4

2) List all of the polyprotic acids from problem #1.

H_2SO_4, H_2S, H_3PO_4

3) Write the Ka expression for the reaction in which each of the following acts as an acid with water

a) HCN

$$Ka = \frac{[H_3O^+][CN^-]}{[HCN]}$$

b) HPO_4^{2-}

$$Ka = \frac{[H_3O^+][PO_4^{3-}]}{[HPO_4^{2-}]}$$

c) HNO_2

$$Ka = \frac{[H_3O^+][NO_2^-]}{[HNO_2]}$$

4) Write the Kb expression for the reaction in which each of the following acts as a base with water

a) HS^-

$$Kb = \frac{[H_2S][OH^-]}{[HS^-]}$$

b) CH_3NH_2

$$K_b = \frac{[HCH_3NH_2^+][OH^-]}{[CH_3NH_2]}$$

c) F^-

$$K_b = \frac{[HF][OH^-]}{[F^-]}$$

5) Write the formulas for the conjugate base of each of the following acids

a. H_2SO_3 b. HCO_3^- c. NH_4^+

HSO_3^- CO_3^{2-} NH_3

6) Write the formulas for the conjugate acid of each of the following bases.

a. H_2O b. CO_3^{2-} c. PH_3

H_3O^+ HCO_3^- PH_4^+

7) Using your knowledge of the Bronsted-Lowry theory of acids and bases, write equations for the following acid-base reactions and indicate each conjugate acid-base pair

a) $HNO_{3(aq)} + OH^-_{(aq)} \rightarrow NO_3^-{}_{(aq)} + H_2O_{(l)}$

acid base conj base conj acid

b) $CH_3NH_{2(aq)} + H_2O_{(l)} \rightarrow CH_3NH_3^+ + OH^-$

base acid conj acid conj base

c) $OH^-_{(aq)} + HPO4^{2-}_{(aq)} \rightarrow H_2O_{(aq)} + PO_4^{3-}$

base acid conj acid conj base

d) $H_3O^+_{(aq)} + OH^-_{(aq)} \rightarrow H_2O_{(aq)} + H_2O_{(aq)}$

acid base acid base

8) Write a balanced chemical equation for the reaction of potassium hydroxide and nitric acid.

$KOH_{(aq)} + HNO_{3(aq)} \rightleftharpoons KNO_{3(aq)} + H_2O_{(aq)}$

base acid conj base conj acid

neutralization

(double displacement.