

Name: _____

School: _____

Chemistry 30: Unit 6 Hand In Assignment #1

This assignment includes material covered in sections 6.1-6.4.

1. Which of the following is a correct acid-base conjugate pair? (1 mark)
a) HNO_3 , NO_3^- b) HClO_4 , ClO^- c) H_2PO_4^- , PO_4^{3-} d) H_2SO_4 , H_2SO_3

2. In each of the following equations, identify the conjugate acid-base pairs (3 marks).

a) $\text{HSO}_4^- + \text{H}_2\text{O} \leftrightarrow \text{SO}_4^{2-} + \text{H}_3\text{O}^+$
Pair #1:
Pair #2:

b) $\text{CH}_3\text{NH}_2 + \text{HCl} \leftrightarrow \text{CH}_3\text{NH}_3^+ + \text{Cl}^-$
Pair #1:
Pair #2:

c) $\text{CH}_3\text{COO}^- + \text{H}_2\text{O} \leftrightarrow \text{CH}_3\text{COOH} + \text{OH}^-$
Pair #1:
Pair #2:

3. Classify each of the following as either an acid or a base (5 marks):

a. The substance has a bitter taste _____
b. H_2SO_4 _____
c. HNO_3 _____
d. litmus paper dipped in this turns red _____
e. reacts with active metals to produce hydrogen gas _____
f. KOH _____
g. NH_3 _____
h. has a slippery feel _____
i. has a sour taste _____
j. a proton acceptor _____

4. Write balanced equations for each of the following. Show the states and charges in the products (2 marks each):

a. The dissociation of potassium hydroxide.

b. The ionization of formic acid, HCOOH (showing water in the equation)

Name: _____

School: _____

c. The ionization of nitric acid (showing water in the equation)

5. For each of the following categories, write the compounds in order of increasing strength (4 marks).

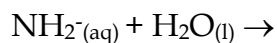
Bases

- a. I^-
- b. SO_3^{2-}
- c. PO_4^{3-}
- d. $\text{C}_2\text{H}_3\text{O}_2^{1-}$

Acids

- e. HClO_4
- f. H_2S
- g. HCO_3^{1-}
- h. HNO_2

6. Predict the products of the following acid-base reaction; show states.
There is only one substance here that will act like an acid. Choose wisely.
(2 marks)



7. The following substances will get mixed together. One will act as a Bronsted-Lowry acid and the other will act as the Bronsted-Lowry base.

- i) Write the equilibrium reaction that will occur when they are mixed.
(2 marks)
- ii) Label the acid and base in the reactant side (1 mark)
- iii) Label the conjugate acid and conjugate base in the product side
(1 mark)

a. HCN and F^-

b. HPO_4^{2-} and SO_4^{2-}

Name: _____

School: _____

- What is $[\text{H}_3\text{O}^+]$ for a 0.500 M solution of hydrochloric acid? Make sure you include the ionization equation. (2 marks)
- If 2.50g of the strong base lithium hydroxide is dissolved in 1.50 L of solution, what is the concentration of hydroxide ions? Make sure you include the dissociation equation. (3 marks)?
- What is $[\text{H}_3\text{O}^+]$ for a 0.200 M solution of hydrofluoric acid? Make sure you include the ionization equation. (4 marks)
- Calculate $[\text{OH}^-]$ ions in a 0.125 M solution of nitrous acid. Is this solution acidic or basic; how do you know? Make sure you include the ionization equation. (6 marks)

Name: _____

School: _____

12. Calculate the $[\text{H}_3\text{O}^+]$ in a 2.00 L solution of NaOH, a strong base, if it contains 0.800 g of solute. Is this solution acidic or basic; how do you know? Make sure you include the dissociation equation. (6 marks)

13. If 23 grams of formic acid, HCOOH , are dissolved in 10L of water at 25°C , the $[\text{H}^+]$ is found to be 3.0×10^{-3} M. Determine the K_a for HCOOH . Hint: think ICE BOX. (6 marks)