Exercise 14.8
Hydrolysis of Ions

Name: _____

Date: _____ Per: _____

DIRECTIONS: Complete the following in the space provided.

1. Are solutions of the following salts acidic, basic or neutral? For those which are not neutral, write the balanced equation for the reactions causing the solution to be acidic or basic. You may need to look at relevant K_a or K_b values.

   a. $NaNO_3$ _____

   b. $NaNO_2$ _____

   c. NH_4NO_3 _____

   d. NH_4NO_2 _____

   e. Na_2CO_3 _____

   f. NaF _____

   g. $NH_4C_2H_3O_2$ _____

2. Arrange the following 0.10 *M* solutions in order from most acidic to most basic.

   KOH KBr KCN NH_4Br NH_4CN HCN

3. Arrange the following 0.10 *M* solutions in order from most acidic to most basic.

   H_2O KNO_2 HNO_3 HNO_2 NH_4NO_3 NH_4NO_2

4. Sodium azide (NaN_3) is sometimes added to water to kill bacteria. Calculate the concentration of all species in a 0.010 *M* solution of NaN_3. The K_a value for hydrazoic acid (HN_3) is 1.9×10^{-5}. ***($K_b = 1.0 \times 10^{-14}/K_a$)***

5. Given that the K_a value for hypochlorous acid is 3×10^{-8}, which is the stronger base, OCl^- or $C_2H_3O_2^-$?

6. The K_b values for ammonia and methylamine are 1.8×10^{-5} and 4.4×10^{-5}, respectively. Which is the stronger acid, NH_4^+ or $CH_3NH_3^+$?

7. Place the species in each of the following groups in order of increasing base strength. Give your reasoning in each case.

HBrO		
$HBrO_2$		
$HBrO_3$		

H_3AsO_4		
$H_2AsO_4^-$		
$HAsO_4^{2-}$		

8. Order the following from the strongest acid to weakest acid.

$HClO_2$		
$HBrO_2$		
HIO_2		

H_3PO_4		
H_3AsO_4		

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9. Place the species in each of the following groups in order of increasing base strength. Give your reasoning in each case.

BrO^{1-}		
BrO_2^{1-}		
BrO_3^{1-}		

$H_2PO_4^{1-}$		
HPO_4^{2-}		
PO_4^{3-}		

10. Will the following oxides give acidic, basic, or neutral solutions when dissolved in water? Write the reactions to justify your answers.

a. CaO _____

b. Cl_2O _____

c. Na_2O _____

d. P_4O_{10} _____

e. SO_2 _____

f. NO_2 _____