**Acid and Base Practice**

1. Use one term from each group to describe each species. 1- (Concentrated/Dilute) 2 - (Strong/weak) 3 - (Acid/base) Example: 12.0 M HCl = Concentrated, strong acid.
   1. 10 M NH3 b) 0.10 M KOH c) 17 M CH3COOH d) 0.50 M H2SO4
2. Write a chemical equation showing the reaction of the weak acid, HF, and water. Circle the conjugate base. Write the equilibrium expression for this reaction.
3. Write a chemical equation showing the reaction of the weak base ammonia (NH3) and water. Circle the conjugate acid. Write the equilibrium expression
4. Two bottles of clear liquid are both labeled “1.00 M acid.” It is known that one is a strong acid and one is weak. Describe three tests you could use to tell which is which, and explain why it would work.
5. Suppose some base is added to a system to change it from pH 5 to pH 7. What change in hydrogen ion concentration does this represent?
6. Rank the following from lowest pH to highest pH KOH NH3 HF HCl
7. What is the pH of 10cm3 of 0.10 mol dm-3 HCl?
   1. If 90cm3 of water is added to the acid, what happens to the pH?
   2. If the solution from part a is now diluted by a factor of a million (106), what is the approximate pH of the final solution?
8. Predict and balance the reactions below. Use state symbols:
   1. HCl(aq) + NaOH(aq) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. H2SO4(aq) + KOH(aq) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Ba(OH)2(aq) + HF(aq) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. HCl(aq) + Zn(s) 🡺 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. HNO3(aq) + Mg(s) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   6. HF(aq) + CaCO3(s) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   7. CH3COOH(aq) + MgCO3(s) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   8. HI(aq) + NaHCO3(s) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   9. HBr(aq) + NH3(aq) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   10. H2SO4(aq) + NH3(aq) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   11. Na(s) + H2O(l)🡪\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Calculate the following. Assume 100% ionization in all cases

1. 1.00g of HCl(g) is dissolved in 10.0 dm3 of solution:
   1. What is the concentration of HCl?
   2. What is the concentration of H3O+ ions in the solution?
   3. What is the concentration of Cl- ions in the solution?
2. 0.0560g of H2SO4 is dissolved in 366 cm3 of water
   1. What is the concentration of H2SO4 ?
   2. What is the concentration of H+ ions in the solution?
   3. What is the concentration of sulfate ions in the solution?
3. 2.00 g of NaOH is dissolved in 987 cm3 solution.
   1. What is the concentration of sodium hydroxide?
   2. What is the concentration of sodium ions in the solution?
   3. What is the concentration of hydroxide ions in the solution?
4. Calculate the pH of these solutions:
   1. 0.0500 mol dm-3 NaOH
   2. 0.0500 mol dm-3 Ba(OH)2
   3. Which one (NaOH or Ba(OH)2) has a higher pH? Why?
   4. 0.0100 mol dm-3 HCl
   5. 0.0100 mol dm-3 H2SO4
   6. which one (HCl or H2SO4) has the lower pH? Why?



**Sample MC – also see workbook for additional samples**

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| * 1. Increases the yield of nitric acid | * 1. Increases the rate of the forward reaction only | * 1. Increases the equilibrium constant | * 1. Has no effect on the equilibrium position. |

3)

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4)

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| 1. Acid A is stronger than acid B | 1. [A]>[B] | C) The concentration of H+ ions in higher in A than in B | D) In concentration of H+ ions in B is twice the concentration in A |