AP Chemistry
Thou Shalt Not Forget Questions

General Equilibrium

1. Write the equilibrium expression for the following reaction: $2N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$
2. Write the K_c/K_p for this reaction in #1
3. A large/small K_{eq} means that there are more (products or reactants) at equilibrium?
4. Reversing a reaction? / Doubling a reaction? / Adding reactions? --- What happens to K_{eq} ?
5. If Q is larger/smaller than K_{eq}, then the reaction shifts which direction?
6. a) Name 2 things that DO NOT shift a reaction's equilibrium position.

   b) Name 3 ways to increase the amount of products present at equilibrium in the following endo/exo reaction: **ENDO**: $2H_2S(g) + 3O_2(g) \rightarrow 2H_2O(g) + 2SO_2(g)$ **EXO**: $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$
7. a) When will a change in pressure (by changing the volume) NOT shift an equilibrium?

   b) Which direction will the equilibrium shift if the volume is dec./inc.? (write an example on the white board)

Acid-Base Equilibrium

1. The pH of acids/bases are _____ than 7.
2. Acids/bases donate or accept $[H^+]$ (protons).
3. How do you make a hydronium ion?
4. Write the formula for the 6 strong acids.
5. Write the formula for the strong bases.
6. a) If $[H^+] = 1 \times 10^{-x}$ what is the pH?

   b) If the pH = x, what is the $[H^+]$?
7. The stronger the acid, the _____ its conjugate base.
8. If K_{eq} is greater/less than 1, then which side of the reaction has the stronger acid and base?
9. a) Square Root of M_aK_a is equal to what variable?

   b) You CANNOT use $[H^+]$ =Square Root of M_aK_a if what is true about the acid?
10. "x" in the ice box calculation is equal to what ion for a weak acid/base.
11. % Ionization of a weak acid = _____
12. a) % ionization increases/decreases as the acid concentration _____.

    b) Adding more water to a weak acid will increase or decrease the % ionization.
13. a) Give an example of a salt that contains a CBOWA.

    b) CBOWA ions have what charge?
14. a) Give an example of a salt that contains a CAOWB.

b) CAOWB ions have what charge?

15. a) If a salt contains conjugates of both a strong acid and strong base, the salt is _____.

    b) Give an example of a salt that is neutral.

16. A larger/smaller K_a / K_b value means a stronger or weaker acid/base?

17. a) Smaller cations are more or less acidic?

    b) More (+) charge on the cation makes it more or less acidic?

    c) More oxygens/more electronegative atoms on an anion makes it more or less acidic?

    d) List 2 things that make a cation more acidic.

Additional Aspects of Aqueous Equilibrium: Titrations and Buffers

1. Buffers have 2 general components. Name them.
2. a) M_aK_a/[salt] equals what variable?

   b) When using the formula $[H^+] = M_aK_a$/[salt], what units can you use instead of molarity for M_a and [salt]?
3. a) Adding a common ion to a weak acid/base decreases or increases the % ionization?

   b) Adding a common ion to a weak acid/base has what effect on the pH?
4. $M_aV_a=M_bV_b$ This is only true "when"/"where" in a titration?
5. a) $M_1V_1 = M_2V_2$ is used for what type of calculation?

   b) What formula do we use for dilution calculations?
6. a) Titrations: Weak acid + Strong Base has a pH at the equivalence point that's above or below or equal to 7?

   b) Weak Base + Strong Acid has a pH at the equivalence point that's above or below or equal to 7?

   c) Strong Acid + Strong Base has a pH at the equivalence point that's above or below or equal to 7?
7. a) pH = pK_a "when"/"where" in a titration?

   b) At the ½ equivalence point for a "weak + strong" titration, what 2 concentrations are equal?

   c) At the ½ equivalence point for a "weak + strong" titration, what does the pKa/pH equal?
8. Buffer capacity depends on what factor(s)?
9. a) 2 ions....K_{sp} = ? ; 3 ions...K_{sp} = ?

   b) For a K_{sp} ICE box, "x" refers to what value?

   c) What are the units for molar solubility?
10. What does the magnitude of K_{sp} (or the magnitude of "x" of a K_{sp} ICE box) tell us about the salt?
11. When Q is less than or greater than K_{sp}, then a precipitate will form.
12. List the symbols of the most common spectator cations/the most common spectator anion in a chemical reaction.