Name: _____ Period: ____

Chemistry 12

Acid Base Sections 14, 15, 16 and 17

Worksheet #4

Directions: Answer in the space provided. Make sure you fully answer the questions.

Section 4.14

1. In fifty (50) words or less, write a really interesting story. (Mention the word 'bunny')

2. In fifty (50) words or less, explain why I'm losing my mind.

3. In fifty (50) words or less, explain why some students not motivated.

4. In fifty (50) words or less, tell me something I DO NOT know about you.

Name: _____ Period: ____

5. A 0.100 M solution of HOBr has a pH of 5.343. What is K_a for HOBr?

6. The pH of a 0.010 M solution of HBr is 2.00. What is K_a for HBr?

7. What is the pH of a 0.20 M solution of H_2O_2?

8. Calculate the pH of a 0.30 M solution of NH_4NO_3.

9. What is the pH of a 3.0 M solution of $Fe(H_2O)_6Cl_3$?

Name: _____ Period: _____

10. What concentration of HCOOH is required to produce a pH of 1.93

Section 4.15

11. A 0.750 M solution of Te^{2-} had a pH of 12.438. What is K_b for Te^{2-}?

12. A 0.600 M solution of the weak base hydroxylamine, NH_2OH, has a pH of 9.904. What is K_a for NH_3OH^+?

13. Calculate the pH of a 0.50 M solution of NaCN.

14. Calculate $[H^+]$, $[OH^-]$, pH and pOH for a 0.20 M solution of NH_3.

Name: _____ Period: ____

15. Calculate the pH of a saturated solution of CaF_2. ($K_{sp} = 1.46 \times 10^{-10}$ for CaF_2)

16. What concentration of SO_3^{2-} is required to produce a pH of 9.69?

17. $K_b = 1.7 \times 10^{-6}$ for hydrazine, N_2H_4. If a solution of N_2H_4 has a pH of 10.50, what is the $[N_2H_4]$ in the solution?

Section 4.16

18. A solution of NaOH having an unknown concentration is titrated using 0.125 M HCl. The equivalence point is reached after 15.3 mL of HCl is added to 25.0 mL portion of base. What is the [NaOH]?

Name: _____ Period: _____

19. A solution of H_2SO_4 is titrated according to the equation using 0.0635 M KOH;

$$H_2SO_4 + 2\,KOH \text{ -----> } K_2SO_4 + 2\,H_2O$$

The equivalence point in the reaction is reached when 28.2 mL of KOH is added to a 25.0 mL portion of the acid. What is the $[H_2SO_4]$?

20. What volume of 0.0350 M NH_3 will be required to reach the equivalence point in the titration of 50.0 mL of 0.0275 M HCl?

21. What volume of 0.230 M NaOH is required to bring 25.0 mL of 0.175 M H_2CO_3 to the equivalence point represented by the equation:

$$H_2CO_3 + 2\,NaOH \text{ ------> } Na_2CO_3 + 2\,H_2O$$

Name: _____ Period: _____

Section 4.17

22. An indicator, HIn is red in acids and blue in bases. What is the colour of the anion, In^-? Explain.

23. Bromocresol purple is yellow in its acid for and purple in its base form. If the colour change occurs in the pH range 5.2 to 6.8, what will be the colour if bromocresol purple added to a 0.01 M HCl solution? Justify your answer with the appropriate calculations.

24. An indicator named Clayton Yellow changes colour from yellow to amber at about pH 12.7. What is the Ka value of this indicator?

25. In indicator 2,4-dinitrophenol undergoes a colour change in the pH range 2.8 to 4.0, such that it is half-way through the colour change at pH = 3.4. Estimate the Ka value of the indicator.

26. Use the table below to determine the pH range of the solution:

Indicator	pH range in which colour change occurs	Colour change as pH increases
Methyl orange	3.2 to 4.4	red to yellow
Thymol blue	8.0 to 9.6	yellow to blue
Bromthymol blue	6.0 to 7.6	yellow to blue

A solution was tested with all of the above indicators and the following results were obtained:

Indicator	Colour
Methyl orange	yellow
Thymol blue	yellow
Bromthymol blue	yellow

What is the approximate pH range of the solution?