Chemy 102 – LAB QUIZZES

Exp. 1, Quiz # 1

T or **F**

a) If heat is absorbed then the reaction is endothermic. [ ]
b) The enthalpy change is the heat change of a reaction at a constant pressure. [ ]
c) In calculation of this experiment it is assumed that there is no heat released to the atmosphere. [ ]
d) The heat absorbed by the coffee cup is considered in the calculation of ΔH in this experiment. [ ]
e) The device used to measure the heat change of reaction is called a calorimeter. [ ]
f) 25.0 ml of solution ≈ 25.0 ml of water because the solution of Zn in $CuSO_4$ is dilute. [ ]
g) You must weigh exactly 3.0 g of Zn. [ ]
h) You may measure 25.0 ml of $CuSO_4$ using a graduated cylinder. [ ]
i) If $\Delta T = 40^oC$ then ΔT in Kelvin = 40 + 273.15 [ ]
j) You will plot temperature versus time in this experiment. [ ]

Exp. 2, Quiz # 2A

Q1 What is the expression of K_a for the weak acid HCN ?

Q2
Which of the following is/are correct for the dissociation of the weak acid HF?

a) $[H^+] > [F^-]$ b) $[H^+] < [F^-]$ c) $[H^+] = [F^-]$
d) $K_a \times [HF] = [H^+] \times [F^-]$ e) $pK_a = \log K_a$

Q3
In acid-base titration, the point at which the added base reacts with all the acid present is called _____

Q4
30.0 ml of 0.100 M of NaOH is required to completely react with 15.0 ml of HF . What is the molarity of HF?

Q5 **T** or **F**

a) $pH = -\log [H^+]$. [ ]
b) At half equivalence point $pH = \frac{1}{2} pK_a$. [ ]
c) In this experiment you will plot pH of solution versus volume of base added. [ ]
d) You will need an indicator to detect the end point during the titration of this experiment. [ ]

Exp. 2, Quiz # 2B

Q1

In acid-base titration, the point at which the added base reacts with half of the acid present is called _____

Q2

Which of the following is/are correct with regard to the equivalence point of an acid-base titration?

a) $pK_a = \log K_a$ **b)** $pH = pK_a$ **c)** $pH = \frac{1}{2} pK_a$
d) amount of base added reacts with half of the acid.
e) none of the above.

Q3

What is the expression of K_a for the weak acid HNO_2 ?

Q4

In this experiment you will plot pH of solution versus _____

Q5

15.0 ml of 0.100 M of NaOH is required to completely react with 30.0 ml of HNO_2 . What is the molarity of HNO_2 ?

Q6 **T** or **F**

- **a)** $pH = \log [H^+]$. [ ]
- **b)** in HF solution, $[H^+] > [F^-]$. [ ]
- **c)** You will need an indicator to detect the end point for the titration of this experiment. [ ]

Exp. 3, Quiz # 3A

Q1

List the three types of acid-base titration reactions to be studied in this experiment.

a)
b)
c)

Q2

Consider the neutralization reaction between $HClO_2$ (weak acid) and KOH.

- **a)** What is the net ionic equation for the reaction?

- **b)** Is the solution at the equivalence point acid, basic, or neutral? Explain using a proper equation.

Q3 **T** or **F**

a) The pH at the equivalence point for the titration of strong acid with weak base is less than 7. [ ]
b) An indicator is a weak acid or base that has different colors in its nonionized (HIn) and ionized (In^-) forms. [ ]
c) A suitable indicator is the one that changes color at the equivalence point of titration. [ ]
d) All indicators change color at the same pH. [ ]

Exp. 3, Quiz # 3B

Q1. *(2 marks)*
What are the two main objectives of this experiment?

Q2. *(4 marks)*
Consider the titration of the weak base NH_3 with HI.

a) Write the net ionic equation for the neutralization reaction.

b) Is the solution at the end point acidic, basic or neutral?
(show your answer by a proper equation)

Q3. *(4 marks)*
T or **F**

a. An indicator can be a weak organic base. [ ]
b. An indicator has different colors in ionized and nonionized forms of different pH. [ ]
c. The end point of an indicator occurs at specific pH. [ ]
d. We choose an indicator whose end point lies on the steep part of the titration curve. [ ]

Exp. 4, Quiz # 4A

Q1. *(2 marks)*
Which of the following ions will undergo hydrolysis reaction?
[*circle the correct answer(s)*]

I^- , Ca^{2+} , ClO_2^- , Fe^{3+} , CN^- , Al^{3+}

Q2. Write a hydrolysis reaction for SO_3^{2-} *(2 marks)*

Q3. Write a hydrolysis reaction for NH_4^+ *(2 marks)*

Q4. *(2.5 marks)*

Classify aqueous solution of the following compounds as neutral, acidic, or basic.

$KClO_4$ _____ AgCl _____

$CuBr_2$ _____ Na_2CO_3 _____

$Ba(NO_2)_2$ _____

Q5. **T** or **F** *(1.5 marks)*

a) A buffer solution resist large changes in pH upon the addition of any amounts of strong bases or acids. [ ]

b) A buffer solution resist changes in pH upon the addition of strong bases because it reacts with the added OH^- from the base. [ ]

c) From the pH of a aqueous solution you can calculate $[H^+]$ and from that you can calculate $[OH^-]$. [ ]

Exp. 4, Quiz # 4B

Q1. *(2 marks)*

Which of the following ions will undergo hydrolysis reaction?
[*circle the correct answer(s)*]

Ni^{2+} , $C_2H_3O_2^-$, Br^- , Ba^{2+} , SO_3^{2-} , Fe^{3+}

Q2. Write a hydrolysis reaction for NH_4^+ *(2 marks)*

Q3. Write a hydrolysis reaction for ClO_2^- *(2 marks)*

Q4. *(2.5 marks)*

Classify aqueous solution of the following compounds as neutral, acidic, or basic.

Na_2CO_3 _____ BaCN _____

$CuBr_2$ _____ $NaNO_3$ _____

NH_4I _____

Q5. *(0.5 mark)*

In an aqueous solution at 25^oC , $[H^+] \times [OH^-]$ = _____

Q6. **T** or **F** *(1 mark)*

a) A buffer solution resist large changes in pH upon the addition of any amounts of strong bases or acids. [ ]

b) A buffer solution resist changes in pH upon the addition of strong acid because it reacts with the added H^+ from the base. [ ]

Exp. 5, Quiz # 5A

Q1

What is meant by a sparingly soluble salt?

Q2 consider a saturated solution of Ag_2CrO_4 .

a) K_{sp} for Ag_2CrO_4 =

b) If $[Ag^+]$ = 0.010 M, what is the value of K_{sp} for Ag_2CrO_4?

c) The solubility of Ag_2CrO_4 = _____ M

Q3.

When you first filter the saturated solution of $Ca(OH)_2$ in this experiment, why do you run the first few milliliters to waste?

Q4.

What is the use of standardized hydrochloric acid in this experiment?

Exp. 5, Quiz # 5B

Q1

What is meant by a sparingly soluble salt?

Q2 consider a saturated solution of Ag_2CrO_4 .

a) K_{sp} for Ag_2CrO_4 =

b) If $[Ag^+]$ = 0.012 M, what is the value of K_{sp} for Ag_2CrO_4?

c) The solubility of Ag_2CrO_4 = _____ M

Q3.

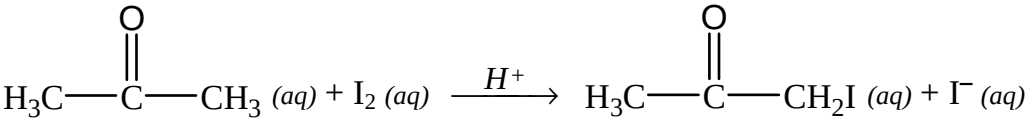
When you first filter the saturated solution of $Ca(OH)_2$ in this experiment, why do you run the first few milliliters to waste?

Q4.

What is the use of standardized hydrochloric acid in this experiment?

Exp. 6, Quiz # 6A

In this experiment we will study the kinetic of the reaction between iodine and acetone:



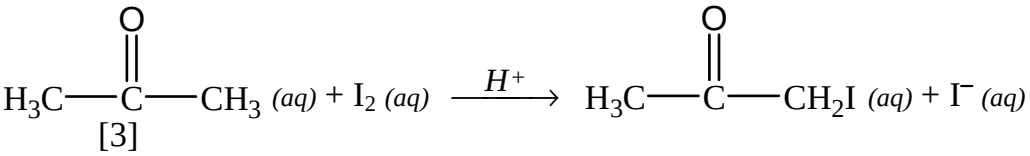
Two reaction mixtures are shown in the following table:

Mixture	Volume / mL			
	4.0 *M* acetone	**1.0 *M* HCl**	**0.0050 *M* I_2**	**H_2O**
1	10	10	10	20
2	20	10	10	10

a) Which reactant is/are limiting and which is/are excess?
b) Which reactant has a color?
c) What is the concentration of acetone *in* the reaction mixture **1**?
d) What is the concentration of I_2 *in* the reaction mixture **1**?
e) From the order of reaction with respect to which reactant can be calculated from the ratio of rate of reaction mixture **1** to rate of reaction mixture **2**?
f) Why a reaction of a certain mixture need to be carried out at different temperature?
g) In this experiment you will plot _____ vs _____ and from the slope you will obtain _____
h) **T** or **F**
- **i.** The concentration of I_2 will remain approximately constant during the reaction of mixture **1**. [ ]
- **ii.** The concentration of acetone will remain approximately constant during the reaction of mixture **2**. [ ]
- **iii.** The concentration of H^+ will remain approximately constant during the reaction of mixture **2**. [ ]

Exp. 6, Quiz # 6B

In this experiment we will study the kinetic of the reaction between iodine and acetone:



[3]

Two reaction mixtures are shown in the table below.

Mixture	Volume / mL			
	4.0 *M* acetone	**1.0 *M* HCl**	**0.0050 *M* I_2**	**H_2O**
1	15	10	10	25
2	25	10	10	15

1) Which reactant is limiting?
2) Which reactant has a color?
3) What is the concentration of acetone *in* the reaction mixture **1**?
4) What is the concentration of I_2 *in* the reaction mixture **2**?

5) From $\left(\frac{Rate\ of\ reaction\ mixture\ 1}{Rate\ of\ reaction\ mixture\ 2}\right)$ you can calculate the order of reaction with respect to _____

6) Why a reaction of a certain mixture need to be carried out at different temperatures?

7) In this experiment you will plot _____ vs _____ , and the slope = _____

8) **T** or **F**

a) The concentration of I_2 will remain approximately constant during the reaction of mixture 1. [ ]

b) The concentration of acetone will remain approximately constant during the reaction of mixture 2. [ ]

c) If reaction of mixture 2 takes 3 minutes, then it is expected that the rate of reaction will be approximately constant during these 3 minutes. [ ]

Exp. 8, Quiz # 7

Q1. (3 marks)

This experiment is divided into 2 parts, what are they?

A)

B)

Q2.

Potassium permanganate reacts with oxalate ions in acidic solution as follows:

$$5C_2O_4^{2-}\,(aq) + 2MnO_4^{-}\,(aq) + 16H^{+}\,(aq) \rightarrow 10CO_2\,(g) + 8H_2O\,(l) + 2Mn^{2+}\,(aq)$$

a) What is the color of the solution before the end point? (1 mark)

b) What is the color of the solution at the end point? And what is it due to? (2 marks)

c) What is the concentration of $KMnO_4$ if 12.0 mL of it is required to neutralize 6.70×10^{-4} mol of $Na_2C_2O_4$? (3 marks)

Q3. (1 mark)

Why is it necessary to heat the reaction mixture in this experiment?