Josh Whitehead

Name _____ Section _____ Date _____

Instructor _____

EXPERIMENT 26

Lab Report

Part A – Determination of the Ionization Constant (K_a or K_b) of an Unknown Solution

Should you record the unknown number of the unknown solution?

Yes #9

Is the solution acidic or basic? How would you make this determination? Would this determination involve the use of MeasureNet? If this determination involves MeasureNet, how do you calibrate the appropriate MeasureNet probe to make the determination?

~~Basic~~ The Solution is basic. The starting pH was 7.64 for trial 1 and 7.38 for trial 2. The pH was measured using MeasureNet and a pH probe. The pH probe was calibrated using a buffer solution with a pH of 7.00

What are the equivalence and half equivalence points (pH and mL added) for each titration?

Eq point: For trial 1: pH = 6.61 V = 2.04 mL

trial 2: pH = 6.59 V = 1.02 mL

half Eq point: 1: V = 1.45 mL, pH = 7.47

2: V = 0.51 mL, pH = 7.25

What is the pH of the unknown solution that will be used to determine the ionization constant (K_a or K_b)? 7.6 was the pH of the unknown solution

What are the ionization constants determined from each titration?

#1) @ half equivalence point: pOH = pKb ∴ $K_b = 10^{-pK_b}$

pOH = 14 - 7.47 = 6.53 → $K_b = 10^{-6.53} = 2.95 \times 10^{-7}$

#2) 14 - 7.25 = 6.75 → $10^{-6.75} = 1.78 \times 10^{-7}$

What is the average ionization constant for the unknown?

$K_b = 2.35 \times 10^{-7}$

Using Table 1, identify the unknown solution.

The unknown solution should be OCl^- with a K_b of 2.9×10^{-7}

What is the molarity of the unknown solution used in each titration?

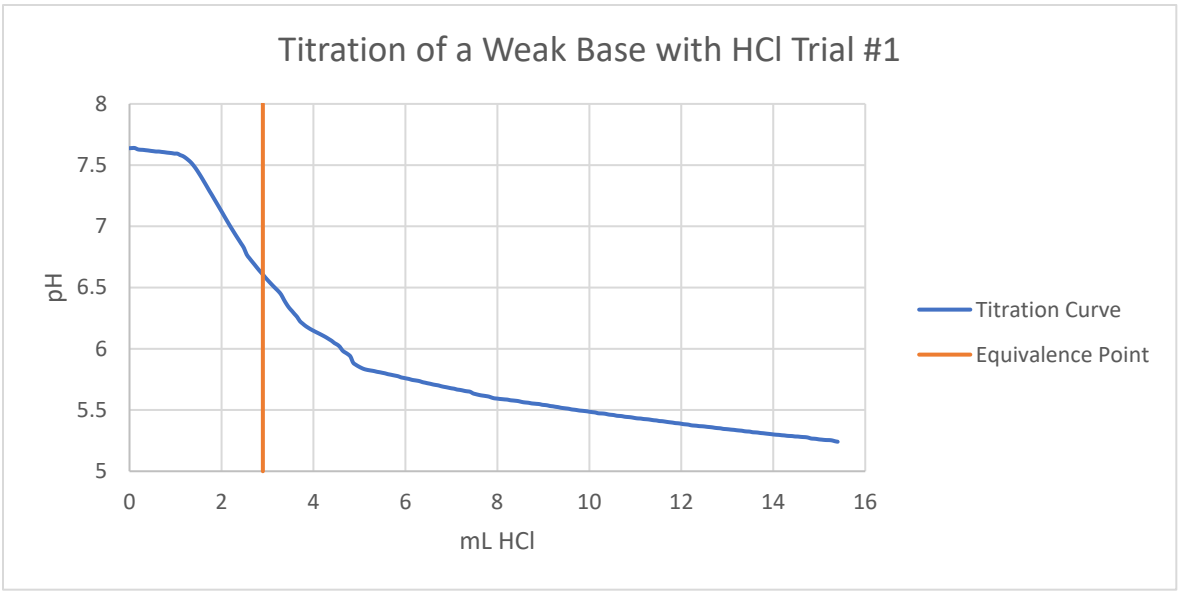
What is the average molarity of the unknown solution?

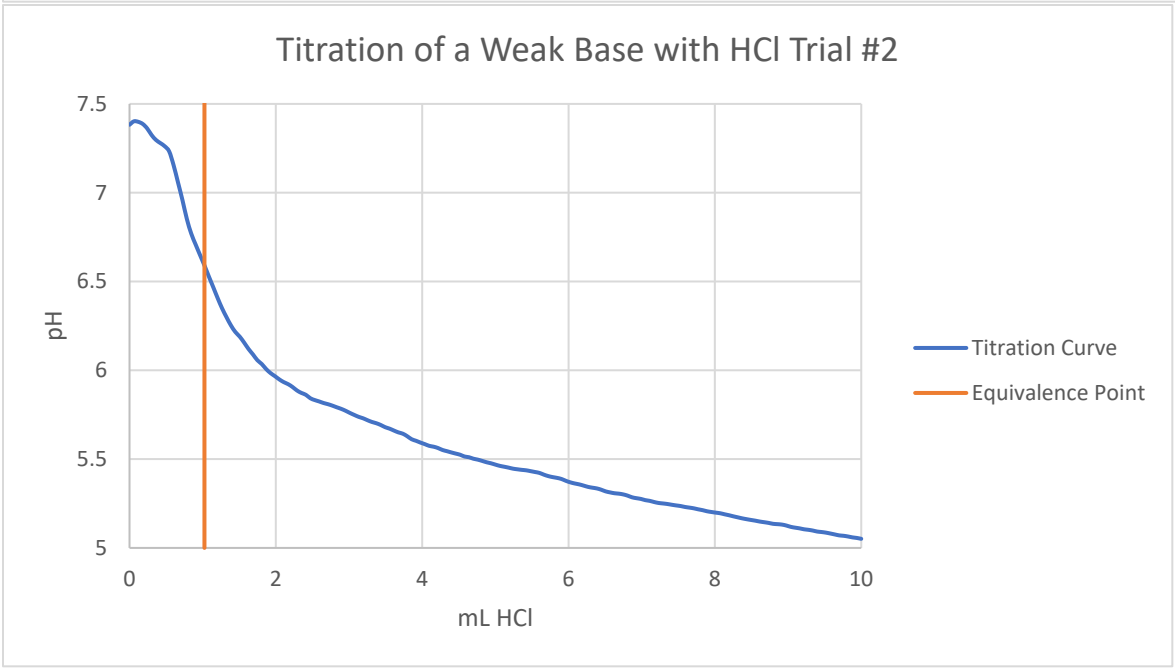
Part B – Determination of the Ionization Constant (K_a or K_b) of an Unknown Solution from the Initial Concentration and pH or pOH of the Solution

Determine the pH of the solution. If the unknown solution is a base, how will you determine the pOH of the solution?

The pH of the unknown solution was 7.6. $pOH = 14 - pH = 14 - 7.6$

$= 6.4$


Titration of a Weak Base with HCl Trial #1
pH
8
7.5
7
6.5
6
5.5
5
0
2
4
6
8
10
12
14
16
mL HCl
Titration Curve
Equivalence Point


Titration of a Weak Base with HCl Trial #2
pH
7.5
7
6.5
6
5.5
5
0
2
4
6
8
10
mL HCl
Titration Curve
Equivalence Point