Warm up question

- Give the conjugate pairs

- H_2O + CH_3COO^- <---> CH_3COOH + OH^-

Book reference:
Chapter 21 pp. 616 - 618
Questions 1 - 4

Titration

Acid Base chemistry as an analytic tool

Important lab experience before college

Titration & pH Calculation

Much like the dilution equation

$$M_{acid} \times V_{acid} = M_{base} \times V_{base}$$

Really this is Moles acid = Moles base

Titration

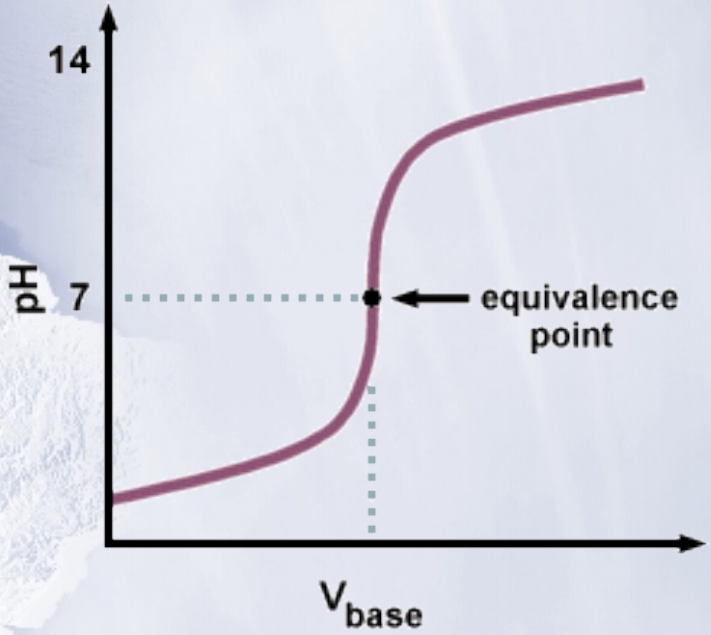
- Standard solution (this is given to you)
  - Known Molarity
- Find the volumes of an acid & base
- Add base or acid until “end point or equivalence point ” is achieved, a pH of 7 (moles acid = moles base)
- Two methods for determining a pH of 7
  - A color change using a chemical indicator
  - A pH meter show the pH change

See this lab example

titration example

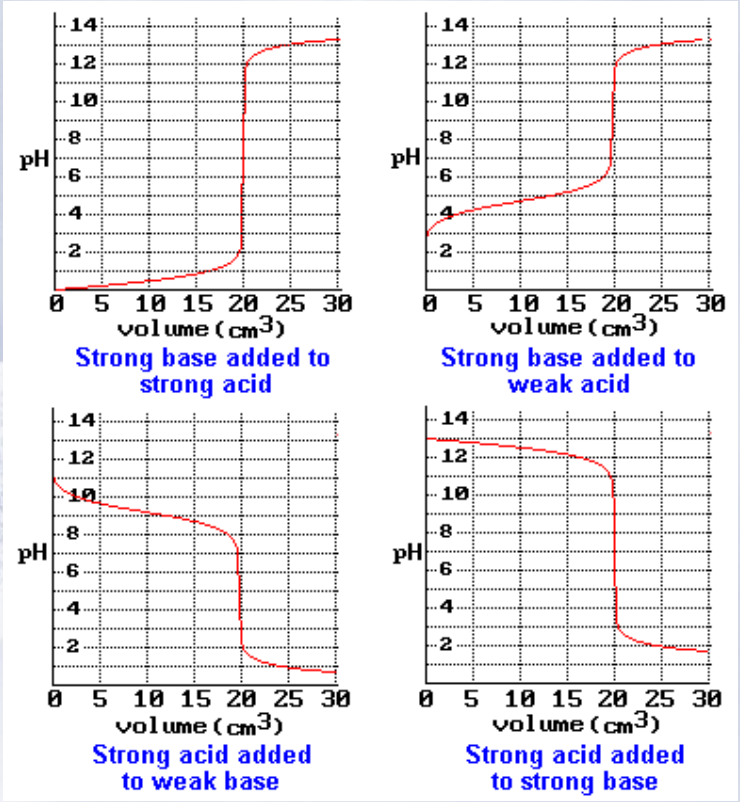
titration # 2

pH curves



End point equal moles of acid to equal moles of base

pH Curves


pH
14
12
10
8
6
4
2
0 5 10 15 20 25 30
volume (cm3)
Strong base added to strong acid
Strong base added to weak acid
Strong acid added to weak base
Strong acid added to strong base

Sample problem

What is the molarity of hydrochloric acid if 25.0 mL of the solution Is neutralized by 25.5 mL of 0.50 M KOH?

$M_b \times V_b = M_a \times V_a$

0.50 M x 25.5 mL = Ma x 25.0 mL

0.51 M

Find the concentration of acid

If 14.56 mL of 0.10 M NaOH is required to neutralize 20.5 mL of acetic acid (vinegar)

$M_b \times V_b = M_a \times V_a$

0.10 M NaOH x 14.56 mL = Ma x 20.5 mL

Ma = .071M