

Misc Tips and Info in solving acid-base buffer and titration problems:

1. Identify all information given in the problem. Re-write it if necessary.
2. Write the net ionic equation(s).
3. Calculate the moles of your acid and base. Use molarity and volume given in the problem.
4. Check the stoichiometry of the problem and use your knowledge of weak and strong acids/bases to see what you are working with. A couple of possibilities:
 - a. One reactant is in excess and the other is limiting. In this case, you would subtract the limiting from the excess.
 - b. Neither is in excess, all will be converted.
5. Calculate the total volume of the solution and the concentration(s) of the acid or base in solution.
6. Calculate the pH
7. Check your answer to see if it is reasonable.

Additional Tips and Info for Titration graphs:

1. $\text{pH} = \text{pK}_a$ at $\frac{1}{2}$ way point to equivalence / endpoint on the curve.
2. $V_1M_1 = V_2M_2$ when doing certain calculations.
3. Don't forget the H-H equation or that $K_w = K_a \times K_b = 1 \times 10^{-14}$
4. Use the table below for determining appropriate indicators for pKa's:

| Indicator | Color Change | pH Range | pKa |
|-------------------|-------------------|----------|-----|
| Bromphenol blue | yellow to blue | 3-4.5 | 4 |
| Bromcresol green | yellow to blue | 4-5 | 4.5 |
| Methyl red | red to yellow | 4.5-6 | 5 |
| Bromthymol blue | yellow to blue | 6-7.5 | 7 |
| Phenol red | yellow to red | 7-8 | 7.5 |
| Phenolphthalein | colorless to pink | 8-10 | 9 |
| Alizarin yellow R | yellow to red | 10-12 | 11 |