Ch. 17 Additional Aspects of Aqueous Equilibria Practice Problems

(Part 1)

1) What is the pH of a solution that is 0.50 M in propanoic acid and 0.40 M in sodium propanoate. (*Ka* for propanoic acid = 1.3 x 10-5)

 a) -4.98 b) 0.097 c) 0.47 d) 4.98 e) 4.79

2) A buffer solution is prepared that is 0.50 M in propanoic acid and 0.40 M in sodium propanoate with a solution volume of 1.00 liters. (*Ka* for propanoic acid = 1.3 x 10-5). What is the pH of the solution when 0.040 moles of HCl(g) is added to the solution? Assume no change in solution volume.

 a) 4.91 b) 4.87 c) 5.06 d) 4.78 e) 4.71

3) A buffer solution is prepared that is 0.50 M in propanoic acid and 0.40 M in sodium propanoate with a solution volume of 1.00 liters. (*Ka* for propanoic acid = 1.3 x 10-5). What is the pH of the solution when 0.060 moles of NaOH(s) is added to the solution? Assume no change in solution volume.

 a) 4.97 b) 4.91 c) 4.67 d) 4.77 e) 3.97

4) 80.0 mL of a buffer solution contains 0.169 M NH3 and 0.183 M NH4Cl. If you add 10.0 mL of 0.100 M HCl, what will be the pH? *Kb* = 1.81 x 10-5. Assume additive volumes.

 a) 9.161 b) 9.223 c) 7.908 d) 10.309 e) 8.985

5) 200.0 mL of 0.200 M HCl is titrated with 0.050 M NaOH. What is the pH after the addition of 100.0 mL of the NaOH solution? a) 0.93 b) 1.45 c) 1.03 d) 0.76 e) 0.82

6) A chemist desires to create a buffer solution beginning with 1.00 liter of 0.200 M NH3. How many moles of gaseous HCl must be introduced in order to produce a buffer of maximum capacity? (Assume no increase in solution volume.) \_\_\_\_\_\_\_\_\_\_\_

7) The graph shown below is a titration of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

a) weak acid with a strong base b) weak base with a strong base c) strong acid with a weak base

d) weak acid with a strong acid e) strong acid with a strong base



8) Suppose that 15.0 grams of Na2CO3 was added to a solution of H2CO3. What would happen to the pH of the solution? a) the pH would increase b) the pH would decrease c) the pH would be the same

 9) Suppose that NaOH is added to a solution of HC2H3O2. What would happen to the pH of the solution? a) the pH would increase b) the pH would decrease c) the pH would be the same

10) 25.0 mL of 3.0 M NaOH is titrated with 2.0 M HCl. What volume of HCl would be necessary to reach the equivalence point?