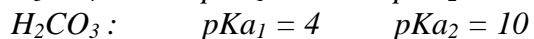


CH 302 Spring 2008 Worksheet 7

For all of the problems on this worksheet, use the following K values:

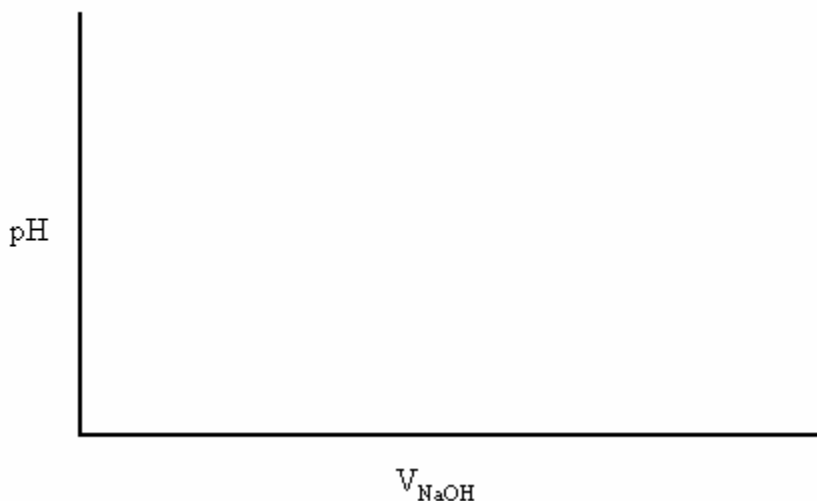


1. You drop 0.1 mol of KOH into 1 L of water. What is the pH of solution?
2. You drop 0.1 mol of KOH into a 1 L solution of 1 M H_3PO_4 and KH_2PO_4 . What is the pH of the solution?
3. You drop 0.1 mol of NaOH into a 1 L solution of 0.5 M $RbHCO_3$ and 0.5 M Na_2CO_3 . What is the pH of the solution?
4. You drop 0.5 mol of NaOH into a 1 L solution of 0.5 M $RbHCO_3$ and 0.5 M Na_2CO_3 . What is the pH of the solution?
5. You drop 1.0 mol of NaOH into a 1 L solution of 0.5 M $RbHCO_3$ and 0.5 M Na_2CO_3 . What is the pH of the solution?

For questions 6-13, 1.5 L 0.1 M H_3PO_4 is titrated with 1 M NaOH. Give the pH for the given amount of NaOH solution added to the H_3PO_4 solution.

	V_{NaOH}	pH
6.	0 mL	
7.	50 mL	
8.	150 mL	
9.	250 mL	
10.	300 mL	
11.	400 mL	
12.	450 mL	
13.	500 mL	

14. Sketch the titration curve for a triprotic acid such as H_3PO_4 and label the important areas including the end points and the places where $\text{pH} = \text{pK}$.



- 15 Place the numbers 6 through 13 on the curve indicating the area of the titration curve corresponding to the calculation.

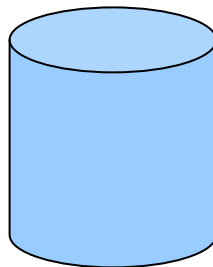
The 11 questions below represent the important areas of a triprotic acid titration curve. For each mixture, explain where you are on the curve after neutralization, provide the equation you would use for the calculation, and estimate the correct pH for the given mixture. **DON'T USE A CALCULATOR.** To guide you, draw the equilibrium species essential to determining the pH in the beaker provided (AFTER NEUTRALIZATION.) Hints: Assume there are no K_w contribution in the calculations use these numbers a lot: *Phosphoric acid values: $\text{pK}_{a1} = 2$ $\text{pK}_{a2} = 6$ $\text{pK}_{a3} = 10$*

16. 1M HCl and 1 M H_3PO_4

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____

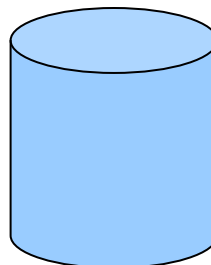


17. 1 M H_3PO_4

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____

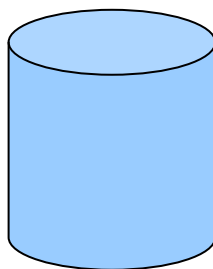


18. 1M H₃PO₄ and 1 M NaH₂PO₄

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____

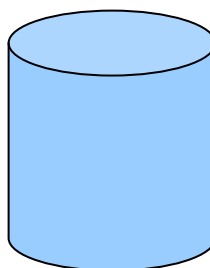


19. 1M H₃PO₄, 1 M NaH₂PO₄ and .002M NaOH

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____

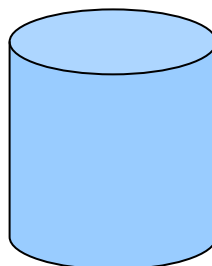


20. 1 M NaH₂PO₄

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____

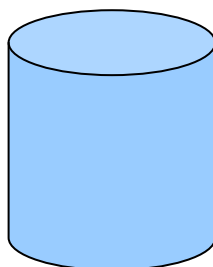


21. 1 M NaH₂PO₄ and 1M Li₂HPO₄

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____

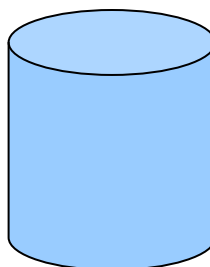


22. 1 M NaH₂PO₄, Li₂HPO₄ and 0.002 HCl

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____

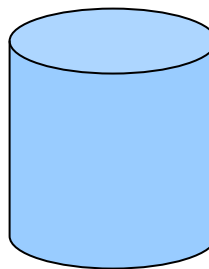


23. 1M Li_2HPO_4

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____

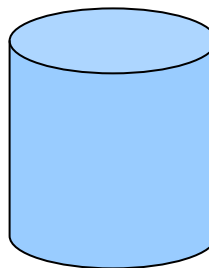


24. 1M Li_2HPO_4 and 1M NaLiRbPO_4

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____

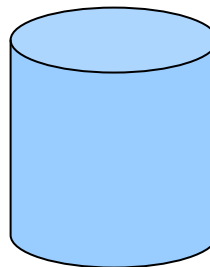


25. 1M Li_2HPO_4 and 1M NaLiRbPO_4 and .002M NaOH

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____

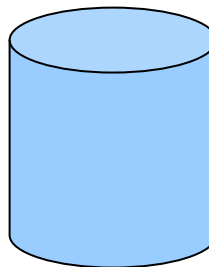


26. 1M NaLiRbPO_4

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____



27. 1M NaLiRbPO_4 and 1M NaOH

Where are you on a titration curve? _____

Equation used to determine the pH. _____

Estimated pH. _____

